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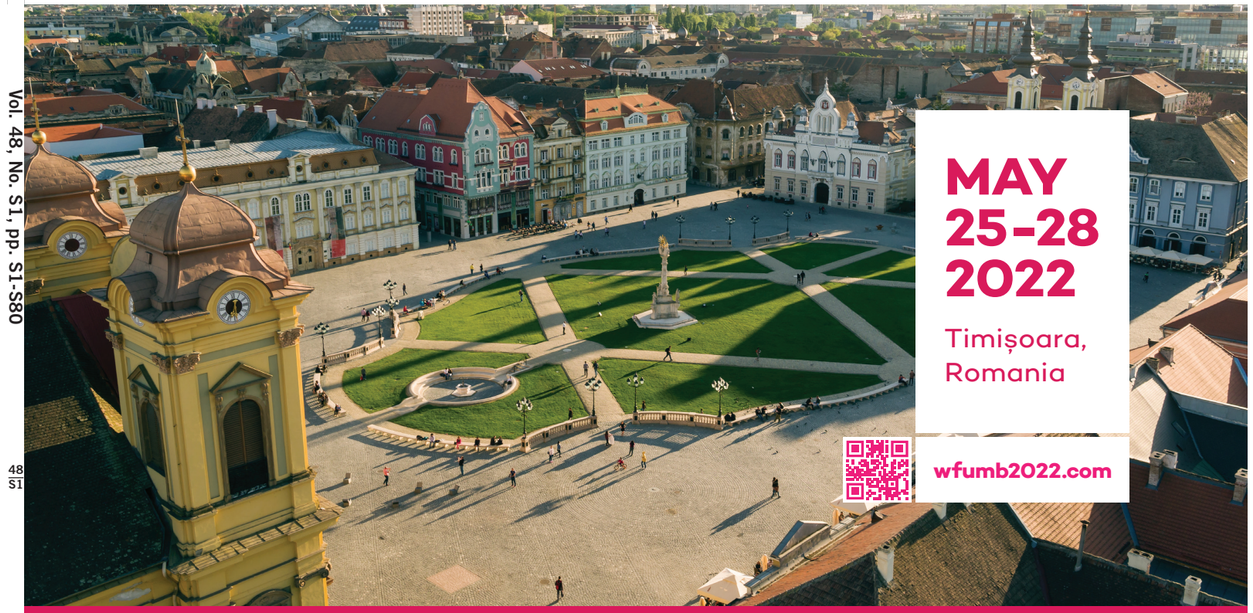

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Ultrasound in Medicine and Biology is the official journal of the World Federation for Ultrasound in Medicine and Biology. The journal publishes original contributions that demonstrate a novel application of an existing ultrasound technology in clinical diagnostic, interventional and therapeutic applications, new and improved clinical techniques, the physics, engineering and technology of ultrasound in medicine and biology, and the interactions between ultrasound and biological systems, including bioeffects. Papers that simply utilize standard diagnostic ultrasound as a measuring tool will be considered out of scope. Extended critical reviews of subjects of contemporary interest in the field are also published, in addition to occasional editorial articles, clinical and technical notes, book reviews, letters to the editor and a calendar of forthcoming meetings. It is the aim of the journal fully to meet the information and publication requirements of the clinicians, scientists, engineers and other professionals who constitute the biomedical ultrasonic community.

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ORAL PRESENTATIONS

OP.01

LUNG ULTRASOUND IN OUTPATIENTS WITH COVID-19 INFECTION ASSOCIATED PNEUMONIA

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Objectives: The method of lung ultrasound (LUS) has been known for more than 20 years, but attracted attention during the epidemic of COVID-19 infection. LUS safe and low cost method assisting in the diagnosis of some acute respiratory diseases. The aim of the study is to evaluate the possibility of detecting LUS features using a 12-zone protocol in outpatients with pneumonia associated with COVID-19 infection.
Materials: We examined 39 outpatients with diagnostic criteria for COVID-19 infection (17 men and 22 women) aged 31-75 years (median 49 years). The SARS-CoV-2 reverse transcriptase polymerase chain reaction obtained from the oropharynx or nasopharynx according to WHO standards was performed in all patients. All patients underwent LUS immediately after computer tomography (CT) scan by a blinded specialist. LUS score was calculated according to presence and severity of abnormalities for 12 zones (maximum 36 points). Correlation analysis of the results of quantitative assessment was performed. We also calculated the diagnostic accuracy for LUS using CT as a reference for diagnosing interstitial abnormalities in COVID-19 pneumonia.
Results: CT diagnosis of pneumonia was found in 25 patients (64%; 95% CI 47-79). Ultrasounds abnormalities were detected in 31 patients, the most common were focal areas of nonconfluent B-lines, diffuse confluent B-lines, subpleural microconsolidations and in one case large parenchymal consolidations with air bronchograms. LUS false positive results were found in nonviral interstitial lung diseases and in one due chronic heart failure (in all cases LUS score=2). When evaluating the LUS, the optimal sensitivity/specificity cut-off was $\geq$2 points, the area under the curve (AUC) = 0.970 (95% CI 0.858-0.999; p <0.0001). The score of lung ultrasound significantly correlated with the quantitative assessment on CT scan (r = 0.928, p <0.001).
Conclusions: LUS has excellent diagnostic accuracy for interstitial abnormalities in COVID-19 pneumonia in outpatients with disease mild and moderate grade. The results obtained are probably due to the typical localization of interstitial abnormalities in the lungs in COVID-19. LUS could represent a valid diagnostic aid in setting of a significant number of admitting patients.
Keywords: lung ultrasound, COVID-19, point-of-care ultrasonography.

OP 02

ACCELERATING COVID-19 DIFFERENTIAL DIAGNOSISWITH EXPLAINABLE ULTRASOUND IMAGE ANALYSIS: AN AI TOOL

Charlotte Buhre,[1] Jannis Born,[2] Nina Wiedemann,[2] Manuel Cossio,[3] Gabriel Brändle,[4] Konstantin Leidermann,[5] Avinash Aujayeb,[6] Bastian Rieck,[2,7] Karsten Bogwardt[7]
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Objectives: Lung ultrasound with an artificial intelligence (AI) application provides a low-cost, non-invasive diagnostic that can play a supporting role in diagnosing COVID-19, especially in areas without PCR/CT access. [1][2] Especially throughout the COVID-19 pandemic fast, safe and highly sensitive diagnostic tools are crucial. [3] The goal of this work was twofold: 1. create a publicly available dataset of lung ultrasound images/videos and 2. train an AI algorithm to detect and classify COVID-19 on lung ultrasound images and videos.
Materials: The largest publicly available COVID-19 lung ultrasound dataset was created from a variety of sources, with > 200 videos and > 50 images. The dataset is heterogeneous, mostly acquired with a convex transducer and according to BLUE protocol. Using available additional patient information, lung ultrasound images in the dataset were categorized as COVID-19, bacterial pneumonia, other viral pneumonia, and healthy. In addition, two independent reviewers evaluated the visible pathologies in the lung ultrasound images. On the dataset, an in-depth study of deep learning methods for differential diagnosis of lung pathologies was performed.
Results: In the COVID-19 ultrasound images and videos lung ultrasound signs of a nonspecific pneuomia (fragmented pleural lines, B-lines, (subpleural) consolidations, aero bronchograms and pleural effusions) were visible.The frame-based model correctly distinguished COVID-19 lung ultrasound images from healthy and bacterial pneumonia with a sensitivity of 0.90 $\pm$ 0.08 and a specificity of 0.96 $\pm$ 0.04.
Conclusions: Our work shows promising results of AI application in the field of lung sonography using COVID-19 as an example. Currently, the AI model is in the clinical trial phase. The data set as well as the code for the CNN are publicly available: https://github.com/BorgwardtLab/covid19_ultrasound. The provided dataset facilitates the validation of lung ultrasound based neural networks to develop fast, accessible screening methods for pulmonary diseases.
Keywords: computer vision, convolutional neural network, COVID-19, deep learning, interpretability, pneumonia, lung imaging, machine learning, medical imaging, ultrasound, supervised learning.

References

1. Stewart, K.A., Navarro, S.M., Kambala, S., Tan, G., Poondla, R., Lederman, S.; Barbour, K.; Lavy, C. Trends in Ultrasound Use in Low and Middle Income Countries: A Systematic Review. Int. J. 2020, 9, 103–120.
2. Fiala, M. J. Ultrasound in COVID-19: a timeline of ultrasound findings in relation to CT. Clin Radiol. 2020 Jul; 75(7): 553-554.
3. Schmid, M., Escher, F., Clevert, D. A. (2020). Sonographische Bildgebung der Lunge bei COVID-19 [Lung ultrasonography in COVID-19 pneumonia]. Der Radiologe. 2020; 60(10), 919–926.

OP 03

HEAD-TO-HEAD COMPARISON OF PERFLUOROBUTANE-CEUS AND MULTIPARAMETRIC-MRI FOR BREAST LESIONS: A PROSPECTIVE, MULTICENTER STUDY

Manlin Lang
Chinese PLA General Hospital, Department of Interventional Ultrasound, Beijing, China

Objectives: To evaluate whether the diagnostic performance of Perfluorobutane (PFB)-contrast enhanced ultrasound (CEUS) is not inferior to Multiparametric(MP)-MRI in the differentiation of breast cancer from noncancer.
Materials: In this head-to-head, prospective study from August 2020 to February 2021, patients with newly-diagnosis breast lesions by conventional US as Breast Imaging Reporting and Data System (BI-RADS) 3, 4, 5 categories across 17 centers were included and underwent both CEUS and MRI scan. BI-RADS of CEUS and MRI were categorized by the operators on-site and three reviewers, respectively. Logistic-bootstrap 1000 samples analysis was used to construct CEUS, MRI and hybrid (CEUS+MRI) models to distinguish breast cancer.
Results: 179 women were evaluated with a total 186 breast lesions (117 malignancies). The area under the receiver operating characteristic curve (AUC) of CEUS (0.86; 95% confidence interval[CI]: 0.70, 0.95) was comparable to that of MRI (0.86; 95% CI: 0.71, 0.96) model, while both were inferior to hybrid model(0.92, 95% CI: 0.77, 0.98). CEUS model showed higher sensitivity than MRI (95.4% vs 76.9%, P=.008) for patients >50-year-old, while no sensitivity and specificity difference with MRI in tumor size, enhancement type and breast density subgroups (P>0.05 for all).In BI-RADS 4A+ lesions, the sensitivity of CEUS and MRI on-site radiologists improved moderately(2.6% and 1.7%), while the specificity improved 21.1% and 28.1% by using hybrid model, respectively; and the false-positive identified rates of CEUS, MRI and hydrid model for on-site radiologists were 80.6%, 77.8%, and 90.3%, respectively.
Conclusions: The proposed model of PFB-CEUS can potentially deliver efficient and accurate diagnoses as that of MP-MRI, and they jointly could provide better support for clinical decision-making of breast lesions.
Keywords: breast, contrast-enhanced ultrasound, Multiparametric-MRI.

OP 04

SELECTING PATIENTS FOR EMBOLIZATION OF VARICOCELES BASED ON ULTRASONOGRAPHY

Izabela Dąbrowska,[1] Łukasz Światłowski,[1] Krzysztof Pyra,[1] Tomasz Jargiełło,[1] Agata Zarajczyk,[2] i Maria Materek[2]
[1] Department of Interventional Radiology and Neuroradiology, Medical University of Lublin, Lublin, Poland, [2] Students Scientific Society at the Department of Interventional Radiology and NeuroradiologyPurpose

Objectives: The aim of the study was to assess diagnostic usefulness of color Doppler ultrasound examination in patients with suspected varicoceles.
Methods: 131 patients with suspected varicoceles underwent an ultrasound examination in the Department of Interventional Radiology and Neuroradiology in Lublin, Poland. Each ultrasound examination was performed using the Logiq 7 GE Medical System with linear probe at 6-12 MHz using the B-mode and color Doppler functions. The study was performed in both the supine and standing position of the patient. The morphological structures of the scrotum and the width of the pampiniform venous plexus were assessed. Based on clinical symptoms and ultrasound findings, the patients were selected for endovascular treatment.
Results: Varicoceles were confirmed in all patients during ultrasound examination using color Doppler function, 86 of them were qualified for endovascular treatment. Diagnostic venography confirmed venous stasis or retrograde flow in the testicular vein and widened vessels of the pampiniform venous plexus over 2 mm in diameter in all patients undergoing endovascular treatment. The diagnostic efficacy of ultrasound examination was 100%.
Conclusions: Ultrasound examination is the method of choice in qualifying patients with varicoceles for embolization. Color Doppler mode/function is the most sensitive non-invasive technique enabling identification of varicoceles.
Keywords: varicocele, ultrasonography, embolisation.

OP 05

LIVER STIFFNESS AS ASSESSED BY TWO-DIMENSIONAL SHEAR WAVE ELASTOGRAPHY IS ASSOCIATED WITH ADVERSE CLINICAL OUTCOMES OF PATIENTS WITH COMPENSATED CHRONIC LIVER DISEASE

Kristian Podrug,[1] Marko Lucijanic,[2] Ida Tjesic Drinkovic,[3] Tonci Bozin,[3] Tomislav Bokun,[3] Ivica Grgurevic[3,4]
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Objectives: Previous studies revealed liver stiffness as the important prognostic factor among the patients with compensated advanced chronic liver disease (cACLD). The aim of this study was to evaluate potential impact of liver stiffness measurements (LSM) and spleen stiffness measurements (SSM) by using two-dimensional shear wave elastography (2DSWE) on the outcomes across the entire spectrum (not only advanced) of compensated chronic liver disease (CCLD).
Materials: We conducted a database search for patients with chronic liver disease (compensated, with any stage of fibrosis) who underwent LSM and/or SSM by using 2DSWE (Aixplorer® ultrasound system) between 2011 and 2015, whose clinical outcomes including liver decompensation, HCC development, liver transplantation or death could have been traced up to the end of 2018. Patients with biliary obstruction, congestive heart failure, ALT>5xULN, current or previous malignant disease, as well as the patients with current or previous liver decompensation were excluded from the study.
Results: In total 328 patients were analyzed (61.6% males, median age 56 years, IQR (42-64), hepatitis B/C 18%, NAFLD 16.8%, alcoholic liver disease 11.3%, other etiology 23.6%, unknown etiology 30.5%). Median LSM (N=328 pts) was 8 kPa, IQR (6.5-14), and median SSM (N=102 pts) was 25 kPa, IQR (19-30). Median follow up was 53 months. Patients with LSM>9.9 kPa and >13 kPa had inferior overall survival (HR=5.39; P<0.001) and shorter time to the first complication (HR=45.64; P<0.001), respectively. In multivariate survival analysis adjusted for age, gender, etiology and comorbidities, LSM >9.9 kPa (HR=2.65, P=0.005), age (HR=1.06; P<0.001) and alcoholic etiology (HR=2.59; P=0.009) remained independently associated with inferior survival. Patients with SSM>26 kPa and >20.4 kPa had inferior overall survival (HR=3.86; P<0.001) and shorter time to the first

complication (HR=3.23; P=0.026), respectively. In multivariate survival analysis adjusted for age, gender, etiology and comorbidities SSM lost its prognostic properties. Accordingly, LSM (HR=4.86; P=0.019), but not SSM (P=0.187) remained associated with inferior overall survival in multivariate setting.
Conclusions: LSM>9.9 kPa measured by 2DSWE can identify patients with CCLD at risk of shorter survival. This LSM cut-off corresponds to the cut-off used by transient elastography to discriminate patients according to the presence of cACLD.
Keywords: Transient elastography, Liver stiffness measurement, Spleen stiffness measurement, Chronic liver disease, Survival, Prognosis.

OP 06

PERFORMANCE OF P-SWE AND 2D-SWE WITH THREE PROBES FROM A NEW ULTRASOUND MACHINE FOR THE PREDICTION OF ADVANCED LIVER FIBROSIS USING TRANSIENT ELASTOGRAPHY AS A REFERENCE METHOD

Ioan Sporea,[1,2] Raluca Lupusoru,[1,2,3] Roxana Sirli,[1,2] Felix Bende,[1,2] Alexandru Popa,[1,2] Radu Cotrau,[1,2] Alina Popescu[1,2]
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Objectives: The aim of this study was to assess the performance and optimal cut-off points for p-SWE and 2D-SWE for the non-invasive assessment of advanced liver fibrosis, using transient elastography as a reference method.
Materials: Siemens ACUSON Sequoia (5C-1 convex transducer and Deep Abdominal Transducer-DAX) and FibroScan Compact M 530 (M and XL probes) were used. We included 198 consecutive patients with or without chronic liver disease that had all five LS values available. LS was evaluated in the same session by 3 elastographic techniques: TE, p-SWE and 2D-SWE. Reliable measurements were defined as the median value of 10 measurements and an IQR/M<0.3. For cACLD, the transient elastography cut-off point of 9.5 kPa was used [1].
Results: From the 198 patients, 41.5% were women and 58.5% were men, mean age 54.8 ±13.8 years. The best cut-off values cACLD were: for 2D-SWE- 5C1 probe:>8.8 kPa, Se=97.7%, Sp=38.6%, AUC=0.84, p<0.0001;DAX probe:>7.6 kPa, Se= 40.9%, Sp=99.9%, AUC=0.84, p<0.0001; ForpSWE- 5C1 probe: >9.1 kPa, Se=54.5%, Sp=97.7%, AUC=0.86, p<0.0001; DAXprobe: > 8.8 kPa, Se=50%, Sp=98.5%, AUC=0.88, p<0.0001.
Conclusions: The best cut-off value for predicting cACLD in pSWE range between 8.8 kPa and 9.1 kPa and for 2D-SWE raged between 7.6 kPa and 8.8 kPa.
Keywords: Liver elastography, cACLD- compensated advanced chronic liver disease.

References

1. Tsochatzis EA, Gurusamy KS, Ntaoula S, Cholongitas E, Davidson BR, Burroughs AK. Elastography for the diagnosis of severity of fibrosis in chronic liver disease: a meta-analysis of diagnostic accuracy. J Hepatol. 2011 Apr;54(4):650-9. doi: 10.1016/j.jhep.2010.07.033. Epub 2010 Sep 24. PMID: 21146892.

OP 07

FACTORS AFFECTING ASSESSMENT OF LIVER STEATOSIS WITH QUANTITATIVE ULTRASOUND

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Objectives: We aim to observe the diagnostic performance of quantitative ultrasound and their factors affecting assessment of liver steatosis with tissue attenuation imaging (TAI), and tissue scatter distribution imaging (TSI) in patients with non-alcoholic fatty liver disease (NAFLD).
Materials: We performed liver TAI, TSI ultrasound measurements with Samsung RS85 Prestige ultrasound system and prospectively enrolled 101 participants with suspected NAFLD. As a reference, magnetic resonance imaging proton-density-fat-fraction (MRI-PDFF) was performed, and patients were divided into ≤5%, 5%-10%, and ≥10% of MRI-PDFF groups. Kruskal-Wallis test with post-hoc Dunn's test was used to compare the TAI and TSI values between the three steatosis groups. Spearman's correlation analysis was used to determine correlation between TAI, TSI, and MRI-PDFF. Simple and multiple linear regression analysis were performed to identify independent predictors. The diagnostic performance of TAI, TSI was interpreted with area under the receiver operating characteristic curve (AUC). The intraclass correlation coefficient (ICC) was calculated to assess interobserver reliability.
Results: Kruskal-Wallis test showed significant difference between both steatosis groups (p<0.0001). Both TAI (ρ=0.78, p<0.001) and TSI (ρ=0.68, p<0.001) showed significant correlation with MRI-PDFF. MRI-PDFF proved to be an independent predictor of TAI (β=1.03; p<0.001), while both MRI-PDFF (β=50.9; p<0.001) and liver stiffness measures with shear wave elastography (β=-0.86; p<0.001) were independent predictors of TSI when adjusted for body mass index and liver capsule-to-skin distance. TAI overperformed TSI in the detection of both ≥5% MRI-PDFF (AUC=0.89 vs. 0.87) and ≥10% (AUC=0.93 vs. 0.86). Interobserver correlation analysis showed excellent reproducibility of TAI (ICC=0.95) and moderate reproducibility of TSI (ICC=0.73).
Conclusions: In a linear regression analysis MRI-PDFF was a significant independent predictor of both TAI and TSI while liver stiffness had weak but significant influence on TSI. Both TAI and TSI were reproducible methods for diagnosing fatty liver disease.
Keywords: Ultrasonography, Quantitative imaging, Non-alcoholic fatty liver disease, Liver.

OP.08

CLINICAL EVALUATION OF VISCOELASTICITY MEASUREMENTS BY SHEAR WAVE ELASTOGRAPHY IN HEALTHY AND CHRONIC LIVER DISEASE SUBJECTS

Roxana Sirli,[1,2] Alexandru Popa,[1,2] Alina Popescu,[1,2] Felix Bende,[1,2] Renata Fofiu,[1,2] Victor Baldea,[1,2] Radu Cotrau,[1,2] Camelia Foncea,[1,2] Ariana Pascu,[1,2] Ioan Sporea[1,2]

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Objectives: Liver fibrosis is the most significant prognostic factor in chronic liver disease (CLD). Clinical practice guidelines recommend the use of non-invasive techniques, such as two-dimensional shear-wave elastography (2D-SWE), to assess liver elasticity as a marker of fibrosis. It is presumed that changes due to necro-inflammation modify the propagation of shear waves [1]. Therefore, new imaging techniques that investigate the dispersion properties of shear waves have been developed, which can serve as an indirect method of measuring liver viscosity (Vi PLUS). This study aims to analyze the performance of SWE to assess viscosity, to analyze factors influencing Vi PLUS measurements in a large cohort of patients with CLD, and to assess the normal ranges of liver viscosity measurements in participants with healthy livers.
Materials: 867 consecutive adult subjects were enrolled in this prospective study (199 with healthy livers and 668 with CLD). Subjects were first examined using the Supersonic MACH® 30 US system (Hologic® SuperSonic® Imagine, Aix-en-Provence, France). Gray-scale US, as well as 2D-SWE and Vi PLUS measurements were performed. Secondly, TE measurements were performed with a FibroScan® Compact 530 device (EchoSens®, Paris, France).
Results: The mean Vi PLUS values in normal, ALD, HBV, HCV, NAFLD patients were: 1.6±0.3 Pa·s, 2.8±0.8 Pa·s, 1.9±0.3 Pa·s, 2.1±0.5 Pa·s and 2±0.4 Pa·s respectively (table 1). The mean Vi PLUS values were significantly higher in subjects with chronic liver disease than in normal subjects, independent of the etiology ($p>0.05$). Mean Vi PLUS values were significantly higher in subjects with ALD compared to HCV ($p<0.0001$), HBV ($p<0.0001$) and NAFLD subjects ($p<0.0001$); significantly higher in subjects with HCV compared to HBV ($p=0.0001$) and NAFLD subjects ($p=0.011$). No significant differences were found between HBV and NAFLD subjects ($p=0.0615$).

In univariate regression analysis, Vi PLUS measurements were independently associated with: BMI ($p<0.001$), abdominal circumference ($p<0.001$), age ($p<0.001$), AST ($p<0.001$), ALT ($p=0.009$), the presence of diabetes mellitus ($p<0.0001$) and the presence of arterial hypertension ($p<0.001$). In multiple regression analysis the model including: abdominal circumference ($p<0.0001$), AST ($p<0.0001$) and ALT values ($p=0.0029$) was associated with ViPLUS measurements.
Conclusions: Vi PLUS and 2D-SWE by SSI are highly feasible methods. The mean liver viscosity determined by Vi PLUS in our cohort of participants with healthy livers was 1.69 Pa·s. CLD patients had significantly higher viscosity values. Increased liver stiffness, high transaminases and obesity were associated with high viscosity values.
Keywords: Viscosity, Inflammation, Non-invasive techniques.

References

1 Sugimoto, K.; Moriyasu, F.; Oshiro, H.; Takeuchi, H.; Yoshimasu, Y.; Kasai, Y.; Itoi, T. Clinical utilization of shear wave dispersion imaging in diffuse liver disease. Ultrason. (Seoul, Korea) 2020, 39, 3−10, doi:10.14366/usg.19031.

OP 09

ECHOCARDIOGRAPHYC FINDINGS IN A CHRONIC KIDNEY DISEASE COHORT

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Objectives: Left ventricular hypertrophy (LVH) is the main manifestation of uremic cardiomyopathy and may contribute to the onset of extensive cardiovascular diseases in chronic kidney disease (CKD) patients. Although anemia in patients with CKD is caused by decreased production of erythropoietin in parallel with the decrease in the number of nephrons, it may also hasten the decline in eGFR and determine the occurrence and progression of LVH. Diastolic dysfunction is still an underinvestigated “matter of the heart” in CKD population. We aimed to evaluate several cardiovascular risk factors in CKD patients.
Materials: The study included a cohort of 142 patients with CKD (eGFR <60ml/min/1, 73m2). They were examined by standard echocardiography and blood chemistry at baseline. LVMi was measured according to the ASE guidelines, and was defined as LVMi >130 g/m in males, and LVMi >100 g/m in females. We divided them in 4 groups based on eGRF according to CKD stages 3 to 5D, where 5D patients have hemodialysis age < 3months. For statistical analysis we used Kruskall-Wallis for non-parametric data, t-Student for unequal variances, Correlation and Multiple regression analysis.
Results: Overall prevalence of LVH was 70% and renal function (estimated by eGRF mean) was worse in CKD patients with LVH vs. CKD patients with no LVH ($p=0.02$). Concentric hypertrophy was the prevalent type of LVH in our study (68%). Multiple regression was performed using eGRF as the dependent variable and LVMi, hemoglobin, diastolic dysfunction, age, body surface area (BSA) and albuminuria as independent variables. Anemia and LVMi were the most important risk factors for CKD progresion ($p<0.0001$), diastolic dysfunction was also predictor of eGFR decline ($p=0.001$), meanwhile age, BSA and albuminuria had no prognostic value. Diastolic dysfunction was present in 63% patients and correlated directly with eGFR decline (rho Spearman=0.248, $p=0.037$).
Conclusions: Pressure overload is main factor for increased LVMi in early stages of CKD. Even if role of albuminuria in CKD is important in predicting cardiovascular risk the fact that it didn’t correlate with eGFR in our study means that we may have had other determinants of albuminuria implicated along with renal function decline.
Keywords: echocardiography, chronic kidney disease, left ventricular hypertrophy, diastolic disfunction.

OP 10

LEFT ATRIAL DYSFUNCTION BY SPECKLE TRACKING ECHOCARDIOGRAPHY IN YOUNG SUBJECTS WITH HIV INFECTION

Oana Mirea,[1] Ionut Donoiu,[1] Mirela Manescu,[2] Florentina Dumitrescu,[3] Octavian Istratoaie,[1] Constantin Militaru[1]
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Objectives: Despite effective antiviral treatment, the rate of acute cardiac events remains high in subjects with HIV. Left atrium strain (LAS) was shown to be an independent predictor of cardiovascular events in the general population. Therefore, the aim of this study was to investigate whether left atrial (LA) strain has incremental value over conventional echocardiographic parameters to identify HIV subjects with subclinical cardiac disease.
Materials: We prospectively included 100 young patients (mean age 31.3±4.8; 60 males) with acquired HIV (mean interval from diagnosis 18 ± 9 years) and 80 healthy volunteers matched by age and gender. Echocardiography was performed using a Vivid iQ machine (GE Healthcare). Left ventricular (LV) and LA conventional measurements were obtained according to current recommendations. LA strain during the reservoir (LASr) phase was calculated using a dedicated tracking tool (EchoPac v 20.4).
Results: The treatment protocol included reverse-transcriptase inhibitors (RTIs) (40%), a combination of RTIs with non-nucleoside reverse transcriptase inhibitors (NNRTIs) (25%), a combination of RTIs with HIV protease inhibitors (20%), or a combination of RTIs with HIV integrase inhibitors (15%). No significant difference in LV ejection fraction between the groups was found (57±6 vs. 59±7, p=0.15). Subjects with HIV had higher LV mass (78±19 vs. 68±15, p< 0.001) and E/E' ratio (6±2 vs. 5±1, p< 0.01). While LA volume showed similar values (38 ±11ml vs 41 ±12 ml, p=0.14), LASr was significantly reduced in patients with HIV compared to healthy subjects (33±8 vs. 38±7, p < 0.001). In multivariate analysis, LASr was independently associated with age (p=0.01) and years since HIV diagnosis (p=0.03). The choice of treatment protocol did not influence LA strain (p=0.16).
Conclusions: In our study, both groups had similar LA volumes according to measurements derived from conventional echocardiography, while 2D-STE measurements proved a significantly reduced LA strain during the reservoir phase in patients with HIV compared to healthy volunteers. Our study shows evidence that LA strain is impaired in young asymptomatic subjects with HIV, prior to conventional echocardiographic measurements and the measurement could be useful in the detection of subjects at risk for developing heart failure.
Keywords: speckle tracking echocardiography, HIV, left atrium.

OP11

SHEAR-WAVE ELASTOGRAPHY VERSUS STRAIN ELASTOGRAPHY WITH HISTOGRAM ANALYSIS IN SOLID PANCREATIC LESIONS: A PILOT STUDY.

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Objectives: Strain elastography histogram endoscopic ultrasound (SH) has been proved as a valuable supplement to endoscopic ultrasound (EUS) in assessing solid pancreatic lesions, with sensitivity of 98% and specificity of 63%. However, the value of newly available shear wave EUS elastography (EUS-SWM) has been disappointing in one retrospective study. The aim of the study was to assess the diagnostic value of SH and EUS-SWM in solid pancreatic lesions.
Materials: Our prospective study was started in August 2021 in one tertiary medical center and we recruited patients with solid pancreatic masses> 2 cm in diameter at CT scan for EUS assessment first with strain histogram (SH) (3 measurements), followed by EUS-SWM (3 measurements with VsN>20). Patients with inconclusive pathology results were excluded. The final diagnosis was based on surgery or EUS tissue acquisition results.
Results: 37 patients with solid pancreatic lesions were evaluated. The final diagnosis was 26 pancreatic adenocarcinomas, 2 neuroendocrine pancreatic tumours (NETs). Nine patients (24,32%) were excluded because of inconclusive biopsy results or other kind of lesions. The mean value of SH for pancreatic adenocarcinoma was 35,93 and for NETs 38,83 (p<0,05). The mean values of EUS-SWM were 45,86kPa for pancreatic adenocarcinomas and 20,59kPa (p<0,05).
Conclusions: In this prospective study we found a significant difference between SH and EUS-SWM in differentiating pancreatic adenocarcinomas and NETs. Semiquantitative assessment by strain ratio was higher in neuroendocrine tumors compared with pancreatic adenocarcinoma, which was discordant compared to the results of shear-wave. Further research is needed in this topic with a larger database in order to face the challenges in standardizing the EUS-SWM procedure in pancreatic lesions.
Keywords: EUS, endoscopic ultrasound elastography (EUS-EG), shear-wave, strain-histogram (SH), EUS-SWM, solid pancreatic tumor.

OP.12

THE ROLE OF DYNAMIC CONTRAST HARMONIC IMAGING ENDOSCOPIC ULTRASOUND (CHI-EUS) AND CD105 AND CD31 IMMUNOSTAINING IN TUMOR ANGIOGENESIS ASSESSMENT ON PATIENTS WITH GASTRIC CANCER – A FEASIBILITY STUDY

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Objectives: Angiogenesis is a critical process for tumor growth and metastasis, it is now considered an important marker of disease prognosis and sensitivity to anticancer therapy. However, gastric cancer (GC) studies are rather scarce. CHI-EUS was proposed in this study as a useful method to assess GC vascularization patterns.
Materials: Patients initially diagnosed with GC, only adenocarcinoma type, who subsequently performed CHI-EUS examinations before any treatment decision, were included in this study. Dedicated software named Vuebox (Bracco Imaging S.p.A., Milan, Italy) was used to quantitatively evaluate angiogenesis in the chosen regions of interest (ROI). As a result, this software generated automatically parameters derived from time-intensity curve (TIC) like peak enhancement (PE), rise time (RT), time to peak (TTP), wash in perfusion index (WiPI), ROI area, and others were compared to immunohistopathological data. CD105 and CD31 immunostaining was performed to calculate the vascular diameter (vd) and the microvascular density (MVD). The final results were compared with CHI-EUS parameters.
Results: A total of eighty CHI-EUS video sequences were assessed. Multiple high statistical correlations (p<0.05) were highlighted between TIC analysis parameters, MVD, and vd CD31. Also, strong correlations were found between tumor grade and CHI-EUS parameters, p<0.005. Differences in TIC parameters and immunohistochemical markers between the group of patients without (M0) versus the group with (M1) metastasis were noted.
Conclusions: Our study demonstrated that GC angiogenesis assessed by CHI-EUS was a feasible method and may be considered for future studies based on TIC analysis.
Keywords: CHI-EUS, angiogenesis, gastric cancer.

OP.13

LIVER LESION SEGMENTATION IN CONTRAST-ENHANCED ULTRASOUND USING DEEP LEARNING ALGORITHMS

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Objectives: Liver tumor visualization in ultrasound can be of great importance for the diagnosis of malignancy, being operator and patient dependent. Deep learning neural networks can greatly decrease variability and provide better diagnosis. Our aim was to develop a flexible, fast and reliable system to consistently identify liver lesions in ultrasound recordings.

Materials: We used 50 uncompressed video recordings of contrast-enhanced ultrasound (CEUS) investigations in which we defined and extracted the B-mode region in all frames. A senior gastroenterologist with over 20 years of experience in US interpretation (LS) then manually segmented the lesions in each frame. The resulting dataset included the B-mode images and their corresponding masks. The purpose of the deep learning algorithm used in this study was to perform segmentation of the CEUS video examination to identify the lesions. We used a version of U-Net with a tensor size of 256x256. U-Net contained an encoder which decreased the resolution and increased the depth to capture the context. The resulting model had a total of 412,865 trainable parameters.

Results: We trained the U-Net model for 50 epochs with a batch size of 8, using the Adam optimizer that could find individual learning rates for each parameter. We randomly divided the dataset into 70% for training, 20% for testing and 10% for validation. We measured the performance of the model, using Intersection over Union (IoU), recall and precision, obtaining an IoU = 0.7, recall = 0.76 and precision = 0.86.

Conclusions: Image segmentation is a computer vision technique in which for each pixel in an image a corresponding label is assigned. Performing image segmentation on B-mode ultrasound in a CEUS investigation is a challenging task due to many external factors such as patient or probe movement. Our model obtained high precision values, having the ability of class separation and learning the contour of liver lesions.

Keywords: Deep learning neural networks, liver, ultrasound.

OP.14

DIAGNOSTIC ACCURACY OF CONTRAST ENHANCED ULTRASOUND (CEUS) IN HEPATO-CELLULAR CARCINOMA BY USING LI- RADS V2017 AND ANCILLARY FEATURES

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Objectives: Hepatocellular carcinoma (HCC) is one of the neoplasms with a growing incidence. Only a limited number of studies evaluated the diagnostic performance of CEUS LI-RADS. Clinical utility of ancillary features (AFs) in CEUS LI-RADS is yet to be established. We assessed the diagnostic yield of CEUS LI-RADS and AFs in HCC. To our knowledge, this is the first blind study of CEUS application in assessing focal liver lesions (FLL) by using the LI-RADS algorithm and AFs.

Materials: We retrospectively included patients with risk factors for HCC with newly diagnosed FLL, hospitalized between January 2016 and December 2019 in the Gastroenterology Department of Emergency County Hospital of Craiova, Romania. All lesions have been categorized according to the CEUS LI-RADS v2017 by an experienced sonographer blinded to clinical data and to the final diagnosis. CEUS AFs in favor of benignity were size reduction or stability >2 years of the tumor. The malignancy aspects were: definite growth, nodule in nodule architecture and mosaic architecture, favoring HCC in particular. Diagnostic accuracy of CEUS was calculated.

Results: From a total of 143 patients with 191 FLL, AFs favoring HCC were observed in 19.8% cases as hypoechoic rim and in 16.7% cases as nodule in nodule architecture. From the total of 141 HCC cases, 118 of them (83.6%) were correctly classified as HCC diagnosis, as follows: 81 tumors (57.4%)—definitely HCC (LR-5) and 37 tumors (26.2%)—probably HCC (LR-4). In 13 cases (9.21%), CEUS characteristics indicated malignant lesions, but not necessarily HCC (LR-M); 3 cases (2.12%) were classified as intermediate probability of malignancy (LR-3); none of them was incorrectly diagnosed as benign. The LR-5 category was 96.2% (95% CI: 89.4−98.7%) predictive (PPV) of HCC, with one case of misdiagnosis for cholangiocarcinoma. CEUS LR-5 sensitivity for HCC was 60.4% and specificity was 93.6%. Regarding the LR-4 category, PPV was 94.8%, with only 26.2% sensitivity, whereas for LR-3 the PPV was 41.02%, with only 2% sensitivity.

Conclusions: CEUS LIRADS algorithm including AFs remains an excellent diagnostic tool for HCC.

Keywords: contrast-enhanced ultrasonography, hepatocellular carcinoma, ancillary features, LI-RADS.

OP.15

PREDICTION OF PROSTATE BIOPSY OUTCOME BY MULTIPARAMETRIC ULTRASOUND IMAGING

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Objectives: Prostate cancer (PCa) diagnosis still relies on 12-core systematic biopsy (SBx). More recently, pre-biopsy multiparametric MRI has been introduced in the guidelines as a valuable imaging tool for the detection of significant PCa. However, poor reproducibility and specificity, along with its high cost and limited availability, evidence the need for cost-effective, widespread imaging alternatives. 3D contrast-enhanced ultrasound (CEUS) has shown promise for PCa localization

by extraction of quantitative perfusion and dispersion features associated with cancer angiogenesis. Tissue stiffness is an additional PCa biomarker that can be quantified by ultrasound shear-wave elastography (SWE). In this study, the diagnostic potential of multiparametric ultrasound imaging, combining 3D CEUS and SWE features, was evaluated for PCa localization by comparison with the corresponding SBx outcome.

Materials: After signing an informed consent, 54 biopsy-naïve patients underwent a 3D CEUS recording using a LOGIQ E9 scanner (GE HealthCare, USA) and a multi-plane (probe sweep) 2D SWE scan using an Aixplorer scanner (SuperSonic Imagine, France) at the Second Affiliated Hospital of Zhejiang University (China). All patients received SBx. Multiple 3D perfusion and dispersion feature maps were extracted from the 3D CEUS acquisitions and further complemented with 3D maps of tissue stiffness, reconstructed based on the multi-plane 2D SWE acquisitions. Subsequently, all the 3D maps were subdivided in 12 regions corresponding to the SBx locations. Gradient Boosting (GB) classification was then implemented together with sequential floating forward feature selection for prediction of the biopsy outcome. The classification accuracy was assessed by a k-fold cross-validation procedure.

Results: Of the 54 patients, 20 had SBx-proven significant PCa. Prediction of biopsy outcome using only CEUS features produced an area under the receiver-operating-characteristic curve (AUC) of 0.81, while using the SWE elasticity alone produced an AUC of 0.66. Their combination yielded an improved AUC of 0.85.

Conclusions: The proposed 3D multiparametric ultrasound imaging approach yields accurate PCa classification results, showing promise for cost-effective PCa localization by multiparametric ultrasound imaging. A multicenter trial has recently started to validate and optimize the classification performance in a larger patient cohort.

Keywords: Prostate cancer, Multiparametric ultrasound imaging, Machine learning, Biopsy outcome prediction.

OP.16

ULTRASOUND GUIDED TRANSPERINEAL VS. TRANSRECTAL PROSTATE BIOPSY: A COMPARISON OF SIGNIFICANT CANCER DETECTION RATE

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Objectives: Prostate cancer is the second most frequent cancer in men and the fourth most frequent cancer worldwide. In 2020, the new prostate cancer cases number was estimated at 1.4 million, from 1.27 million in 2018. Prostate biopsy is still the gold standard for prostate cancer diagnosis. Transrectal prostate biopsy (TR) was the first ultrasound-assisted way of performing prostate biopsy, while the transperineal prostate biopsy (TP) method has decreased risk of infectious complications and has been proven to achieve superior sampling of the anterior and apical regions.

Materials: The prospective study took place between January 2019 and January 2021. A total of 310 (178 TP, 132 TR) patients from Craiova Emergency Hospital scheduled for ultrasound guided prostate biopsy were enrolled in this study in accordance with standard inclusion criteria (i.e. elevated PSA or suspicious DRE and PIRADS score 3-5 on mpMRI). The primary outcome assessment was clinically significant prostate cancer detection rate (Gleason score above 6) while the secondary endpoint was the evaluation of the complication rate.

Results: There were no significant differences between the two patient samples regarding age, BMI, symptoms (IPSS), prostate volume, PSA value, PIRADS score, Gleason score or T tumor staging. Pathology reports showed that overall prostate cancer detection rate was 55.80% (173 cases). Clinically significant prostate cancers were 47.09% (146 patients). TP and TR biopsies had a similar result in terms of clinically significant prostate cancer detection rate (TP: 49.44% vs. TR: 43.94%; p = ns.). However, TR biopsy had a significantly higher complication rate (TP: 6.74% vs TR: 14.39%, $p < 0.05$). Complications included urinary retention, hematuria or prostate infection.

Conclusions: Our findings indicate that while TP and TR ultrasound guided prostate biopsy methods have a similar detection rate of clinically significant prostate cancer, TR approach has a significantly higher complication rate. We conclude that the ultrasound guided TP prostate biopsy approach should be considered as the preferred technique for prostate cancer diagnosis.

Keywords: Prostate cancer, prostate biopsy, transperineal, transrectal, ultrasound guided.

OP.17

EVALUATION OF FIBROTIC AND INFLAMMATORY STRICTURE IN THE TERMINAL ILEUM WITH SHEAR WAVE ELASTOGRAPHY (SWE) IN CHRON'S DISEASE

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Objectives: Evaluation of changes in the terminal ileum wall by ultrasonography plays a very important role in Crohn's disease. The purpose of this study was to evaluate the capability of SWE in differentiating fibrotic from inflammatory strictures in patients with Crohn's disease (CD).

Materials: 34 patients admitted to our hospital with the diagnosis of CD were included. In addition to endoscopic and histopathological findings, conventional bowel ultrasound (US) and SWE evaluations were made. Limberg scores indicating bowel vascularization calculated in US and SWE values were recorded using m/s and kPa as units.

Results: Increased vascularization (Limberg score of 2 or above) is considered abnormal and indicated severe inflammation. While the SWE value was 18.6 ± 1.4 kPa and 2,13 ± 0,22 m/s in cases with mild inflammation, 20.3 ± 2.9 kPa and 2,61 ± 0,23 m/s was found in cases with severe inflammation. There was no significant difference in SWE values between different types of inflammation (P = 0.350). On the other hand, we found 24.25± 4.1 kPa and 4,78 ± 0,34 m/s value in severe fibrosis, 14.6 ± 2.5 kPa and 2,28 ± 0,11 m/s in mild fibrosis and 17.8 ± 4.3 kPa and 3,01 ± 0,34 m/s in moderate fibrosis. There was a significant difference between mean SWE values and different grades of fibrosis (P = 0.006). We considered CD lesions with a high SWE value (taking the cut-off values as >23.30 kPa and >4.09 m/s) as severe fibrosis in our study.

Conclusions: SWE is a useful imaging modality that can be used as a guiding method by combining the Limberg vascularization score in the evaluation of fibrosis, especially in CD patients with strictures.

Keywords: Crohn's disease, fibrosis, stricture, inflammation, SWE.

OP.18

GIUS + CEUS VS. ENTERO-RM IN ASSESSING THE SEVERITY OF ILEAL CROHN'S DISEASE: A FEASIBILITY STUDY

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Objectives: Imaging techniques like entero-RM and GIUS (gastrointestinal endoscopy) were developed as complementary methods to colonoscopy for a better and complete assessment of patients with Crohn's disease. GIUS has the advantage that it can be repeated whenever needed to monitor the evolution and response to treatment. Our aim is to evaluate the severity of intestinal damage in patients with ileal Crohn's disease using GIUS and MR-enterography.
Materials: This study included 10 patients with ileal Crohn's disease with a mean age of 36 years. Patients were evaluated via GIUS + CEUS, using a Hitachi Arieta ultrasonography system with a 7.5 MHz linear transducer. The contrast agent used was SonoVue, 4,8 ml. The assessed parameters included: the thickness of the intestinal wall, parietal stratification, motility, the presence of lymph nodes and mesenteric fat, color Doppler parameters. Using a dedicated software CEUS parameters were assessed: Peak enhancement (PE), Wash-in area under the curve (WiAUC), Rise time (RT), Mean transit time (MTT), Wash-in rate (WiR), etc. The MR-enterography was performed using a Philips Ingenia 3T device, and for the quantification of severity we used the modified MaRIA index.
Results: The mean severity index (CDAI, respectively HBI-Harvey-Bradshaw Index) was 173.8 (STDEV 109.06) for CDAI and 6.8 (STDEV 4.18) for HBI. The parameters that were statistically correlated with the activity and severity of the disease assessed by CDAI and HBI are: thickening of the intestinal wall over 4 mm, the presence of Doppler signal at the level of intestinal wall (Limberg classification) and enhancement parameters on CEUS. On GIUS, the average thickness of the terminal ileum wall was 6.28 mm (STDEV 1.13). The average for the Limberg score was 2 (STDEV 0.94), and for the modified MaRIA score was 7.40 (STDEV 5.05). We found that there are correlations between GIUS parameters, entero-RM parameters and the severity of the disease.
Conclusions: Intestinal ultrasound has been shown to be useful in assessing the severity of ileal Crohn's disease and response to treatment comparable to MR-enterography. Entero-RM seems to be superior to GIUS in detecting proximal stenosis of ileum.
Keywords: Crohn's disease, GIUS, CEUS, severity.

OP.19

IDENTIFIABLE CARDIOMETABOLIC RISK FACTORS CAN PREDICT SUBCLINICAL ATHEROSLEROSIS PROGRESSION IN OBESE CHILDREN WHEN CORRELATED TO CAROTID INTIMA-MEDIA THICKNESS MEASUREMENT

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Objectives: Carotid intima-media thickness (CIMT), a marker of endothelial distress, is recognized as a predictor of atherosclerotic progression in obese children [1,2]. Multiple risk factors act as additional precipitant causes of atherosclerosis [3,4,5]. The assessment of these risk factor can offer a better understanding of the patient's cardiometabolic status and a better prediction of overall cardiometabolic risk in adulthood. Aim: To assess the impact of obesity on CIMT and how it correlates to identifiable genetic and epigenetic risk factors.
Materials: We analyzed 60 patients aged 6−18 years old by measuring their CIMT using the Aixplorer MACH 30 echography machine automatic measurement software (SuperSonic Imagine, Aix-en-Provence, France). Three study groups were defined, depending on the severity of weight excess: obese and overweight, and normal-weight patients as controls. We performed a clinical examination (weight, height, waist circumference, and blood pressure measurements) and a targeted anamnesis to detect the presence of certain risk factors: postnatal nutrition (breastfed/formula-fed), birth weight (<2500 g/>3500 g/normal weight), pregnancy-associated risk factors (no pathology/>20 kg surplus/gestational diabetes/gestational hypertension/autoimmune thyroiditis/smoking during pregnancy), family history (no pathologies/obesity/dyslipidemia/type 2 diabetes/coronary disease/stroke/autoimmune thyroiditis), smoking during pregnancy (yes/no), smoking by the patient (yes/no), and physical activity (normal/sedentary).
Results: CIMT values are significantly higher in older children and boys. Over 20 kg weight gain during pregnancy and other at-risk disorders during pregnancy (p=0.047), family history of cardiovascular risk (p=0.049), hypertension (p=0.012), and smoking (p=0.015) are linked to increased CIMT. Artificial postnatal nutrition, high/low birth weight, and sedentary lifestyle are linked to increased CIMT.
Conclusions: Weight excess in children is associated with increased values of CIMT, and the severity of the excess increases the expected values of CIMT. Risk factors like weight gain of over 20 kg during pregnancy and overall metabolic disturbances of the mother, family history of cardiovascular risk, high blood pressure, and smoking are linked to increased CIMT.
Keywords: cardiometabolic risk factors, carotid intima-media thickness, childhood obesity, subclinical atherosclerosis.

OP.20

SHEAR WAVE ELASTOGRAPHY - A USEFUL TOOL IN DIAGNOSING CHRONIC AUTOIMMUNE THYROIDITIS IN CHILDREN

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Objectives: The most common pediatric thyroid disease is chronic autoimmune thyroiditis (CAT), being also one of the most common autoimmune pathologies in children. In addition to the clinical and biological examination, ultrasound brings an important value in thyroid evaluation. Studies have shown the importance of share-wave elastography (SWE) in the diagnosis of thyroid disease in adults. This paper aims to investigate the usefulness of share-wave elastography in the diagnosis of CAT in children.

Materials: We included in our study one hundred children aged between 5 and 18 years, divided into two groups, age matched, 50 children without thyroid pathology and 50 children diagnosed with CAT. A complete thyroid examination, including elastography (Aixplorer Mach 30, Supersonic imagine, France), was performed for all study participants.
Results: Thyroid stiffness (TS) values were significantly higher in the CAT group compared to the healthy aged matched controls (15.51 ± 4.76 kPa vs. 10.41 ± 2.01 kPa; $p < 0.0001$). No differences were found between the mean values obtained in the left lobe and the right lobe, respectively (15.47 ± 4.77 kPa vs. 15.56 ± 5.22 kPa; $p = 0.92$). The optimal cut-off value determined using the mean TS values for predicting the presence of CAT in children was >12.2 kPa (AUROC—0.88, Se—82%, Sp—88%, PPV—87.2% and NPV—83%). A weak positive correlation was found between TS values and thyroid peroxidase antibodies (ATPO) levels ($r = 0.43$) and also between TS values and age ($r = 0.30$). No correlation was found between TS values and thyroid stimulating hormone (TSH), free thyroxine (FT4), thyroid volume or Antithyroglobulin antibody (ATG) level.
Conclusions: SWE proves to be extremely useful in the diagnosis of CAT in children and should be used in the usual examination of the thyroid whenever possible.
Keywords: chronic autoimmune thyroiditis, elastography, shear-wave elastography, thyroid, children.

OP.21

QUANTITATIVE ASSESSMENT OF CONTRAST ENHANCED ENDOSCOPIC ULTRASONOGRAPHY (CE-EUS) WASHOUT RATE IN PREDICTING MALIGNANCY IN PANCREATIC SOLID MASSES: A PILOT STUDY

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Objectives: Contrast enhanced endoscopic ultrasound (CE-EUS) is a sensitive method to evaluate pancreatic solid masses, with arterial hypoenhancement in adenocarcinomas and hyperenhancement in case of inflammatory masses or neuroendocrine tumors. However, the importance of venous wash-out has been less studied. The aim: to evaluate the diagnostic role of CE-EUS wash-out rate in the early and late venous phase based on quantitative analysis.
Materials: We prospectively analyzed patients from one center with solid pancreatic masses on CT scan who underwent conventional EUS followed by CE-EUS and EUS-fine needle aspiration. Quantitative parameters were generated by time-intensity curve analysis. A standardized region of interest inside the tumor was examined and the quantitative uptake of SonoVue was recorded. The analyzed parameters in the wash-out phase were: peak intensity between 25-30 seconds, uptake at 45 seconds − defined as early washout and uptake at 60 seconds − defined as late washout. The early and late washout rates were analyzed as a ratio compared to the peak and as decrease in absolute values on the time-intensity curve. The final diagnosis was based on surgery or EUS tissue acquisition results and 6 months follow-up.
Results: A total of 31 patients were included, 23 adenocarcinomas and 8 chronic pancreatitis patients. In adenocarcinomas the early wash-out was 80,3%±26,4% (absolute values -3,6±-7,1) and the late wash-out was 73±34,1% (absolute values: -6,9±-15,7), showing slow wash-out. In case of chronic pancreatitis, the early wash-out was 81,8±15,7% (absolute values: -7,4±-3,25) and late wash-out was 61,4±18,4% (absolute values: -15±6,16). There was no statistically significant difference between the adenocarcinomas and chronic pancreatitis group.
Conclusions: The washout rates between pancreatic adenocarcinoma and chronic pancreatitis were not different. The high standard deviation value at 60 seconds in the adenocarcinoma group shows the heterogeneity of the washout rate and further assessment based on different grading of adenocarcinoma is needed.
Keywords: EUS, contrast enhanced endoscopic ultrasound, CE-EUS, solid pancreatic tumor, chronic pancreatitis.

OP.22

ESTABLISHMENT AND COMPARISON OF PIECEWISE LINEAR REGRESSION MODELS TO MEASURE THYROID VOLUME BY 2D AND 3D ULTRASOUND

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Objectives: To improve the accuracy of thyroid volume calculation by ultrasound.
Materials: Eighty patients who underwent total thyroidectomy were enrolled. Thyroid size was measured by 2-D US using the equation length × width × thickness + length × width × thickness, and 3-D values were obtained by 3-D US. One 2-D model and one 3-D model were developed using piecewise linear regression analysis. The accuracy of these models was compared using an ellipsoid model (2D value × 0.5), 3D US, and Ying's model [1.76 + (2D value × 0.38)].
Results: The intraclass correlation coefficient of 2-D and 3-D US was 0.996, and the interclass correlation coefficient was 0.972 and 0.912, respectively. Thyroid volumes using 3-D US (13.41 [9.08, 20.94]), ellipsoid model (15.90 [10.88, 26.58]), and Ying's model (12.64 [10.35, 18.64]) were not significantly different from each other ($P > 0.05$) but were significantly lower than that of thyroid specimens (19.75 [15.00, 29.35], $P < 0.05$). The function of the new 2-D US model was $2.66 + (0.71 \times X1) - (1.51 \times X2)$. In this model, if 2D value ≤ 228.39, X1 = 2D value and X2 = 0; otherwise, X1 = 2D value and X2 = 2D value − 228.39. The function of the 3-D US model was $2.90 + (1.08 \times X1) + (2.43 \times X2)$. In this model, if 3D value ≤ 102.06, X1 = 3D value and X2 = 0; otherwise, X1 = 3D value and X2 = 3D value − 102.06. The accuracy of the new models was higher than that of 3-D US, the ellipsoid model, and Ying's model ($P < 0.05$).
Conclusions: 2-D and 3-D US models established by linear piecewise regression are reliable and can accurately measure thyroid volume.
Keywords: thyroid volume, piecewise linear regression model, ultrasound.

OP.23

THE VALUE OF THE NOMOGRAM MODEL BASED ON ACR TI-RADS: PREDICTION OF THE CENTRAL CERVICAL LYMPH NODE METASTASIS IN THYROID PAPILLARY CARCINOMA

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Objectives: To explore the value of nomogram model (ATR model) based on American Society of Radiology thyroid imaging reporting and data system (ACR TI-RADS), computed tomography (CT), and cervical ultrasound (C-US) in predicting central cervical lymph node metastasis (CLNM) of thyroid papillary carcinoma (PTC).
Materials: 366 PTC nodules were used as the modeling cohort and 121 PTC nodules were included as the external validation cohort. According to the 7:3 ratio of the modeling cohort, the training set and test set were randomly generated. The ATR model was constructed in the training set, and the discrimination and consistency of the model were evaluated. In the external validation cohort, the diagnostic efficacy of the ATR model, CT, C-US, and C-US combined CT (CT+US) were compared and decision curve analysis (DCA) and clinical impact curve (CIC) were used to explore the clinical value.
Results: ATR model: Y= -3.548 + 0.923 × Gender + 1.065 × Multifocality + 0.092 × Maximum diameters + 0.235 × ACR TI-RADS score. In the training set, test set, and external validation cohort, the C-indexes (0.756, 0.729, 0.753) showed the ATR model has good discrimination. Hosmer-Lemeshow goodness of fit test (P=0.837, P=0.619, P=0.389) and the calibration curve results showed that the model has a good consistency. In the external validation cohort, the sensitivity of ATR model was significantly higher than that of CT, C-US and CT + US (66.1% vs. 9.7%, P<0.05; 66.1% vs. 16.1%, P<0.05; 66.1% vs. 24.2%, P<0.05), and the accuracy was better than that of CT and C-US (66.1% vs. 52.9%, P<0.05; 66.1% vs. 55.4%, P<0.05), The specificity was lower than that of the three (72.9% vs. 98.3%, P<0.05; 72.9% vs. 96.6%, P<0.05; 72.9% vs. 94.9%, P<0.05). DCA showed that the ATR model had the largest risk threshold range (0.3-0.8) and the highest net benefit (0.32). CIC showed that the ATR model had excellent accuracy when the predicted risk threshold was greater than 0.3.
Conclusions: The ATR model has good diagnostic performance and clinical value in predicting CLNM.
Keywords: Thyroid, Central cervical lymph nodes, Ultrasonography, Decision curve analysis, Papillary carcinoma.

OP.24

MICROWAVE ABLATION VERSUS LAPAROSCOPIC RESECTION AS FIRST-LINE THERAPY FOR SOLITARY 3−5 CM HEPATOCELLULAR CARCINOMA

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Objectives: To compare the effectiveness of microwave ablation (MWA) and laparoscopic liver resection (LLR) on solitary 3−5cm HCC over time.
Materials: From 2008 to 2019, 1,289 patients from 12 hospitals were enrolled in this retrospective study. Diagnosis of all lesions were based on histopathology. Propensity score matching (PSM) was used to balance all baseline variables between the two groups in 2008−2019 (n =335 in each group) and 2014−2019 (n =257 in each group) cohorts, respectively.
Results: For cohort 2008−2019, during a median follow-up of 35.8 months, there were no differences in overall survival (OS) between MWA and LLR (Hazard ratio (HR): 0.88, 95% confidence interval (CI) 0.65−1.19, P =0.420), and MWA was inferior to LLR regarding disease-free survival (DFS) (HR 1.36, 95%CI (1.05−1.75), P =0.017). For cohort 2014−2019, there was comparable OS (HR 0.85, 95%CI (0.56−1.30), P =0.460) and approached statistical significance for DFS (HR 1.33, 95%CI (0.98−1.82), P =0.071) between MWA and LLR. Subgroup analyses showed comparable OS in 3.1−4.0cm HCCs (HR 0.88, 95%CI (0.53−1.47), P =0.630) and 4.1−5.0cm HCCs (HR 0.77, 95%CI (0.37−1.60), P =0.483) between two modalities. For both cohorts, MWA shared comparable major complications (both P >0.05), shorter hospitalization and lower cost to LLR (all P <0.001).
Conclusions: MWA might be a first-line alternative to LLR for solitary 3−5cm HCC in selected patients with technical advances, especially for patients unsuitable for LLR.
Keywords: microwave ablation, laparoscopic liver resection, hepatocellular carcinoma, overall survival, disease-free survival.

OP.25

PERIOD-DEPENDENT SURVIVAL BENEFIT OF PERCUTANEOUS MICROWAVE ABLATION FOR HEPATOCELLULAR CARCINOMA: A 12-YEAR REAL-WORLD, MULTICENTRIC EXPERIENCE

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Objectives: To assess whether the advances in MWA for HCC translated into a real-world survival benefit.
Materials: This retrospective study included 2,354 patients with Barcelona Clinic Liver Cancer (BCLC) stage 0 to B from five hospitals, with at least 2 years of follow-up for all the patients. Recurrence and survival were analyzed using the Kaplan-Meier method with time-period stratification.
Results: A total of 5,326 HCCs (mean diameter, 2.9 cm ± 1.2) underwent 4,051 sessions of MWA with a median follow-up of 61.3 (0.6−169.5 range) months during three periods (2007−2010, 2011−2014, and 2015−2018). Technical success was achieved in 5,194 (97.5%) tumors with significant improvement over time, especially for >3.0-cm HCC (p <0.001). Local tumor progression (LTP) showed no period-dependent advance, with>3.0-cm HCC and perivascular location being the risk factors for LTP. The median intra-hepatic metastasis time was 27.6 (95% confidence interval (CI): 25.2−28.8) months, with 5- and 10-year occurrence rates of 68.8% and 79.4%, respectively. The 5- and 10-year overall survivals were 63.9% and 41.1%, respectively, and BCLC stage 0, A, and all B patients showed an observable survival improvement over time(p<0.001). The median disease-free survival time increased from 19.4 (95% CI: 16.5−22.6) months in 2007−2010 to 28.1 (95% CI: 25.9−32.3) months in 2015−2018. The improved survival for early recurrent (≤ 2 years) patients was period-dependent, as verified by Cox regression analyses. The major complications rate per procedure was 3.0% (122/4,051).
Conclusions: These real-world data show that MWA provided an upward trend in survival for HCC patients with BCLC stage 0−B over a 12-year follow-up period. An encouraging clear survival benefit in early recurrent patients was also observed
Keywords: hepatocellular carcinoma, microwave ablation, period-dependent, real-world, survival benefit.

OP.26

POPULATION ULTRASOUND (POP-US) BY THE ATTENUATION COEFFICIENT MEASUREMENT FOR SCREENING NON-ALCOHOLIC FATTY LIVER DISEASE.

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Objectives: Non-alcoholic fatty liver disease (NAFLD) has become a pandemic. There are no simple, safe and economically effective methods for screening of liver steatosis. Population ultrasound (pop-US) studies should include screening and early diagnosis of NAFLD [1]. This will effectively overcome hepatic steatosis without medication in accordance EASL [2].The aim was to evaluate the possibilities of organizing and performing population US steatometry by attenuation coefficient measurement (ACM) for NAFLD screening.
Materials: 2 populations were examined by the ACM (dB/cm). Group 1 - 7318 patients aged 18 to 82 years (2944 men and 4374 women, average age - 42.52 ± 15.62 years). Group 2 - 105 patients with type 2 diabetes mellitus (24 men and 81 women, age - 57.75 ± 8.60 years, duration of diabetes - 10.19 ± 5.99 years). B-mode and ACM were performed on US systems Soneus P7, weight 13 kg (Ultrasign, Ukraine) by a C1-5 MHz convex probe. The training of 5 doctors on mastering the ACM was only 30 minutes due to the simple and intuitive navigation of the ROI by the profilogram of attenuation on a handmade US steatophantom [3]. Stratification of hepatic steatosis was performed by a scale Sasso M. et al. (2011): S0 < 2,22 dB/cm, S I ≥ 2,22 dB/cm, S II ≥ 2,33 dB/cm, SIII ≥ 2,90 dB/cm [4].
Results: In group 1 according to B-mode, there were revealed of steatosis in 1317 individuals (18.00%): mild in 302 (22.93%), moderate - 893 (67.81%), severe - 122 (9.26%). According to ACM in 1819 individuals steatosis was detected (18.86%): mild S1 in 962 (52.89%), moderate S2 - 637 (35.02%), severe S3 - 220 (12.09%). Group 2 revealed patients with S0 - 9 (8.6%), S 1 - 4 (3.8%), S2 - 73 (69.5%), S3 - 19 (18.1%). High prevalence of NAFLD in different populations was revealed [5].
Conclusions: 1. Population US (pop-US) by ACM can be easily performed with the goal of screening and early diagnosis of NAFLD. 2. Pop-US of NAFLD must be performing on a US mobile device.3. The universal screening by pop-US ACM is appropriate for management of NAFLD.
Keywords: population ultrasound, liver steatometry, attenuation coefficient measurement, non-alcoholic fatty liver disease.

References

1 Dietrich CG, Rau M, Geier A. Screening for nonalcoholic fatty liver disease-when, who and how? Review. World J Gastroenterol. 2021;27(35):5803-5821.doi: 10.3748/wjg.v27.i35.5803. PMID: 34629804.
2 EASL-EASD-EASO Clinical Practice Guidelines for the management of non-alcoholic fatty liver disease. J Hepatol. 2016;64 (6):1388-402. doi: 10.1016/j.jhep.2015.11.004.
3 Dynnyk O., Omelchenko O, Solodovnik O, Marunchyn N. Multimodal multi-parametric phantom of the fatty liver disease. // ECR 2020. Book of abstracts. Insights Imaging. 2020; 11(Suppl 1): 34. B377. RPS 1013-11. doi.org/10.1186/s13244-020-00851-0.
4 Sasso M., Tengher-barna I., Ziol M. et al. Novel controlled attenuation parameter for noninvasive assessment of steatosis using Fibroscan(®): validation in chronic hepatitis C. J Viral Hepat. 2012;19 (4):244-53. doi: 10.1111/j.1365-2893.2011.01534.x. PMID: 22404722.
5 Sporea I, Mare R, Popescu A et al. Screening for liver fibrosis and steatosis in a large cohort of patients with type 2 diabetes using vibration controlled transient elastography and controlled attenuation parameter in a single-center real-life experience. J Clin Med. 2020;9(4):1032. doi: 10.3390/jcm9041032.

OP.27

STEATOSIS AND FIBROSIS PREDICTIVE SCORES IN PATIENTS WITH TYPE 2 DIABETES

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Objectives: The prevalence of non-alcoholic fatty liver disease (NAFLD) is increasing in patients with type 2 diabetes (T2D), as a result, a systematic screening in this population should be performed. The aim of this study was to identify risk factors associated with moderate steatosis (S2) and advanced fibrosis (F≥3) and to develop a score that could be used in daily practice.
Materials: A prospective study on 534 patients with T2D was conducted using Vibration Controlled Transient Elastography (VCTE) to assess fibrosis severity and Controlled Attenuation Parameter (CAP) to assess steatosis severity. We stratified our cohort into study cohort (348 patients) and validation cohort (186 patients). We aimed for 10 valid CAP and liver stiffness measurements (LSM) with an IQR/Median <30%. A cut-off value of 290 dB/m was used to define S2 while for F≥3 a cut-off of 9.7 kPa [1]. For developing a score for stratifying the risk of moderate steatosis, and of advanced fibrosis, we used univariate and multivariate logistic regression analysis.
Results: Out of 534 patients, 62.7% had at least S2 and 19.2% had at least F≥3 by VCTE. In univariate analysis, BMI (p< 0.0001), waist circumference -WC (p< 0.0001), elevated levels of ALT (p=0.001), total cholesterol -TC (p=0.03), triglycerides-TG (p=0.01), fasting blood glucose (p=0.004) and presence of hypertension-HTA (p=0.04) were associated with at least moderate steatosis. The steatosis score is composed of: 0.5 points for high BMI (>32.1 kg/m2), TC (> 235 mg/dl), TG (>165 mg/dl), glycemia (> 200 mg/dl), ALT (> 40 U/L) and WC (> 100 cm) and 1 point for the presence of HTA. In univariate analysis, BMI (p< 0.0001), WC (p< 0.0001), elevated levels of AST (p=0.001), liver steatosis (p=0.03) were associated with at least F≥3. The fibrosis score is composed of: 0.5 points for high BMI (>32.4 kg/m2), AST (> 42 U/L), WC (> 110 cm) and for the presence of steatosis. The derived steatosis and fibrosis cut-offs for identifying patients with T2D were for steatosis ≥S2 (2 points) with an AUROC of 0.72 (42.4% Se, 96.7% Sp, 45.2% PPV, 90.9% NPV) and for fibrosis ≥F3 (1 point) with an AUROC of 0.68 (77.3% Se, 56.4% Sp, 37.8% PPV, 90.1% NPV).In the validation group the accuracy of our scores were 83.9% for identifying at least moderate steatosis and 84.1% for advanced fibrosis.

Conclusions: Both steatosis and fibrosis scores can be used with reasonable accuracy in clinical setting for identifying patients with T2D at risk for developing at least moderate and advanced fibrosis.
Keywords: fibrosis, steatosis, type 2 diabetes.

References

1. Eddowes P et al. Controlled Attenuation Parameter and Liver Stiffness Measurement in Assessing Steatosis and Fibrosis in Patients With Nonalcoholic Fatty Liver Disease. Gastroenterology. 2019;156(6):1717-1730

OP.28

TRANSABDOMINAL ULTRASOUND COMBINED WITH TRANSVAGINAL ULTRASOUND SCREENING FOR FETAL CARDIAC ABNORMALITIES IN EARLY PREGNANCY

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Objectives: To investigate the diagnostic value of transabdominal ultrasound combined with transvaginal ultrasound (two-step method) in screening fetal cardiac abnormalities in the first trimester.
Materials: 1897 fetuses of 11～13+6 weeks were screened by ultrasonography. The two-step method was used to screen the fetal hearts and diagnose congenital fetal heart malformations. Pregnancy outcomes of all positive cases were followed up.
Results: Of 1897 fetuses in the first trimester, 16 fetuses with fetal cardiac abnormalities were detected, including 14 cases of intracardiac structural abnormalities (3 cases of single atrium and single ventricle, 3 cases of ventricular septal defect, 4 cases of tetralogy of Fallot, 1 case of mitral atresia, ventricular septal defect and right heart enlargement, 1 case of complete atrioventricular septal defect, 2 cases of aberrant right subclavian artery), and 2 cases of cardiac axis abnormalities (2 cases of left diaphragmatic hernia). However, 15 fetuses with fetal abnormalities (6 cases of ventricular septal defect, 4 cases of atrial septal defect, 3 cases of aberrant right subclavian artery, 1 cases of complete transposition of the great arteries, and 1 cases of tetralogy of Fallot) were not detected by ultrasonographic scanning in the first trimester, but were found in the second and third trimesters or postpartum period by ultrasonography. The sensitivity, specificity, positive predictive value, and negative predictive value of the two-step method in screening fetal cardiac abnormalities in early pregnancy were 51.6%, 100%, 100% and 98.4% respectively when compared to the postnatal follow-up results.
Conclusions: Transabdominal ultrasound combined with transvaginal ultrasound (two-step method), to some extent, has diagnostic value in screening fetal cardiac abnormalities in the first trimester.
Keywords: First trimester, Fetuses, Cardiac abnormalities, Two-step method.

OP.29

ULTRASOUND ASSESSMENT OF FETAL STRUCTURAL ABNORMALITIES AT NUCHAL SCAN

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Objectives: To optimize the ultrasound screening for fetal structural abnormalities during the late first trimester nuchal translucency (NT) scan using an extended morphological protocol.
Materials: A population of 257 unselected 11+0 and 13+6 weeks' fetuses were examined by a pre-established protocol between January 2019 and December 2021. Ultrasound examinations were performed using a Voluson E10 machine, equipped with 4-8 MHz curvilinear transducer.The extended morphological protocol included evaluation of the fetal heart in Grey Scale and Color Doppler mode for assessing the four chamber and outflow tracts view, evaluation of the fetal skull and brain, chest, abdomen, upper and lower limbs. The detected abnormalities were classified as major/minor and correlated with the second trimester morphological scan, genetic results and anatomopathological specimen.
Results: By using an extended protocol we had a 45.3% detection rate for fetal structural abnormalities. These included abnormalities of the heart, brain, face, spine, anterior abdominal wall and limbs. The detection rate was 38.3% for cardiac defects, 64.2% for nervous system defects, 31.2% for facial abnormalities, 94.2% for abdominal wall defects and 32.9% for limbs defects.The diagnosis set in the late first trimester was confirmed in the early second trimester and, in cases ended up by abortion, on the anatomopathological specimen. An increased NT value was detected for the majority of the fetuses diagnosed with major structural abnormalities. In such cases, genetic testing confirmed chromosomal abnormalities.
Conclusions: Detection of fetal structural abnormalities at NT scan is feasible using an extensive examination protocol. But, there will always be undiagnosed abnormalities at this time. Therefore, this type of examination cannot replace the routine second trimester morphological scan.
Keywords: Nuchal scan, screening, fetal abnormalities, ultrasound.

References

1. Nicolaides KH. Screening for fetal aneuploidies at 11 to 13 weeks. Prenat Diagn 2011;31(3):7-15.
2. Syngelaki A, Hammami A, Bower S, et al. Diagnosis of fetal non−chromosomal abnormalities on routine ultrasound examination at 11−13 weeks' gestation. Ultrasound Obstet Gynecol. 2019;54(4):468−476.
3. Souka AP, Snijders RJ, Novakov A, Soares W, Nicolaides KH. Defects and syndromes in chromosomally normal fetuses with increased nuchal translucency thickness at 10-14 weeks of gestation. Ultrasound Obstet Gynecol 1998;11(2):391-400.

OP.30

FIRST TRIMESTER FETAL HEART INTERPRETATION BY ARTIFICIAL INTELLIGENCE

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Objectives: To investigate if artificial intelligence can support first-trimester heart screening by alerting the sonographer if the normal appearance of cardiac sweep key planes is missing.
Materials: Images from first-trimester heart scan acquired at 12-13+6 gestational weeks have been collected and further processed to show

only color Doppler mode. Modern architectures of deep learning have been trained and validated to recognize the four cardiac key planes: atrioventricular flows in the four-chamber view plane, aorta in the left ventricular outflow tract plane, pulmonary artery - arterial ductus in the right ventricular outflow tract plane, and the "V-sign" in the three-vessel plane. We extracted frames showing each class of images from recorded video scans during general practice and labeled them accordingly for the machine learning approach.

Results: 80% of the images (7251) from 326 scans were used for AI training. Once this stage was complete, 95.56% of the remaining 20% of test data were correctly classified. The accuracy is nevertheless very good, since usually, a certain plane appears several times in a cardiac sweep, hence, at this percent, the model will definitely identify at least one of its instances. The model was developed to be further applied to 50 ultrasound cardiac sweeps, such as to simulate a real scenario. A threshold probability of 70% of being certain on the four planes labels pointed out all 15 major anomalies in this group and correctly identified normal hearts. d probability of 70% of being certain on the four planes labels pointed out all 15 major anomalies in this group and correctly identified normal hearts.

Conclusions: The current results show great promise in the direction of artificial intelligence support for first-trimester heart scans.

Keywords: prenatal diagnosis, fetal heart, first trimester, ultrasound, pregnancy.

OP.31

VALUE OF UTERINE NOTCHING ASSESSMENT AS AN INDEPENDENT FACTOR IN PREDICTING PREECLAMPSIA-A CROSS SECTIONAL STUDY

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Objectives: Preeclampsia (PE) is a multisystemic disease with a heterogenous pathogenesis involving maternal as well as fetal and placental factors. Traditionally, screening for preeclampsia was directed in identifying risk factors such as maternal demographic and medical characteristics. Nowadays, Doppler evaluation of the uterine arteries has become an integrated part of different PE screening protocols, being well known that impaired utero-placental vascularization is manifested as abnormal waveforms patterns with persistently elevated resistance of blood flow. Uterine artery notching has been evaluated in the context of screening for preeclampsia but not in risk assessing. Thus, the objective of the following study is to determine if bilateral notching could be used as in independent factor in predicting PE risk.

Materials: A total of 200 normotensive pregnant women with risk factors for PE were evaluated using color Doppler between 19-25 weeks of gestation. The 95th percentile of the mean pulsatility index (PI) and resistance index (RI) of both uterine arteries were calculated. The following indices were noted: cross-sectional index: the mean RI for each patient and considered abnormal when >/= 0.58; longitudinal indices: the individual longitudinal flow pattern of mean RI of both the main uterine arteries was considered for each subject and defined as typical physiological flow pattern or non-physiological flow pattern. Multivariable logistic regression analyses were performed to determine if bilateral uterine artery notching is an independent explanatory variable for the occurrence of early or late-onset preeclampsia and gestational hypertension. Aspects about delivery and fetal and neonatal outcomes were also noted.

Results: Persistent bilateral notching was seen in about 7.5% of cases. About 3.5 % of these patients developed PE, 3% with late onset while about 0.5% were early onset cases. Bilateral uterine artery notching was an independent explanatory variable for the development of preeclampsia early-onset preeclampsia, and gestational hypertension, but not for late-onset preeclampsia.

Conclusions: Including bilateral uterine notching in screening protocols for PE may improve the detection rate for patients at risk for developing early-onset PE and other pregnancy induced hypertensive disorders.

Keywords: uterine notch, Doppler, preeclampsia, screening.

OP.32

ARTERIOVENOUS FISTULA FLOW AND CARDIAC HEART FAILURE IN HEMODIALYSED PATIENTS

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Objectives: The long-term effects of hemodialysis arteriovenous fistula (AVF) to cardiac hemodynamics creates controversy especially in patients on dialysis for more than 6 months.

Materials: Sixty-six hemodialyzed patients were followed prospectively from, first visit, at inclusion into the study to 3 and 6 months after. Evaluation included clinical parameters, echocardiographic measurements, vascular Doppler assessment of AVF and blood chemistry. New York Heart Association classification was used to determine cardiac heart failure (CHF).

Results: Average duration of renal replacement therapy from debut until the time of inclusion in the study was 29.30±15.84 months. Overall prevalence of CHF was 36%. Mean AVF venous flow was significantly higher in CHF patients than those without CHF ($p<0.001$). We've performed ROC curve analysis to determine threshold of AVF flow volume value from which CHF is present. A flow volume of ≥1170ml/min is a strong predictor for CHF (AUC: 0.984, CI95%: 0.92-1.00, $p<0.0001$). In dynamics, left ventricle ejection fraction (EF) and shortening fraction (SF) slightly increased with no statistical significance, probably because hemoglobin levels significantly increased ($p=0.007$) and systolic and diastolic blood pressure decreased ($p=0.475$, respectively $p=0.023$). Although both cardiac output and AVF flow volume decreased during the monitoring period, they did not correlate significantly. Left ventricular mass index (LVMi) was greater in CHF patients than those without CHF ($p<0.001$).

Conclusions: Hypertension, left ventricular hypertrophy and anemia must be strictly managed to avoid worsening of CHF in end-stage renal disease patients. AVF flow volume of ≥1170ml/min is a strong predictor for CHF.

Keywords: Arteriovenous fistula, chronic kidney disease, echocardiography, cardiac heart failure.

OP.33

TRANSCRANIAL DOPPLER-BASED MODEL TO PREDICT NEUROLOGICAL FUNCTION AFTER INTRA-ARTERIAL MECHANICAL THROMBECTOMY FOR ACUTE ANTERIOR CIRCULATION LARGE VESSEL OCCLUSION

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Objectives: To establish a model based on transcranial Doppler (TCD) to predict neurological function after Intra-arterial mechanical thrombectomy for acute anterior circulation large vessel occlusion (aLVO).
Materials: From June 2020 to March 2021, 44 patients with aLVO after Intra-arterial mechanical thrombectomy were enrolled in this retrospective study. TCD was performed to obtain peak flow velocity of middle cerebral artery after operation. Meanwhile, the clinical indexes, such as time from onset to reperfusion, were recorded. Three months after operation, all patients were evaluated for modified Rankin scale(mRS) to assess neurological function prognosis. Correlation analysis and multiple linear regression analysis was used to screen the factors closely associated with neurological function prognosis. Then, the model was established and validated by using the bootstrap method.
Results: Correlation analysis and multiple linear regression analysis showed that bilateral middle cerebral artery peak flow velocity difference ratio (P=0.036) and time from onset to reperfusion (P=0.037) are factors closely associated with neurological prognosis. The model was established, $0.91 + 1.37*X1$(time from onset to reperfusion,$>$240min:1;$<$240min:0)$+ 3.43*X2$ (bilateral middle cerebral artery peak flow velocity difference ratio). The bootstrap validation results showed that the model of each variable regression coefficients felled within the 95% confidence interval.
Conclusions: Bilateral middle cerebral artery peak flow velocity ratio and time from onset to reperfusion are related to neurological function after Intra-arterial mechanical thrombectomy for aLVO. The model can reliably predict the prognosis of neural function.
Keywords: Large vessel occlusion, Neurological function prognosis, Model, Middle cerebral artery, Transcranial Doppler, Intra-arterial mechanical thrombectomy.

OP.34

OPTICAL AND ULTRASOUND IMAGING OF SHEAR WAVE GENERATED BY LASER INDUCED CAVITATION BUBBLES

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Objectives: In this work we captured shear wave generated by cavitation bubble collapse with both ultrasound and optical high speed imaging
Materials: While active shear wave elastography for creating tissue elasticity map has mushroomed over years, there are not lots of shear generation sources so far in use. Here we show non-spherical cavitation bubble collapse can generate shear wave in a tissue mimicking material thus it can be a promising method for creating shear waves in active elastography. With generating cavitation bubble in a thin layer of graphite powders in a transparent tissue mimicking material, we could track shear wave front after non-spherical collapse of bubble with simultaneous high-speed optical and ultrasound imaging. Comparison between two methods demonstrates excellent agreement in measuring propagation speed of the generated shear wave after bubble collapse.
Results: We show cavitation bubble collapse could be a shear generation source which may be used in shear wave elastography. The speed of the propagating shear wave was measured by both ultrasound and high speed optical imaging.
Conclusions: With monitoring graphite particles in a tissue mimicking material we have shown that cavitation bubble non-spherical collapse can generate shear waves.
Keywords: Elastography, Cavitation bubble collapse, Shear wave, Ultrasound, High speed imaging.

OP.35

DETECTION OF A SPOKE-WHEEL PATTERN OF FOCAL NODULAR HYPERPLASIA WITH NOVEL MICROVASCULAR FLOW IMAGING.

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Objectives: Microvascular flow imaging (MVFI) is a novel advanced Doppler ultrasound (US) technique specifically designed to detect slow-velocity blood flow in small-caliber micro vessels.

Focal nodular hyperplasia (FNH) is the second most common solid liver lesion, the spoke-wheel vascularity pattern is characteristic, and it has been consistently detected with MVFI.

The identification of the typical patterns of vascularity, including the spoke-wheel pattern with MVFI can expedite diagnosis, spare patients from unnecessary procedures, and save cost.
Materials: This study retrospectively collected MVFI US images of twelve patients followed for a known focal liver lesions (FLL), or referred to either a contrast-enhanced (CEUS) or a US-guided biopsy to specify the entity of uncertain FLL. All lesions were diagnosed with either image guided biopsy or with magnetic resonance imaging using a liver-specific contrast agent. Patients were examined using a Samsung RS85 Prestige scanner.

The vascularity of the lesions was evaluated with either conventional color Doppler US or directional power Doppler imaging using the S-FlowTM application. We used the MV-FlowTM application for microvascular flow imaging by recording a 5-10-second-long video in a breath-hold. A CEUS examination was made with 3 ml bolus SonoVueTM microbubble contrast. Lesion was scanned for two minutes and delayed phase images were recorded up to five minutes.
Results: Similar to CEUS, a spoke-wheel distribution of micro vessels is a typical finding with MVFI and it is steadily detectable in all FNH lesions, including small lesions less than 3 cm in diameter. The vascularity pattern detected with MVFI was identical to the spoke-wheel distribution seen during the wash-in phase with CEUS (n=6). According to the subjective assessment of an expert radiologist, MVFI was able to visualize the vascularity of FNHs better compared to color Doppler US or directional power Doppler imaging in all 6 cases. In our case series, spoke-wheel pattern shows to be specific to FNH and could not be detected in any other types of FFL (n=6) including hemangioma, metastasis, and hepatocellular carcinoma.
Conclusions: The spoke wheel pattern can be easily detected with MVFI even in small size FNHs. Further study is needed to validate its diagnostic accuracy.

Keywords: FNH, Microvascular Doppler Ultrasound, Focal liver lesion, Diagnostic sign.

OP.36

3D ULTRASOUND VERSUS COMPUTED TOMOGRAPHY AS EX-VIVO IMAGING OF SURGICAL SPECIMENS – A PILOT STUDY ON ANIMAL SPECIMEN

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Objectives: The goal of surgical oncology is complete resection of the cancer tissue surrounded by a safe margin of normal tissue. The status of the tumor margins of the specimen removed during cancer surgery has an important influence on the survival rate. Adjuvant treatments such as repeating surgery and/or radiotherapy, along with prognostic complications and significant financial costs, are usually required when a close or positive surgical margin is observed by the pathologist. Ex vivo imaging of resected cancer tissue could therefore be useful for margin assessment. Three-dimensional (3D) ultrasound is a new promising low-cost and portable image modality that can be used in the operating room to directly analyze tumor dimensions [1, 2]. In this study, we aimed to investigate the accuracy of 3D ultrasound versus computed tomography (CT) to measure the tumor volume in an animal model compared to anatomical assessment.
Materials: An animal specimen using chicken (resembling tumor), and calf liver (resembling surrounding healthy tissue) was formalin fixated. Accurate and systematic slicing was performed for anatomical assessment by pathologist. A slice-by-slice area measurement was conducted to compare the accuracy of the 3D ultrasound and CT techniques. 3D ultrasound imaging was performed using SAMSUNG RS85 Prestige ultrasound machine and 3D linear ultrasound probe (LV3-14A). The animal specimen was scanned with the CT scanner set at 120 kVp, 100 mA, and 0.5 mm of voxel dimension.
Results: The tumor volume measured by anatomical assessment was 980.2 mm3. The mean measured volume and the standard deviation of repeating the measurement five times using CT was 890.4 ± 90 mm3, and 3D ultrasound resulted in measurements of 924.2 ± 96 mm3.
Conclusions: 3D ultrasound is accurate for the measurement of soft tissue volume on an animal model compared to CT. The low cost and portability of ultrasound could make this modality an attractive imaging modality for the ex-vivo surgical specimens in the operation room.
Keywords: 3D ultrasound, CT, ultrasound volume measurement, animal study.

References

1. Rogers S, Carreira J, Thompson R et al. An Ex Vivo Evaluation of Tomographic 3-D Ultrasound, B-Mode Ultrasound, CT And MR Imaging to Measure Artery Diameter, Length and Wall Volume. Ultrasound Med Biol 2019; 45: 2819-2829. DOI: 10.1016/j.ultrasmedbio.2019.07.002
2. De Koning KJ, Koppes SA, De Bree R et al. Feasibility study of ultrasound-guided resection of tongue cancer with immediate specimen examination to improve margin control – Comparison with conventional treatment. Oral Oncology 2021; 116: 105249. DOI: 10.1016/j.oraloncology.2021.105249

OP.37

DIAGNOSTIC ACCURACY OF CONTROLLED ATTENUATION PARAMETER FOR STEATOSIS ASSESSMENT IN CHRONIC LIVER DISEASES USING THE M AND THE XL PROBES

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Objectives: Hepatic steatosis is a frequent histological finding among subjects with chronic liver diseases (CLDs) (1). The present study analyzed the diagnostic accuracy (DA) of controlled attenuation parameter (CAP) in predicting each steatosis grade, using liver biopsy (LB) as the reference standard, in a large unicenter cohort.
Materials: We prospectively included 669 consecutive CLD patients. All of them underwent CAP measurement using the M or the XL probe, one day before LB. The diagnostic performance of CAP was calculated using the area under the receiver operating characteristic curve (AUROC).
Results: At univariate analysis, several parameters seemed to influence CAP, including steatosis grade, steatosis type, ballooning, skin-to-liver capsule distance (SCD), BMI, and age. However, after multivariate analysis, only the steatosis grade and the SCD had a significant effect on the CAP value (p=0.000). The median (range) CAP (dB/m) values for each steatosis grade were: 217.5 (129-394) for S0, 293.5 (100-398) for S1, 269 (100-391) for S2, and 307 (178-400) for S3. CAP managed to differentiate with high statistical power between all degrees of steatosis (p=0.000), except S1 from S2(p>0.05). The optimum CAP cut-off values (dB/m) were 250.5 for ≥S1, 264.5 for ≥S2 and 287.5 for S3, with AUROC values of 0.732, 0.714 and 0.762, respectively. The maximum DA was obtained for the prediction of severe steatosis (77.73%). 76 cases (11,4%) had SR<60%, while 22 patients (3,3%) had no measurement obtained (SR=0) using the M probe. After multivariate analysis, SR<60% remained significantly influenced by SCD (p=0.003) and gender (p=0.026). The introduction of the novel XL probe overcame this downside among 20 subjects, being unaccountable in only 2 cases, both with alcoholic liver disease.
Conclusions: CAP is significantly influenced by steatosis and the SCD. CAP detects HS with good accuracy among Romanian patients with various CLD.
Keywords: Controlled Attenuation Parameter, steatosis, Vibration Controlled Transient Elastography, chronic liver disease.

References

1. Mueller S. Liver elastography clinical use and interpretation. 2020.

OP.38

FATTY LIVER QUANTIFICATION USING ULTRASOUND DERIVED FAT FRACTION (UDFF) AS COMPARED TO CONTROLLED ATTENUATION PARAMETER (CAP) IN A MIXED COHORT OF PATIENTS

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Objectives: The aim of this study was to assess the performance and optimal cut-off points of UDFF for the non-invasive assessment of liver steatosis, using transient elastography (TE) with CAP as a reference method.

Materials: We included 271 consecutive patients, with or without chronic liver disease (43.7% female, mean age 53.3 ± 13.05 years). Liver steatosis was evaluated in the same session by two techniques: UDFF - using a Siemens ACUSON Sequoia system (Deep Abdominal Transducer-DAX) and by CAP – using a FibroScan Compact M 530 device (M and XL probes). The following CAP cut-off values were used to differentiate among different grades of steatosis: 248dB/m for mild steatosis (S1), 268 dB/m for moderate steatosis (S2) and 280 dB/m for severe steatosis (S3).

Results: According to BMI, from the 271 patients 41% were obese, 34% were overweight and 25% normal weight. The correlation between UDFF and CAP was good, r=0.75, p<0.0001. We calculated the following UDFF optimal cut-off values to differentiate among steatosis grades: for S1->5% [(with 88.4% Se, 77.5% Sp,73.8% NPV, 90.3% PPV and an AUC of 0.92 (0.89-0.95), p<0.0001];for S2 >10% [(with 69.3% Se, 99% Sp, 99.1% NPV, 67.9% PPV and an AUC of 0.95 (0.92-0.97), p<0.0001]; and for S3 >15% [(with46.9% Se, 100% Sp, 100% NPV, 60.5% PPV and an AUC of 0.93 (0.89-0.96), p<0.0001].

Conclusions: UDFF is a good method for classifying steatosis severity with the following cut-offs:> 5% for mild steatosis,> 10% for moderate steatosis and > 15% for severe steatosis,the specificity increasing with steatosis severity.

Keywords: UDFF- ultrasound derived fat fraction, Liver steatosis assessment.

References

1. Karlas T, Petroff D, Sasso M, et al. Individual patient data meta-analysis of controlled attenuation parameter (CAP) technology for assessing steatosis. J Hepatol. 2017 May;66(5):1022-1030. doi: 10.1016/j.jhep.2016.12.022. Epub 2016 Dec 28. PMID: 28039099.

OP.39

MULTIPARAMETRIC ULTRASOUND EVALUATION OF LIVER FIBROSIS, STEATOSIS AND VISCOSITY IN PATIENTS WITH CHRONIC LIVER DISEASE

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Objectives: The multiparametric assessment of liver fibrosis, steatosis and inflammation offers valuable prognostic information in chronic liver disease (CLD) patients (1). The current study aims to evaluate the feasibility and performance of three new ultrasound-based techniques for the noninvasive assessment of liver fibrosis, steatosis and inflammation in CLD patients.

Materials: 209-consecutive compensated CLD patients were included in the study. Ultrasound-based measurements were performed in all patients, in the same session, using ShearWave Elastography (2D-SWE.PLUS), Attenuation Plane-wave Ultrasound (Att.PLUS), Viscosity Plane-wave Ultrasound (Vi.PLUS) from Aixplorer and Transient Elastography (TE) with Controlled Attenuation Parameter (CAP) from FibroScan as reference method.

Results: Valid measurements were obtained in 99% of patients by TE, in 89% of patients by 2D-SWE.PLUS/Vi.PLUS, and in 96.65% of patients by Att.PLUS. Accurate 2D-SWE.PLUS/Vi.PLUS measurements were achieved even at lower levels of Stability index, 80%. 2D-SWE.PLUS values showed excellent correlation with TE values (R=0.913), irrespective of liver fibrosis or steatosis stage. The best cut-off value for moderate fibrosis was 8 kPa (AUC 0.95) and for severe fibrosis 10 kPa (AUC 0.97). CAP values correlated moderately with Att.PLUS (R=0.472). Att.PLUS had moderate performance in predicting different steatosis stages (AUC 0.76->0.77) with the best cut-off values S1-0.45, S2-0.5, S3-0.55 dB/cm/MHz. Viscosity had excellent performance for predicting significant fibrosis (AUC=0.87), with excellent power to predict it as the degree of liver steatosis increased (AUC 0.84->0.89->0.91) but with a less predictive value than 2D-SWE.PLUS (R=0.68 vs R=0.91). Viscosity correlated poorly with GOT level and not at all with GPT.

Conclusions: The multiparametric ultrasound evaluation offers valuable prognostic information in a single analysis in CLD patients. 2D-SWE.PLUS has excellent diagnostic accuracy of liver fibrosis while Att.PLUS has a relatively good accuracy of liver steatosis. Viscosity can better reflect liver fibrosis stage than liver inflammation.

Keywords: Multiparametric assessment.

References

1. Deffieux T et al. Investigating liver stiffness and viscosity for fibrosis, steatosis and activity staging using shear wave elastography. J Hepatol. 2015;62(2):317−24

OP.40

APPLICABILITY OF VISCOSITY PLANE-WAVE ULTRASOUND (VIPLUS) IN THE EVALUATION OF THYROID GLAND IN HEALTHY VOLUNTEERS

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Objectives: Viscoelastic properties of biological tissues are directly linked to the shear wave dispersion within tissues. The aim of this study was to determine normal reference viscosity values for the thyroid gland and to evaluate the influences of age, gender and body mass

index (BMI), using a recent technique Viscosity Plane-wave UltraSound (Vi.PLUS). A secondary objective of the study was to establish if there is a correlation between the viscosity values and the values obtained using 2D Shear-Wave Elastography PLUS (2D-SWE.PLUS).
Materials: The studied group consisted of 85 healthy volunteers (median age 29, 65,9 % were female) prospectively examined between January 2022 and March 2022. The viscosity of thyroid gland was measured using Aixplorer MACH 30 ultrasound system (SuperSonic Imagine, Aix-en-Provence, France) equipped with a curvilinear C6-IX transducer that allows quantification of the viscosity and stiffness at the same time. The mean value of three consecutive measurements was used as a representative value for each volunteer, measured in Pascal-second (Pa.s) for viscosity and kilopascal (kPa) for SWE. To investigate the effects of potential confounding factors (age, gender and BMI) on thyroid viscosity, the Spearman correlation test and the ANOVA test were performed.
Results: The mean thyroid viscosity measurement value was 2.63± 0.47 Pa.s. No statistically significant differences were detected between left and right lobe of the thyroid gland. A strong correlation between thyroid viscosity and elasticity ($P<0.0001$) was found. There was a significant positive correlation between BMI and viscosity values which increased with BMI ($p<0.009$). There was no correlation between viscosity and gender ($p>0.05$).
Conclusions: Supersonic Vi.PLUS and 2D-SWE.PLUS can provide important information regarding viscosity and elasticity of the thyroid parenchyma. The effect of the potential confounding factors on thyroid viscosity was negligible, except BMI.
Keywords: Viscosity, ShearWave Elastography, thyroid gland, healthy subjects.

References

1 Rus G, Faris IH, Torres J, Callejas A, Melchor J. Why Are Viscosity and Nonlinearity Bound to Make an Impact in Clinical Elastographic Diagnosis? Sensors (Basel). 2020 Apr 22;20(8):2379.
2 Muntean D, Lenghel M, Ciurea A, Dudea S. Viscosity Plane-wave UltraSound (ViPLUS) in the assessment of parotid and submandibular glands in healthy subjects - preliminary results. Med Ultrason. 2022 Jan 19
3 Kara T, Ateş F, Durmaz MS, Akyürek N, Durmaz FG, Özbakır B, Öztürk M. Assessment of thyroid gland elasticity with shear-wave elastography in Hashimoto's thyroiditis patients. J Ultrasound. 2020 Dec;23(4):543-551.

OP.41

THE STRAIN RATIO AND 4D VASCULARITY AS ADDITIONAL PARAMETERS TO THE TI-RADS

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Objectives: This study attempts to compare four TI-RADS classifications: the ACR-, EU-, Horvath- and French TIRADS and to evaluate the performance of a fifth score that includes elastography (strain ratio>4) and 4D Color Doppler assessment of vascularity in estimating the risk of thyroid cancer.
Materials: 133 thyroid nodules were evaluated with a HITACHI Preirus machine, using B-mode ultrasound, strain elastography and volumetric Color Doppler assessment and the results were compared to the pathology report.
Results: Thyroid cancer was found in 26.31% of the reports, 62.85% of which, were papillary carcinomas. The strain ratio (SR) was the most prevalent suspicious feature among cancer cases: SR mean of 2.54± 1.28 for the benign and 5.561±1.55 for the malignant group. The ACR and EU-TIRADS had similar accuracy (45.86% and 42.85%), but with high false-positive rate (specificity 31.8% and 23.4%). The TIRADS designed by Horvath was more time-consuming, but had improved accuracy (66.9%); the French TIRADS 2B+qualitative SE had 78% accuracy. A modified French score (2B+SR) outperformed the previous ones (84.9% accuracy). Adding 4D Doppler assessment did not improve accuracy but slightly increased the sensitivity (94.3% vs 91.4%). In our group, category 5 (highest risk) nodules were malignant in 53% for the EU-TIRADS, 43.58% for the ACR, 55.17% for the Horvath model and 81.8% for 2B+SR and 84% for 2B+SR+4D. Good positive correlations were found between the SR, 4D, 2B+SR and the histopathological exam (0.5053765, 0.6506053, 0.5531696).
Conclusions: All imaging scoring systems are helpful in the stratification of thyroid nodules. The SR was the most powerful of the analyzed US features and the French model 2B+SR significantly improved the accuracy by increasing its specificity.
Keywords: thyroid cancer, strain elastrography, TI-RADS, volumetric doppler.

OP.42

THE RELATIONSHIP OF RENAL STIFFNESS MEASURED USING 2D SHEAR WAVE ELASTOGRAPHY AND RENAL FUNCTION IN KIDNEY TRANSPLANT RECIPIENTS

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Objectives: Elastography comes as a useful noninvasive tool for the assessment of renal transplant recipients, but there is however a great heterogeneity between the studies performed with different elastographic methods. 2D-shear wave elastography (SWE) PLUS emerges as a novel technique that promises to offer improved renal stiffness measurements due to improved processing algorithms.
Materials: We performed a cross-sectional study of 35 kidney transplanted patients (13 women, 22 men, with a mean age of 49.4±13 and a mean duration after transplant 10.1±5 years). In every patient, we obtained 5 valid measurements of renal stiffness (obtained from 5 different frames in the cortex of the renal graft), and also tissue viscosity (Viscosity Plane-wave Ultrasound-VI-Plus), with a C6-1X convex transducer using the Ultra-Fast™ software available on the Aixplorer Mach 30 ultrasound system (Supersonic Imagine, Aix-en-Provence, France). The median value of elastographic measurements has been correlated with the demographic and clinical parameters of the patients.
Results: We obtained a cut-off value of renal cortical stiffness of <27.3kPa for detection of estimated glomerular filtration rate(eGFR)< 60ml/min/1.73m2 with 80% sensitivity and 75% specificity (AUC=0.777, P=0.0001), a cut-off value of <26.9kPa for detection of eGFR<45ml/min/1.73m2 with 70.33% sensitivity and 70% specificity

(AUC=0.718, P=0.014) and a cut-off value of <23kPa for detection of eGFR<30ml/min/1.73m2 with 85.7% sensitivity and 75% specificity (AUC=0.837, P<0.001). We found a positive correlation coefficient of renal cortical stiffness and the eGFR (r=0.4855, P=0.0031, 95% CI for r 0.1817 to 0.7048), also with viscosity (r=0.4640, P=0050, 95% CI for r 0.1546 to 0.6905), and a negative correlation with measurement depth (r=-0.3388, P=0.0465, 95% CI for r -0.6038 to -0.0061). No statistically significant correlations were found between mean measures of cortical stiffness and age, hypertension, diabetes, previous glomerular disease, or if the kidney was attained from a living related or a deceased donor or between C reactive protein and viscosity.

Conclusions: Renal stiffness in transplanted patients shows a major statistical correlation with renal function, thus kidneys with reduced renal function show significantly decreased stiffness values. More research is needed to validate this technique for it to be used in regular clinical practice.

Keywords: Chronic kidney disease, Stiffness, 2D-SWE, ultrasound, Supersonic Image.

OP.43

PITFALLS IN RENAL ARTERY STENOSIS ULTRASOUND EXAMINATION

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Objectives: Doppler ultrasonography criteria for significant renal artery stenosis (RAS) are PSV over 1.5m/s, RAR over 3.5, slower systolic upstroke, acceleration time over 0.07 sec, decreased EDV/ESV ratio and typically ”parvus et tardus” waveform distal to site of the stenosis. Performing the examination can be challenging due to numerous factors.

Materials: 401 patients were examined at the Department of Nephrology of Mureș County Hospital and at a private practice for the suspicion of reno-vascular hypertension. The Doppler US examination of the aorta, renal arteries origins, hilum and intrarenal interlobar arteries at three points was performed by a single nephrologist examiner. Patients were young hypertensive or older atherosclerotic. Causes of unsuccessful identification of main renal arteries were noted.

Results: Two patients had a RA stent, 22 (5.48%) had significant RAS and were referred for angiography and stenting. 147 (36.65%) had insufficient results for significant RAS. The rest of the patients presented inconclusive data, and the following pitfalls can be encountered for this: patient related- obesity, insufficient preparation, non-compliance for inspiratory apnea; examiner related- technical issues, type of US device, settings; anatomy related- tortuosity of the main arteries, interference of the RRA origin with the left renal vein, gas artefacts from the colon.

Conclusions: While angiography remains the gold standard for the diagnostic of RAS, it is typically used only after a positive noninvasive screening test. Doppler US is a reliable, safe an non-invasive method for screening in suspected cases. Despite of difficulties, our success rate was high.

Keywords: atherosclerosis, hypertension, renovascular, stent, ultrasonography, Doppler.

References

1. Tafur JD, White CJ.Renal Artery Stenosis: When to Revascularize in 2017.Curr Probl Cardiol. 2017 Apr;42(4):110-135
2. Safian RD.Renal artery stenosis. Prog Cardiovasc Dis. 2021 Mar-Apr;65:60-70.
3. Lenz T.Treatment of renal artery stenosis in the year 2021.Internist (Berl). 2021 Mar;62(3):252-262.

OP.44

ULTRASOUND-BASED RADIOMICS NOMOGRAM FOR DIFFERENTIATING BENIGN AND MALIGNANT SOLID KIDNEY TUMOURS

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Objectives: Early detection and diagnosis of renal cell carcinoma contributes to the prognosis and survival time of patients. However, as the first-line screening medical imaging tool, ultrasound has not been satisfactory for the accurate identification of renal cell carcinoma. This study aimed to develop and validate an ultrasound radiomics model for a new strategy to assess the malignancy and benignity of solid kidney focal lesions to benefit patients.

Materials: Data from 208 and 46 consecutive cases with determined pathological results from two hospitals since March 2013 were included. The images were divided into benign and malignant groups based on the pathological results, and two internal databases were randomly allocated. The radiomics score was determined with 8 features by LASSO regression after performing Student’s t test for 107 features.

Results: The nomogram constructed with 3 clinical characteristics and the radiomics score showed greater discrimination than the clinical model with an AUC of 0.869 vs. 0.778 (P=0.040) and 0.860 vs. 0.730 (P=0.036) in the internal and external validation.

Compared to the less experienced doctors averaged, the nomogram achieved higher accuracy (0.80 vs. 0.67, P=0.154), sensitivity (0.80 vs. 0.69, P=0.274) and specificity (0.82 vs. 0.60, P=0.361). In comparison, the experienced experts averaged showed higher accuracy of 0.87 (P=0.293), sensitivity of 0.94 (P=0.151), but greatly lower specificity of 0.59 (P=0.635) in the independent validation. Decision curve analysis showed the nomogram was clinically useful.

Conclusions: This study represented an ultrasound radiomics nomogram based on clinical and ultrasound data, which can be conveniently used to facilitate detection of renal cell carcinoma and clinical decision-making.

Keywords: Renal Cell Carcinoma, Ultrasonography, Radiomics, Nomogram.

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0301-5629/$ - see front matter

POSTER PRESENTATIONS

PP 01

THE BENEFIT OF USG IN DIAGNOSING RADIAL SCARS IN THE CONTEXT OF DIFFERENTIAL DIAGNOSIS OF BREAST LESIONS

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Objectives: A radial scar or complex sclerosing lesion is a benign hyperplastic lesion that ranks among the risk lesions, (histologically B3a, B3b) as it is not sparse associated with cell atoms or malignancy. In addition, it exhibits high morphological similarity to breast cancer in the imaging methods. USG diagnostics is a very useful way.

The goal of the presentation: In a retrospective study at the Department of Radiology in Trencin and St. Elisabeth Institute of Oncology, he discovered the benefit and accuracy of sonography compared to mammography and magnetic resonance, and biopsy.

Materials: In the period from December 2018 to January 2022, we retrospectively evaluated the results of 386 patients with histologically diagnosed radial scars. We performed examination by age sonographically, mammographically, with magnetic resonance, but always verified histologically. The core biopsy under USG control was realized by freehand methods. The patients were surgically treated. We compared the results of sonographic conclusions, biopsies, and final histology, and compared the accuracy and correctness of the conclusion of sonography and histopathology. We evaluated the data using Mc Nemar's test. We have tested the relationship with Spearman's correlation coefficient

Results: The results are in the tables. The following resulted from the comparison: sonography was consistent with the correct assumption of radial lesion of benign characteristics in 251 cases, in 40 cases it was fundamentally different and the other 95 suspected. USG shows better results in women under the age of 40, women between ages 40 and 50 are less reliable when comparing lesions by age. At the age of 50, MG and DBT are more accurate than the USG. The low correlation of correspondence is also in the field of architectural changes. More precisely, it is the elderly patient's mammography a digital breast tomography.

Conclusions: Sonography has a benefit in examining women aged up to 40 years of age and with dense breast tissue, women over 50 years of age have a more accurate X-ray, MR is not very beneficial, and has low specificity. Sonography is important in the differential diagnosis of radial scar lesions.

Keywords: radial scar, sonography, borderline lesions, mammography, biopsy.

PP 02

THE ISSUE OF UPPER EXTREMITY LYMPHEDEMA IN WOMEN FOLLOWING SURGERY FOR BREAST CANCER - THE ACCURACY OF DIAGNOSIS BY SONOGRAPHY, PILOT STUDY..

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Objectives: Lymphedema is a problem that may occur after cancer surgery when lymph nodes are removed. Lymphedema can occur months or years after treatment. It's a chronic (ongoing) condition that has no cure. But steps can be taken to help keep it from starting and to reduce or relieve symptoms. If left untreated, lymphedema can get worse. Getting treatment right away can lower your risk of infections and complications.

To goal of the prospective study is the compare the accuracy of sonography and manual measurement of the degree of lymphedema of the upper limb in women after breast surgery for breast cancer. Measure changes in interstitial tissue and thickening of the skin prior to treatment, during treatment, and after treatment of lymphedema.

Materials: A pilot study. Women diagnosed with lymphedema C 50. Measuring at 4 locations / from the shoulder joint after wrist 10 cm and in the metacarpal. We compared numerical measurement with the accuracy of sonography. The period from 3. January 2018 to 30.September. 2021. We examined 30 patients, aged from 45 to 72 years. We examined with US machine B-K Focus 400, BC Specto - linear probe, 18 MHz, documented by PACS. We have the first steps in a pilot study.

We compared changes in the subcutaneous tissue, leakage, dilated lymphatic vessels, the extent of leakage compared to the other side, we compared the results before and after the first, second, third lymphatic drainage

Results: The US measurement results correlated with limb circumference. Measurements are specific, precise, and targeted to describe skin thickness and good value changes of interstitial tissue. The first assessment is to measure the physical circuit limb sufficient. But US investigations accurately describe the changes in the tissue and enable the differentiation beginning on or after chronic lymphedema

Conclusions: The results of the pilot study recommended, that the US examination of soft tissue, skin, and subcutaneous tissue of the upper limb with lymphedema on women after breast surgery for breast cancer is fast, accurate, comfortable, and accessible and provides more information than only simple physical measurement circumference limb.

Early diagnosis of lymphedema or lymphedema in the initial phase is very important, as proper physiotherapy does not develop chronic lymphedema. For socio-economic aspects and from the point of view of public health care and psychologic positiv view of the patient, preventive examination of the skin and subcutaneous tissue of the upper limb and women after surgical treatment of breast cancer is an excellent method.

Keywords: Breast carcinoma, conservative breast therapy, breast cancer surgery, lymphedema, physical therapy.

PP 03

DIAGNOSIS OF BREAST CANCER DURING PREGNANCY AND BREASTFEEDING

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Objectives: Breast cancer is the most common female cancer worldwide and the most frequent malignancy during pregnancy [1]. The incidence increases with delayed pregnancy in an ever larger number of women [2]. Breast cancer in pregnancy requires an extra effort in order

to provide mothers the most effective multidisciplinary treatment [3]. The diagnosis triad correlates physical examination, imaging and histopathological investigation.

Materials and methods

Materials: Between 2017- 2020, we performed 897 ultrasonography-guided core needle biopsy at the Craiova Emergency County Hospital for malignancy suspect masses (BI RADS 4), highly malignancy suspect masses (BI RADS 5), and presumably benign masses (BI RADS 3). Only 23 core needle biopsies were performed on pregnant and breastfeeding patients aged 20-40 years.

Results: The first case was a 41-year-old patient presenting as Paget's disease of the breast had also a tumor in the same breast, which was confirmed by core needle biopsy to be invasive breast cancer. The second case was a 29-year-old female patient with a solid breast mass discovered during breastfeeding and confirmed by CNB to be breast cancer. After 7 cures of polychemotherapy we can observed a partial remission of the tumor.

Conclusions: Breast cancer during pregnancy and breastfeeding is a rare occurrence, its evolution varying significantly from one patient to another. The mechanism underlying the protective effect of breastfeeding is not fully understood, and the beneficial effects can be explained by changes in the breast structure and lower lifetime exposure to hormones. Breast cancer can be safely diagnosed, staged and treated during pregnancy, while protecting the fetus and mother, with excellent results for both. The incidence of breast cancer during pregnancy ranges between 0.2-3.8 % and increases with delayed pregnancy (our research timeframe: 2017-2020, value: 2.2%).

Keywords: Breast cancer, pregnancy, breastfeeding.

References

1. Breast carcinoma in pregnant women. Assessment of clinicopathologic and immunohistochemical features. Middleton LP, Amin M, Gwyn K, et al. Cancer. 2003;98:1055−1060.
2. Breast cancer in pregnancy: a literature review. Woo JC, Yu T, Hurd TC. Arch Surg. 2003;138:91−98.
3. Maternal and fetal outcome after breast cancer in pregnancy. Zemlickis D, Lishner M, Degendorfer P, et al. Am J Obstet Gynecol. 1992;166:781−787.

PP 04

VALUE OF CONTRAST-ENHANCED ULTRASOUND IN THE DIFFERENTIAL DIAGNOSIS OF GALLBLADDER LESIONS

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Objectives: Standard ultrasound is an excellent method for assessing gallbladder disease. Despite the well-known advantages of conventional ultrasound, the sensitivity and accuracy are not satisfactory, especially when stones or some other gallbladder lesions fill the gallbladder lumen. Sometimes the bladder sediment may present as an intraluminal mass and mimic tumors such as gallbladder cancer or adenoma. With no information of micro vascularity differential diagnosis between benign diseases from malignant diseases is sometimes very difficult using conventional ultrasound, but CEUS can be a useful tool.

Materials: The study was performed in the Gastroenterology Clinic of SCJU Craiova during 2018-2022. 38 patients with ultrasound-detected gallbladder formations were included. The reference methods for diagnosis were histological examination or computed tomography in cases without operative indication. A single experienced physician with more than fifteen years' experience performed CEUS examinations by applying a second-generation blood pool agent (SonoVue®, Bracco, Milan, Italy). Archived images were interpreted by the same physician and compared to the final diagnosis.

Results: There were 12 malignant and 26 benign gallbladder lesions in total in this study, including 12 cases of gallbladder cancer, 16 case of gallbladder sludge and 10 cases of gallbladder polyps.

All the cases of gallbladder sludge were shown as completely non-enhanced on CEUS, and the diagnostic accuracy was 100%. CEUS exam shows homogeneously hyperenhanced on arterial phase and iso-enhanced on venous phase in gallbladder polyps, The appearances of gallbladder cancer on CEUS were various: a mass in gallbladder which was heterogeneously hyperenhanced on arterial phase and washed out quickly or an irregular thickness of gallbladder, which was also heterogeneously hyperenhanced on arterial phase and washed out quickly.

Conclusions: Gallbladder sludge and gallbladder cancer had completely different features on CEUS and the diagnostic accuracy was very high. CEUS is a feasible alternative tool to differentiate gallbladder pathologic alterations.

Keywords: CEUS, gallbladder lesions.

PP 05

DIFFERENTIATING SOLID PANCREATIC LESIONS: THE CONTRIBUTION OF EUS-FNB WITH CONTRAST-ENHANCED IMAGING

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Objectives: Endoscopic ultrasound tissue acquisition, in the form of fine needle biopsy (EUS-FNB) was designed to provide a proper quantitative sample for determining the histologic architecture and further immunohistochemical staining. This study aimed to investigate the contribution of associating contrast-enhanced ultrasound imaging (CEUS) with EUS-FNB for differentiating solid pancreatic lesions without on-site cytopathology.

Materials: Patients from our institutional database who underwent CE-FNB-EUS for the evaluation of a solid pancreatic lesion were retrieved. Micro vascularization of the tumor was evaluated over 2 min during CEUS after intravenous injection of 4.8 mL SonoVue and was classified as hypervascular, isovascular or hypovascular during both arterial and venous phase. Final diagnosis was based on histopathology of surgical specimens or EUS-guided tissue acquisition and clinical follow-up.

Results: Our retrospective study (2018-2021) enrolled 46 patients with a mean age of 58, female to male ratio 1:2, mass location: 2/3 head, 1/3 body and tail of the pancreas, average mass size 3.5 cm, mean number of needle passes (fanning technique): 2. Final pathology revealed pancreatic ductal adenocarcinoma-PDAC (26), mass-forming pancreatitis-MFP (10), pancreatic neuroendocrine tumors-pNETs (4), undifferentiated carcinoma (3), mucinous carcinoma (1), pancreatic metastasis (1). Hypo-enhancement was noted in 67% of the patient, and the final diagnosis was malignancy in all those cases. Regarding the enhancement patterns: hypovascularity in both arterial and venous phase was associated to PDAC, hypervascularity or isovascularity in both phases were associated to either MFP or NETs, while the carcinomas were hypervascular. A heterogeneous appearance with non-enhancing areas was noted in a small percentage of the hypo-enhancing lesions and it might suggest necrosis. The overall diagnostic accuracy was 91%.

Conclusions: CE-EUS allows detailed visualization of the dynamic enhancement patterns hence it helps to identify the target of EUS-FNB

among different pathological areas of the lesions. CE-FNB-EUS can be used for the differential diagnosis and adequate sampling of solid pancreatic lesions without on-site cytopathology.
Keywords: Endoscopic ultrasound, Fine needle biopsy, Contrast enhancement, Pancreatic cancer.

PP 06

HOW TO IMPROVE THE CONTRAST ENHANCED ULTRASOUND (CEUS) LI-RADS ALGORITHM FOR THE DIAGNOSIS OF DEFINITE HEPATOCELLULAR CARCINOMA: THE ROLE OF COMBINATION OF LR- 4 AND LR-5

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Objectives: CEUS has increased the capability of ultrasonography for the detection of focal liver lesions (FLL). The differential diagnosis between hepatocellular carcinoma (HCC) and other malignant tumors may be limited by similarities in the appearance of CEUS. The aim of this study was to evaluate the role of combination of LR-4 and LR-5 by adding ancillary features (AFs) in the CEUS LI-RADS v2017 algorithm for the diagnosis of definite HCC.
Materials: This retrospective single- center study included 143 patients with 191 FLL detected by abdominal ultrasound from a total of 823 consecutive patients. The risk factors were liver cirrhosis of any etiology and non-cirrhotic HBV patients. Diagnosis was established either through histopathology or based on CT/MRI scan. CEUS recordings were assessed by an EFSUMB level 3 sonographer, with more than 10 years experience in CEUS and who was blinded to clinical data and to the final diagnosis. All lesions have been categorized according to the CEUS LI-RADS® described by The American College of Radiology scheme. The AFs were taken into account. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy were calculated.
Results: PPV for primitive malignancy (LR-4 + LR-5) was 95.7% (95CI%: 90.7−98%), with 88.07% sensitivity, 89.3% specificity and 88.4% accuracy for HCC (95CI%: 82.8−92.6%). LR4 + LR5 had 81.8% sensitivity for HCCs over 2 cm (n = 127), and 78.57% sensitivity for HCCs less than 2 cm (n = 14). Both sensitivity and accuracy of LR-4 + LR-5 for the diagnosis of definite HCC considerably raised to 88.07% and 88.4%, unlike the sensitivity and accuracy for LR-5 of only 60.45% and 69%, respectively. NPV also improved (73.4% vs. 46.6%), while similar high PPVs (95.7% vs. 96.2%) and quite similar specificity (89.3% vs. 93.6%) were maintained.
Conclusions: Higher sensitivity than estimated for the diagnosis of HCCs smaller than 2 cm was achieved for CEUS LR-4 and LR-5. The use of AFs might improve the overarching goal of CEUS LR-5 + LR-4 diagnosis of high specificity for HCC and exclusion of non-HCC malignancy, despite the size of the lesion.
Keywords: contrast-enhanced ultrasonography, hepatocellular carcinoma, ancillary features, LI-RADS.

PP 07

EVALUATION OF LIVER TUMORS BY USING ARTIFICIAL INTELLIGENCE IN CONTRAST-ENHANCED ULTRASOUND

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Objectives: Contrast-enhanced ultrasound (CEUS) is an imagistic method commonly used in clinical practice to characterize focal liver lesions, but it has some limitations that can lead to misdiagnosis. We developed a deep learning system to detect and classify liver tumors based on standard and contrast-enhanced ultrasound, together with clinical data.
Materials: The dataset contained 49 patients with focal liver lesions, both benign and malignant, evaluated in the Department of Gastroenterology and Hepatology from the Emergency Clinical County Hospital of Craiova between February 2018 and December 2020. For dataset preparation, a region of interest (ROI) was drawn manually around the tumor borders by two experienced doctors. Time-intensity curve (TIC) was computed in order to describe the enhancement of contrast agent in all three vascular phases. The proposed system contained two artificial intelligence (AI) models. The first model was trained for image segmentation in order to extract the time-intensity curve, while the second deep learning model was a fully connected neural network which was trained on clinical data along with features extracted from the TIC. We assessed the sensitivity and specificity of the proposed system and compared it with the diagnostic performance of two clinicians, one of them blinded to the clinical informations and the patient's final diagnosis.
Results: For the blinded evaluation, we have obtained a sensitivity of 0,81 and a specificity of 1, while the clinician who had access to the clinical information obtained a sensitivity of 0,87 and a specificity of 1. The AI-based software obtained a sensitivity of 0,82 and specificity of 0,93.
Conclusions: Imagistic assessment based on AI has been introduced in the US field and can prevent human error and improve the accuracy of the diagnosis. However, depending on the samples from the dataset used, an AI model can have difficulties in classifying particular cases.
Keywords: liver tumors, artificial-intelligence, contrast-enhanced ultrasound.

PP 08

ONE STOP SHOP APPROACH FOR THE DIAGNOSIS OF LIVER HEMANGIOMA

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Objectives: Contrast-enhanced ultrasound (CEUS) has similar performance to computed tomography (CT) or MRI in the diagnosis of hepatic hemangioma [1]. We propose an ultrasound-based diagnostic algorithm for hepatic hemangioma that is easy to use and is cost-effective [2,3].
Materials: The study included 204 patients, examined between January 2019-January 2021 in the outpatient setting, diagnosed anteriorly or during the same examination with a focal liver mass. The patients were divided into three groups. Asymptomatic patients, without liver or oncological disease, in whom ultrasound identified a focal liver lesion below 3 cm with homogeneous hyperechoic appearance, with sharp margins and posterior enhancement, an absent halo sign, without intra-tumoral vessels at color Doppler, were assigned to the first group. These characteristics directed the diagnosis toward hepatic hemangioma and further investigations were unnecessary. If ultrasound showed a lesion with features other than those described or if a liver mass was detected in oncological patients or in those with underlying liver disease, CEUS was performed (second group). A typical aspect in contrast ultrasound (peripheral and globular enhancement on arterial phase followed by a central enhancement on delayed phases) guided the diagnosis to liver hemangioma. If the appearance in CEUS was atypical, the patient was referred for further investigations (CT, MRI) (third group). The first two groups were subject to follow-up one year after the diagnosis.
Results: From all the examined patients, 30 were assigned to the first group. At the 1-year follow-up, 25 presented no changes in lesion characteristics and did not require further investigations. For the 5 remaining patients in this group, ultrasound follow-up indicated tumor size progression and CEUS was performed. In all these cases, CEUS revealed the typical characteristics of hepatic hemangioma. The second group included 45 patients with typical hemangioma findings on CEUS. Due to the stationary appearance of the lesions at the 1-year follow-up, subsequent investigations were not pursued. 129 patients included in the third group required further imagistic evaluation.
Conclusions: The diagnostic algorithm of liver hemangioma is applicable to the adult patient in countries where the hepatologist has an ultrasonography system equipped with CEUS software in the consulting room.
Keywords: contrast-enhanced ultrasound, hemangioma, liver.

References

1. Dietrich CF, Nolsøe CP, Barr RG, et al. Guidelines and Good Clinical Practice Recommendations for Contrast-Enhanced Ultrasound (CEUS) in the Liver-Update 2020 WFUMB in Cooperation with EFSUMB, AFSUMB, AIUM, and FLAUS. Ultrasound Med Biol. 2020; 46(10): 2579-2604.
2. Sandulescu LD, Urhut CM, Sandulescu SM, Ciurea AM, Cazacu SM, Iordache S. One stop shop approach for the diagnosis of liver hemangioma. World J Hepatol. 2021;13(12):1892-1908.
3. European Association for the Study of the Liver (EASL). EASL Clinical Practice Guidelines on the management of benign liver tumours. J Hepatol. 2016; 65(2): 386-398

PP 09

THE USEFULNESS OF CEUS IN THE EVALUATION OF HEPATIC HEMANGIOMA – RETROSPECTIVE STUDY

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Objectives: Hemangiomas are among the most common benign solid lesions that can occur in the liver. Generally, they occur as a single lesion less than 3 cm diameter, but there are also described cases with multiple or bigger lesions (up to 20 cm). The diagnosis is confirmed by using imaging methods, thus their incidence has increased due to the recent improvement and widespread use of imaging. The aim of this study was to evaluate the usefulness of CEUS in clinical practice.
Materials: We performed a retrospective study for the year 2021 in the Gastroenterology Department of Emergency County Hospital of Craiova, Romania, including patients with diagnosed hepatic hemangioma. It is based on a group of 35 patients, 12 men and 18 women, ages ranged from 34 to 85 years. There were detected 65 focal liver lesions (21 patients with single lesion, 14 patients with 2 or more lesions) suspected as hemangiomas after performing standard abdominal US, which were further investigated by CEUS and/or contrast-enhanced CT or MRI and diagnosed as hepatic hemangiomas due to the typical enhancement pattern identified, consistent with EFSUMB guidelines.
Results: Out of the 35 patients included in our study, 25 had no preexisting liver damage, 8 had moderate diffuse steatosis and 2 had ethanolic liver cirrhosis. Within standard B-mode US of the 65 lesions, there were found 12 cases (18,5%) with a hypoechoic appearance, 52 cases (80%) with a hyperechoic appearance and 1 case (1,5%) with an isoechoic appearance. None of them showed intralesional vessels at color or power Doppler exam. Out of the 65 FLL, 47 cases (72,3%) were diagnosed as hepatic hemangiomas by CEUS, after presenting typical enhancing pattern: centripetal fill-in in the arterial phase (all 47 cases), partial (20 cases) or complete (27 cases) centripetal filling and sustained enhancement in portal and late phases; 1 case (1,6%) showed no enhancement in any on the vascular phases of CEUS, therefore it was also performed a contrast enhanced CT which confirmed the diagnosis of sclerosed hemangioma (atypical variant); 14 cases (21,5%) were investigated and diagnosed only by contrast-enhanced CT/MRI due to their associated pathology which required detailed investigations (without performing CEUS); 3 cases (4,6%) had typical aspect at standard B-mode US, being diagnosed without the necessity of any other investigations.
Conclusions: Contrast enhanced imaging has an unmatched value for HH diagnosis due to their typical enhancement pattern of the contrast agent, therefore CEUS could be considered the first-line investigation in all the patients with suspected hemangioma after performing a standard B-mode US.
Keywords: contrast-enhanced ultrasonography, liver, hemangioma.

PP 10

THE ROLE OF CONTRAST-ENHANCED ULTRASOUND IN FOCAL FATTY LESIONS CHARACTERISATIONS IN NAFLD AND MAFLD PATIENTS

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Objectives: Background: Fatty liver disease became the most prevalent hepatic disease worldwide. The differential diagnosis of focal fatty lesions (FFL) may be challenging in clinical practice.

Aim: To establish the role of contrast-enhanced ultrasound (CEUS) in focal fatty lesions (FFL) characterization in metabolic associated fatty liver disease (MAFLD) vs non-alcoholic fatty liver disease (NAFLD) patients.
Materials: The retrospective study was conducted over a period of 5 years. It has included patients with hepatic steatosis and FFL (focal fat deposition and focal fatty sparing) diagnosed on B-mode ultrasound. CEUS was performed in all patients. The contrast vascular pattern of focal liver lesions was followed, according to the EFSUMB guidelines. The focal fatty alterations were considered when the same enhancement pattern as the surrounding liver parenchyma was noticed. In all cases, the final diagnostic was confirmed by computed tomography (CT) or magnetic resonance imaging (MRI). Patients were included in two groups according to the presence/absences of obesity, type 2 diabetes mellitus, and metabolic disturbances: MAFLD group vs NAFLD group.
Results: 47 patients (28 women and 19 men, mean age 53 years) were enrolled. According to the biological parameters and anamnesis 30 patients were in MAFLD and 17 in the NAFLD group. The CEUS results were: 39 nodules were diagnosed with FFL, 2 with hepatocarcinoma, 2 with metastasis, 3 hemangiomas, and 1 focal nodular hyperplasia. The final diagnosis (after CT/MRI) was FFL in 37 patients, hepatocarcinoma in 4 patients, metastasis in 2 patients, hemangioma in 2 patients, and focal nodular hyperplasia in 2 patients. The performance of CEUS correct diagnosis of focal steatosis was 94.88% (100% in the MASH group and 93.34% in the NASH group). The most misdiagnosed focal lesions in steatosis patients were hepatocarcinoma and hemangioma.
Conclusions: CEUS is a good method for focal fatty liver lesions characterization in patients with hepatic steatosis. A focal liver lesion in patients with steatosis is more probable to be FFL in MAFLD compared with NAFLD patients.
Keywords: CEUS, focal fatty lesions, NAFLD, MAFLD.

PP 11

RENAL SHEAR WAVE ELASTOGRAPHY IN CHRONIC URINARY INFECTIONS

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Introduction: Early detection of renal failure in chronic urinary infections, clinically silent forms, is our topic. It is of interest, regarding the huge number of patients with silent urinary infections, speeding up the evolution to renal failure, and the increasing number of renal failure cases. Also, an increase in acute pyelonephritic cases was observed, based on chronic infectious silent condition.
Material and methods: Time interval of study - Nov 2019- April 2020. 66 cases**,** 33 normal subjects 33 subjects with urinary tract infection history, no acute cases. Age distribution: 25-78 years old Siemens S2000 Acuson, ARFI technique, m/s quantification, 3 measurements in the middle part of the left kidney. The left kidney was chosen in all studies because it is the preferred kidney to be biopsied. Concomitant measurements: depth of measurement, RI of the arcuate artery in same region of measurement - to express the vascular stiffness increasing with age, because that constant was previously took in account in other studies
Results: Statistic measurements took into account age, ARFI range expressed in m/s, RI value of the arcuate artery, and depth distance. A normal ARFI range was established from the normal group. In the patients group: A significant reduced AFRI value was observed, not depending by age or depth A significant increased RI value was also observed, increasing with age, not depending to depth.
Conclusion: ARFI technique is a valuable tool to predict renal failure produced by urinary tract infections silent forms, combined with age related renal vascular stiffness.
Comments: Further studies are needed, to corelate the blood and urine lab test with the ARFI measurements. In older patients, vascular changes can lead also to ARFI value increase, so the test is not specific. Another group of older patients with vascular degenerative condition should be considered.
Keywords: ARFI elastography, kidney, urinary tract infections, age related vascular stiffness.

PP 12

QUANTITATIVE ULTRASOUND METHODS FOR THE ASSESSMENT OF LIVER STEATOSIS USING CONTROLLED ATTENUATION PARAMETER AS REFERENCE METHOD

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Objectives: Liver steatosis can progress to nonalcoholic steatohepatitis and liver cirrhosis, becoming one of the leading indications for liver transplantation. Therefore, early detection and staging of steatosis is very important. In addition to Transient Elastography (TE) with Controlled Attenuation Parameter (CAP), several methods were developed for steatosis assessment. The aim of our study was to evaluate the feasibility of two new quantitative ultrasound (QUS) parameters, TSI (tissue scatter-distribution imaging) and TAI (tissue attenuation imaging) for steatosis diagnosis considering CAP as reference.
Materials: A prospective study was conducted in which liver steatosis was assessed in 67 patients (65.7% men, mean age 55.6 ± 13.2 years), evaluated in the same session by QUS and CAP implemented on the following systems: Samsung Medison RS85 (CA1-7A probe) and FibroScan Compact M 530 (M and XL probes), respectively. For CAP, reliable measurements were defined as the median value of 10 measurements with IQR/M<0.3. For QUS, five consecutive measurements of TAI and TSI were acquired by a color-coded map overlaid on B-mode ultrasound. Attenuation coefficient and scatter-distribution coefficient were automatically calculated and reliable measurements were defined as an reliability index, R2 over 0.6. The cut-off value by CAP for identifying the presence of at least mild steatosis was 248 dB/m [1].
Results: Reliable measurements by CAP and TAI/TSI were obtained in 100% of cases. Moderate correlations between steatosis assessment methods were observed: TAI vs. CAP r=0.67, TSI vs. CAP r=0.53, TSI vs. TAI, r=0.63. The best cut-off value for TAI to identify at least mild steatosis was > 0.66 (AUROC=0.87, p<0.0001, Se=81.2%, Sp=84.2%, PPV=92.9%, NPV=64%). The best cut-off value for TSI for identifying at least mild steatosis was > 96.2 (AUROC=0.81, p<0.0001, Se=81.2%, Sp=84.2%, PPV=88.6%, NPV=64%).
Conclusions: TAI and TSI are feasible methods for assessing liver steatosis, which moderately correlate with CAP measurements.
Keywords: liver steatosis, elastography, quantitative ultrasound.

References: Karlas T, Petroff D, Sasso M, et al. Individual patient data meta-analysis of controlled attenuation parameter (CAP) technology for assessing steatosis. J Hepatol. 2017 May;66(5):1022-1030. doi: 10.1016/j.jhep.2016.12.022. Epub 2016 Dec 28. PMID: 28039099.

PP 13

ELASTOGRAPHIC DIFFERENCES ENCOUNTERED IN CHILDREN AND ADULTS DIAGNOSED WITH CHRONIC AUTOIMMUNE THYROIDITIS

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Objectives: Chronic autoimmune thyroiditis (CAT) is a common pathology in both children and adults. The diagnosis is suggested by the ultrasound appearance and is certified based on the presence of antithyroid antibodies. By assessing tissue elasticity, shear-wave elastography (SWE) proves to be an important tool in thyroid evaluation. This paper aims to investigate the differences in thyroid elastography between children and adults.
Materials: We included in this study 100 subjects, 50 of them aged between 5 and 18 years and 50 subjects over 18 years, all diagnosed with chronic autoimmune thyroiditis. The evaluation of the subjects included clinical examination, laboratory tests, ultrasonography and thyroid elastography (Aixplorer Mach 30, Supersonic imagine, France) during the same visit.
Results: The mean thyroid stiffness (TS) values were significantly lower for children compared to adults (15.51 ± 4.76 kPa vs. 20.96 ± 6.31 kPa; $p < 0.0001$). We found no differences between the two thyroid lobes, neither in children nor in adults. 34% of children were on levothyroxine replacement therapy at the time of examination. No differences were found between TS values of children with treatment compared to those without (16.29 ± 4.75 kPa vs. 15.11 ± 4.79 kPa; $p = 0.41$). A weak correlation was found between thyroid peroxidase antibodies (ATPO) levels and TS values ($r = 0.43$) and also between TS values and age ($r = 0.30$). No correlation was found between TS values and Antithyroglobulin antibody (ATG) level, Thyroid stimulating hormone (TSH), free thyroxine (FT4) or thyroid volume.
Conclusions: SWE elastography is useful in examining children and adults, the differences between the two groups emphasizing the importance of the disease progression from early childhood.
Keywords: shear-wave elastography, thyroid, chronic autoimmune thyroiditis, children.

PP 14

DIAGNOSTIC PERFORMANCE OF TRANSIENT ELASTOGRAPHY IN CHRONIC HEPATITIS C PATIENTS: A SINGLE-CENTER LARGE-COHORT STUDY

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Objectives: Vibration-controlled Transient Elastography (VCTE) is a widespread technique for non-invasive assessment of liver fibrosis in patients with chronic hepatitis C (CHC). However, the optimal liver stiffness (LS) cut-off values remain unclear due to the dependency on the prevalence of the condition in a specific population. This study aimed to validate the optimal cut-off values for predicting different stages of liver fibrosis in a large cohort of patients with CHC admitted to a tertiary care hospital in Romania.
Materials: This study includes 1,414 CHC patients. All of them underwent paired liver biopsy and VCTE using Fibroscan (Paris, France) with the M probe. Diagnostic performance of the selected cut-off values was calculated using area under the receiver operating characteristic curve (AUROC).
Results: LS ranged between 2.8-75 kPa and significantly correlated with the evaluated histological parameters: steatosis ($r=0.210$, $p<0.0001$), necroinflammatory activity ($r=0.363$, $p<0.0001$) and fibrosis (strongest correlation, $r=0.819$, $p<0.0001$). However, according to the multivariate analysis, only fibrosis and steatosis influenced LS independently ($p<0.0001$. Therefore, fibrosis is the most important predictor of LS with statistically significant differences between adjacent stages ($p<0.0001$). The optimal LS cut-off values were 6.3 kPa, 8.3kPa, 9.1kPa and 12 kPa for $F\geq1$, $F\geq2$, $F\geq3$ and F4 prediction respectively, with AUROCs equal to 0.857, 0.875, 0.937 and 0.97. VCTE is notably useful for excluding cirrhosis, due to the high VPN value (97%). 29 patients (2.5%) had no valid measurement, showing significantly increased values of serum liver enzymes and high body mass index (BMI). However, the multivariate analysis highlighted BMI as the sole factor influencing the failure of the method.
Conclusions: VCTE has an excellent diagnostic performance for advanced hepatic fibrosis and cirrhosis and a good performance for significant fibrosis.
Keywords: Chronic hepatitis C, fibrosis, noninvasive, vibration controlled transient elastography, FibroScan.

PP 15

IS QUANTITATIVE ELASTOGRAPHY USING 2D-SHEAR WAVE ULTRASONOGRAPHY A FEASIBLE METHOD FOR ASSESSING RENAL GRAFTS?

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Objectives: The purpose of this study was to determine the accuracy of quantitative ultrasonic measurements of renal allograft elasticity and viscosity using shear wave elastography (SWE) Aixplorer Mach 30 ultrasound system (Supersonic Imagine, Aix-en-Provence, France).
Materials: 2D-SWE was performed on 35 kidney transplanted patients (13 women, 22 men) with a mean age of 48.45±13.33 years and mean estimated glomerular filtration rate(eGFR) 52.19±22.28ml/min/1.73m2. One nephrologist took 5 quantitative measures of renal cortical elasticity and viscosity, in 5 different frames, which were represented in terms of Young's modulus (kPa) respectively Viscosity Plane-wave Ultra-Sound (Vi-Plus) in Pa.s. The intraclass correlation coefficient, as well as intraobserver reproducibility (Bland-Altman plot with multiple measures per subject), were evaluated.
Results: We obtained 5 valid measurements in every studied patient, with a mean measurement stability index (SI) tool accuracy of 92.5%±

1.95%. We found no correlation between median depth of measurements and median SI, or between kidney length (cm) and median SI, but we found a positive correlation between body mass index (BMI) and mean depth of measurements (r=0.7029, P<0.0001, 95% CI for r 0.4739 to 0.8428). Our study shows a good intraclass correlation coefficient for mean values of transplanted renal cortical elasticity with average measures of 0.9551, 95% CI 0.926 to 0.974 as well as for Vi-Plus with average measures of 0.8338, 95% CI 0.728 to 0.907. The Bland-Altman plot with multiple measures per subject displays a mean of 23.2±1.96 with a lower limit of 8.5 and an upper limit of 37.8.

Conclusions: 2D-SWE with Aixplorer Mach 30 system shows a good intraclass correlation coefficient as well as good intraobserver reproducibility for both measures in renal cortical elasticity and viscosity. This can prove to be a low-cost way to provide additional diagnostic information in kidney transplanted patients. Further studies are required for this method to be introduced routinely into clinical practice.

Keywords: Chronic kidney disease, Stiffness, Fibrosis, Shear wave elastography, Ultrasound.

PP 16

POINT-SHEAR WAVE ELASTOGRAPHY IN THE EVALUATION OF STABLE CKD DIABETIC PATIENTS

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Objectives: Point-Shear wave elastography (pSWE) has been proved as a reliable indicator of kidney fibrosis in chronic kidney disease (CKD). It can be a useful non-invasive examination in the early stages of diabetic nephropathy (DN). The aim of the present study was to analyze the relevance of pSWE values in the characterization of renal cortex changes in DN and its interrelation with CKD progression.

Materials: 62 patients admitted to the Nephrology Department were included in a monocentric prospective observational study – the study group included 35 patients diagnosed with DN and CKD stage 3a (calculated with CKD-EPI formula), whereas 27 non-diabetic patients with normal glomerular filtration rate were part of the control group. An ultrasound examination with pSWE was performed in all cases, using an Esaote MyLab X6 device. The patients were in apnea, voiding state and lateral decubitus. A standard measurement protocol using a box of 0.5/0.5 cm, placed at maximum 5 cm depth, strictly in the cortical area was applied. Two measurements were done in each area and a media was calculated. The results of the elastographic parameters were delivered in kPa. Statistical analysis included t-student test, as well as the median and standard deviation. The cutoff value for statistical significance was 0.05.

Results: In the control group the median value was 7.3 kPa (standard deviation 1.66). Median values proved to be significantly higher (p<0.05) in DN group: 13.4 kPa (StD 6.4). Due to the moderate increase in cortical echogenicity we were able to identify cortical areas, as it is known that medulla has a different elasticity and the renal tissue is anisotropic. Other factors affecting the elasticity are: renal perfusion, hydronephrosis, non-voiding state and respiration. Possible limitations of our study are the small number of patients and the intrarenal vascular resistance.

Conclusions: pSWE value is a reliable ultrasound paramether that can be used in the characterisation of renal cortex in DN in the early stages of CKD. However, larger multicentric studies would be needed in order to define precise cut-of values of the renal cortical elastography, from where early treatment should be promptly initiated.

Keywords: point-shear wave elastography, diabetic nephropathy, chronic kidney disease, renal cortical elasticity.

PP 17

ELASTOGRAPHY AND THYROID NODULES: STRAIN VERSUS 2D SHEAR-WAVE ELASTOGRAPHY PARAMETERS

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Objectives: The main objective of this study was to evaluate the diagnostic value of elastography methods and to provide a head-to-head comparison of real-time strain elastography (RTE) and 2D shear-wave elastography (2D-SWE) techniques in predicting the risk of malignancy of thyroid nodules.

Materials: Ninety-four thyroid nodules were evaluated using conventional US of the neck, followed by elastography examination with 2 different techniques: RTE with a Hitachi Preirus machine (Hitachi Inc., Japan) and consecutively 2D-SWE with a SuperSonic Mach30 equipment (Supersonic Imagine, France). For RTE, the qualitative Asteria score and the strain ratio (SR) were determined, while for 2D-SWE, the mean (Mean SWE) and maximum (Max SWE) elasticity index (kPa) and the nodule-to-parenchyma SWE ratio were determined. The mean of the 5 measurements was considered in the analysis and the results were compared in all cases to the pathology reports.

Results: Out of the 94 nodules, 29 (30.9%) were malignant. The SWE parameters performed as follows: for an optimal cut-off value of 30.5 kPa, the Mean SWE predicts malignancy with a sensitivity of 79.3%, specificity of 95.38%, NPV of 91.2% and PPV of 88.5% (AUROC: 0.912); for the Max SWE, a value above 40.3 kPa has sensitivity of 86.2% and specificity of 81.5% (AUROC 0.877); for a cut-off value of 2.8, the SWE ratio also represents a good parameter, with very good specificity of 92.3% (AUROC 0.851) in detecting thyroid malignancy. The performance of the RTE parameters was for the strain ratio: cutoff >3.9; sensitivity 82.7%; specificity 92.3%, AUROC 0.905 and for the qualitative score: cut-off >2; sensitivity 89.6%; specificity 69.2%; 0.848. Five thyroid cancers were missed by RTE and six malignancies by the SWE evaluation. RTE generated five false positives and SWE, three.

Conclusions: Both methods showed great predictions for predicting the malignancy risk. The best elastography parameters were the strain ratio (SR) for RTE was the strain ratio and the mean elasticity index for the 2D-SWE technique. We concluded that elastography adds diagnostic value in predicting malignancy, both when Hitachi RTE or SuperSonic 2D-SWE were used.

Keywords: thyroid cancer, risk prediction, 2D-SWE, strain ratio, real-time elastography.

PP 18

HOW MANY AUTO PSWE AND ULTRASOUND DERIVED FAT FRACTION (UDFF) ACQUISITIONS SHOULD WE MAKE IN ORDER TO OBTAIN THE BEST RESULT?

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Objectives: Liver elastography assessment currently requires five to ten acquisitions per patient, which sometimes is difficult and time consuming. Auto Shear Waves Elastography (Auto pSWE) and Ultrasound derived fat fraction (UDFF) are new techniques that quantify liver fibrosis and steatosis. The aim of this study was to evaluate which is the smallest number of acquisitions needed in order to accurately quantify liver steatosis and fibrosis.
Materials: 345 consecutive subjects with or without chronic hepatopathies were included in the study, in whom liver stiffness (LS) was evaluated by Auto pSWE and liver steatosis by UDFF. Both methods are implemented on the ACUSON Sequoia system [Siemens ACUSON Sequoia (Deep Abdominal Transducer-DAX)]. Using the automated technique, 15 measurements are made during a single acquisition, in less than 5 seconds, both for steatosis and fibrosis. Patients were evaluated with one acquisition, five acquisitions and ten acquisitions. ANOVA test and Kruskal-Wallis test were used to compare the three groups, depending on their distribution.
Results: The correlation between the results form one acquisition, five acquisitions and ten acquisitions were almost perfect, all correlation coefficients (r) > 0.97. We found no significant differences between the mean LS measurements among three groups (mean ±SD: 5.25 ± 1.2 kPa vs. 5.23 ± 1.3 kPa vs 5.25 ± 1.3 kPa, p=0.99), nor for steatosis [median (IQR): 9 (12.5) vs 10 (11.7) vs 9 (11), p=0.89].
Conclusions: One acquisition for both Auto pSWE and UDFF may be enough to quantify the liver fibrosis and liver steatosis without significant loss of accuracy.
Keywords: liver fibrosis, liver steatosis, UDFF, Auto pSWE.

PP 19

CHRONIC KIDNEY DISEASE IN PATIENTS WITH NONALCOHOLIC FATTY LIVER DISEASE

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Objectives: There is an increased risk of chronic kidney disease (CKD) in patients with nonalcoholic fatty liver disease (NAFLD). Aim of this study was the assessment of kidney's cortical tissue and liver's stiffness by shear wave elastography (SWE), possible correlations between kidney and liver stiffness as well as to estimated glomerular filtration rate (e-GFR).
Materials: 50 patients with NAFLD, 40%women, 60% men, average age 42 to 85 years joined this observational study. Patients were divided in two groups based on the presence or absence of CKD: 10 patients without CKD and 40 patients with early stages of CKD (stage 1=13 patients and stage 2=27 patients). Renal obstructive pathology, lithiasis, cirrhosis and other etiologies of liver diseases were ruled out. Blood and urine biology and urine microbiology, Duplex transabdominal examination, SWE of the right liver and both cortical regions of the right and left kidneys (RK, LK) were performed with Siemens Acuson S3000 equipment. NAFLD was assessed as mild, moderate and severe.
Results: Stiffness of both kidneys was significantly higher in patients without CKD vs. those with CKD: 2.79±0.13m/sec vs. 2.48±0.17m/sec; p<0.0001, for RK and 2.81±0.14 m/sec vs.2.54 ± 0.09m/sec, p<0.0001, for LK. Regarding patients with CKD, significant differences were noted between stage 1 vs. stage 2 in RK:2.57±0.25 m/sec vs.2.4±0.12m/sec, p=0.0002, as well as in LK:2.59± 0.1 m/sec vs.2.49±0.08 m/sec, p<0.0001. No close correlations between groups, regarding liver and kidney's stiffness were set (r=0.21). Strong correlations were however noted between e-GFR and kidney's SWE for both stages 1(RK: r=0.82; LK: r=0.72) and stage 2(RK: r=0.43; LK: r=0.54).
Conclusions: Severity of liver and kidney's stiffness in early stages of CKD did not correlate well in patients with NAFLD. However, kidney's stiffness significantly decreased with severity of disease and strong correlated to e-GFR in patients with NAFLD.
Keywords: kidney's stiffness, SWE, chronic kidney disease, nonalcoholic fatty liver disease.

PP 20

APPLICATION OF ARTIFICIAL INTELLIGENCE FOR PRE-SCREENING PROSTATE CANCER USING SHEAR WAVE ELASTOGRAPHY MEASURMENTS

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Objectives: Compared with conventional ultrasonography, the detection of prostate cancer through SWE elastography represents an alternative and better US technique with increased sensitivity and specificity[1].

We propose an AI system for processing the shear wave elastography (SWE) elasticity measurements of targeted systematic US prostate biopsy cores with the purpose of a precise pre-screening of the patients with prostate cancer (PCa) suspicion.
Materials: In a two years period we prospectively investigated over 100 male patients with biochemical PCa suspicion (abnormal PSA) and/or positive DRE findings. All of them received SWE quantitative measurments of the elasticity of prostate regions that where afterwards targeted in systematic US prostate biopsy for PCa detection and histopathologic diagnostic.

The measurments in kPa of each fragment as SWE ROIs were than compared with HP findings as reference standard. The resulted dataset was used for training our AI screening system. We have employed artificial intelligence techniques for designing a dynamical auto-adaptive system customized for analyzing this particular dataset. We have implemented three machine learning classification algorithms, namely the logistic regression [2], a decision tree classifiyer [3] and a fully

connected feed-forward deep neural network [4]. Our aim was to characterize with the highest possible accuracy the diagnostic of PCa using the numerical values associated to elastography fragments.

Results: We have obtained the following results using Logistic Regression: Accuracy: 80%, Sensitivity: 61%, Specificity: 91%. By using Decision tree classifier the results were: Accuracy: 68%, Sensitivity: 84%, Specificity: 42%. Dense Neural Network obtained Accuracy: 86%, Sensitivity: 85% and Specificity: 82%. By comparing the results, we have obtained the highest accuracy with the neural network classifier namely AUC=0.94, followed by the logistic regression AUC=0.88 and the decision tree with a corresponding AUC=0.78.

Conclusions: Using elastography in prostate biopsy has higher sensitivity than using conventional ultrasound. The intelligent system allowed us a pre-screening with an overall 98% accuracy. But given the relative moderate size of the dataset, the overall sensitivity obtained has not reached levels that allow omitting the randomized systematic biopsy.

Keywords: artificial intelligence system, shear wave elastography, prostate cancer.

References:

1. Pallwein L, Aigner F, Pinggera G, Mitterberger M, Frauscher F, Bartsch G. Is real-time elastography targeted biopsy able to enhance prostate cancer detection? Value of an elasticity-scoring system, American Urological Association Annual Meeting, 17th – 22nd May, 2008, Orlando, USA.
2. https://scikit-learn.org/stable/modules/naive_bayes.html
3. https://keras.io/api/models/sequential/
4. Brown C., Davis H. Receiver operating characteristic curves and related decision measures: a tutorial. Chemometrics and Intelligent Laboratory Systems. 2006; 80: 24−38

PP 21

COMPARISON OF ULTRASOUND ELASTOGRAPHY VALUES BETWEEN: DIFFERENT MACHINES, TRANSDUCERS, ACQUISITION DEPTHS, ROI DIAMETERS AND EXAMINERS, ON A BIOLOGICAL TISSUE IN VITRO STUDY - PRELIMINARY RESULTS.

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Objectives: Elastography is a novel, noninvasive ultrasound application used to assess tissue stiffness. Several studies evaluated the reproducibility of measurements in different elasticity phantoms. To the best of our knowledge, there are no studies made on a biological tissue phantom.

The purpose of this study was to compare shear wave elastography (SWE) values using different machines, transducers, acquisition depths on a biological tissue phantom and to analyze inter-observer variability.

Materials: A custom-made, fresh biological tissue (turkey breast) based, experimental device was used to measure SWE values on two ultrasound machines: A – Aixplorer (Supersonic Imagine, Aix-en-Provence, France) and B - EPIQ Elite (Philips Medical System, the Netherlands). High and low-frequency probes were used with standard abdominal and thyroid settings applied. Measurements were taken with two circular regions of interest (ROIs), 3 and 5 mm, at different acquisition depths (1.5 and 3 cm for the linear probes, 3 and 5 cm for the convex probes) and were expressed in kiloPascals (kPa), as mean and standard deviation.

Results: There were statistically significant differences between SWE measurements at the same depths, between the machines, for both convex and linear transducers (p=0.002). In the subgroup analysis, there were statistically significant differences for all measurements (p=0.043), except for the comparison of linear transducers, at 3 cm depth, using the 5 mm ROI (p=0.225).

The comparison between convex and linear transducers was possible only for the 3 cm depth. The measurements were all statistically significantly different ($p<0.05$), except for machine A, the values measured with both probes, at 3 cm, using the 5 mm ROI (p=0.16).

Concerning the diameter of the ROIs, regardless of the depth acquisition, there were no statistically significant differences for the convex transducer in both machines (p=0.812 machine A, p=0.521 machine B). There were statistically significant differences between measurements taken with 3 mm ROI, compared to 5 mm ROI, for the linear probe (p=0.039 machine A, p=0.044 machine B).

The general inter-observer reproducibility of SWE for machine A was 0.795 (95% CI 0.593-0.895), and for machine B 0.575 (95% CI 0.354-0.805).

Conclusions: The preliminary results show considerable differences in SWE values concerning transducers, acquisition depths, and ROIs. Caution should be exercised in interpreting elastographic data.

Keywords: Ultrasound, elastography, turkey breast phantom, comparison.

PP 22

SHEAR WAVE ELASTOGRAPHY – DIFFERENCES BETWEEN PRIMARY AND SECONDARY HYPERPARATHYROIDISM

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Objectives: The aim of this study was to determine the elastographic characteristics of both primary and secondary hyperparathyroidism using shear wave elastography and also to evaluate the elastographic differences between them, as well as the differences between the parathyroid, thyroid, and muscle tissue. The end-point of this study was to identify a cutoff value for the parathyroid tissue, thus adding more value to the method.

Materials: In this prospective study, we examined a total of 68 patients with hyperparathyroidism, divided into two groups; one group consisted of 27 patients with primary hyperparathyroidism and the other group consisted of 41 selected patients with confirmed secondary hyperparathyroidism. The elasticity index (EI) was determined in the parathyroid, thyroid, and muscle tissue. The determined values were compared to better identify the parathyroid tissue.

Results: The median value of mean SWE values measured for parathyroid adenomas from primary hyperparathyroidism was 4.86 kPa. For secondary hyperparathyroidism, the median value of mean SWE was 6.96 KPa. The median (range) presurgical values for parathormone (PTH) and calcium were 762.80 pg/mL (190, 1243) and 9.40 mg/dL (8.825, 10.20), respectively. We identified significant elastographic differences between the two groups ($p < 0.001$), which remained

significant after adjusting elastographic measures to the nonparametric parameters, such as the parathormone value and vitamin D ($p < 0.001$). The cutoff values found for parathyroid adenoma were 5.96 kPa and for parathyroid tissue 9.58 kPa.
Conclusions: Shear wave elastography is a helpful tool for identifying the parathyroid tissue, in both cases of primary and secondary hyperparathyroidism, as there are significant differences between the parathyroid, thyroid, and muscle tissue. We found a global cutoff value for the parathyroid tissue of 9.58 kPa, but we must keep in mind that there are significant elastographic differences between cutoffs for primary and secondary hyperparathyroidism.
Keywords: elastography, primary hyperparathyroidism, secondary hyperparathyroidism, thyroid ultrasound, shear wave elastography.

PP 23

THYROID PATHOLOGY IN END-STAGE RENAL DISEASE PATIENTS ON HEMODIALYSIS

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Objectives: Chronic kidney disease is a rising cause of morbidity and mortality in developed countries, including end-stage renal disease (ESRD). The prevalence of thyroid comorbidities in persons with chronic kidney disease is documented higher than in normal population. The study aims to investigate the prevalence of morphological and functional thyroid disorders in patients with chronic kidney disease, with renal replacement therapy (hemodialysis).
Materials: A cross-sectional study was performed on 123 consecutive patients with chronic kidney disease stage 5, on hemodialysis during a period of one month (May 2019-June 2020). Thyroid work-up included serum free thyroxin (FT4), free triiodothyronine (FT3) and thyroid-stimulating hormone (TSH) before starting hemodialysis therapy.
Results: We evaluated 123 patients (male to female ratio 70/53) mean age 62.2 ± 11.01, mostly above 65 years old, enrolled in the end-stage renal disease program, on renal replacement therapy. From the cohort, 76/123 presented thyroid disease, including autoimmune hypothyroidism, nodular goiter or thyroid cancer. Among them, 63 patients presented nodular goiter, including 3 thyroid cancers, confirmed by surgery and histopathological result, 22 patients had thyroid autoimmune disease. The serum thyroid-stimulating hormone levels found in the cohort was 3.36 ± 2.313 mUI/mL, which was in the normal laboratory reference range. The thyroid volume was 13 ± 7.18 mL. A single patient in the cohort presented Graves Basedow disease, under treatment and three patients present subclinical hyperthyroidism. We have found that thyroid disease risk is increased by 3.4-fold for the female gender and also the increase of body mass index (BMI) with one unit raises the risk of developing thyroid disease with 1.083 times ($p = 0.018$).
Conclusions: We quantified the prevalence of thyroid disease in end-stage kidney disease population, especially nodular goiter, important for differential diagnosis in cases with secondary hyperparathyroidism. Thyroid autoimmune disease can be prevalent among these patients, as symptoms can overlap those of chronic disease and decrease the quality of life. We have found that thyroid disease has a high prevalence among patients with end-stage renal disease on hemodialysis. Thyroid goiter and nodules in ESRD patients were more prevalent than in the general population. Clinical surveillance and routine screening for thyroid disorders can improve the quality of life in these patients.
Keywords: end-stage renal disease, hemodialysis, nodular goiter, thyroid disease.

PP 24

THE CLINICAL SETTING OF SHEAR WAVE ELASTOGRAPHY IN SECONDARY HYPERPARATHYROIDISM

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Objectives: This study evaluates the diagnostic value of two-dimensional shear wave elastography (2 D-SWE) technique in the evaluation of hyperplastic parathyroid glands in cases with secondary and tertiary hyperparathyroidism.
Materials: A total of 59 patients (end-stage renal disease, under supplemental dialysis program) with visible parathyroid hyperplastic glands on ultrasound, confirmed by biochemical assay and scintigraphy, were enrolled; they were examined on gray-scale ultrasound and 2 D shear wave elastography. We determined the elasticity index (EI) in the parathyroid gland, thyroid parenchyma and surrounding muscles, and the elasticity ratio of hyperplastic parathyroid glands compared to muscle, specifically sternocleidomastoid muscle.
Results: Mean EI in the parathyroid gland was 7.83 kPa, the median value in thyroid parenchyma was 13.76 kPa, and mean muscle EI value was 15.78 kPa. The observed mean parathyroid/muscle SWE ratio was 0.5356 and the value for parathyroid/normal thyroid parenchyma was 0.5995. Using receiver operating characteristic (ROC) analysis, we found that EI below 9.74 kPa correctly identifies parathyroid tissue, with a sensitivity of 94.8%, specificity of 90.7%, and accuracy of 92.26% when compared to normal thyroid tissue. Compared with the muscle tissue, we identified that EI below 9.98 kPa has a sensitivity, specificity, and accuracy of 93.8%, 90.7%, and 91.75%, respectively.
Conclusions: Ultrasound evaluation, completed by elastography is a helpful tool in identifying parathyroid hyperplasia in patients with chronic kidney disease. A cut-off value of 9.98 kPa can be used in 2 D-SWE for accurate diagnosis of parathyroid disease in these patients.
Keywords: elastography, parathyroid, secondary hyperparathyroidism, shear wave elastography, ultrasonography.

PP 25

DIAGNOSTIC PERFORMANCE OF SPLEEN STIFFNESS MEASUREMENTS WITH TWO-DIMENSIONAL SHEAR-WAVE ELASTOGRAPHY BY SUPERSONIC IMAGINE FOR ESOPHAGEAL VARICES IN PATIENTS WITH COMPENSATED ADVANCED CHRONIC LIVER DISEASE

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Objectives: Spleen stiffness measurements (SSM) as the non-invasive diagnostic modality for esophageal varices (EV) has been investigated, with most of the data obtained by using Transient elastography (TE). Here we aimed to evaluate diagnostic performance of SSM for the presence of EV in patients with compensated advanced chronic liver disease (cACLD) by using Two-Dimensional Shear-Wave Elastography incorporated in the Supersonic Imagine Aixplorer platform (2DSWE.SSI).
Materials: Retrospective analysis of the data collected from patients with cACLD who underwent SSM by 2DSWE.SSI. Eligible patients were those with available results of esophagogastroduodenoscopy (EGD) performed within 3 months from SSM, and no history of liver decompensation. cACLD was considered in patients with liver stiffness measurement (LSM) ≥10 kPa by TE or the presence of bridging fibrosis or cirrhosis in liver histology.
Results: There were 106 patients analyzed: 88 (83%) males, median age 62 years, IQR (56.25 - 66), 44 (41.5%) had alcoholic liver disease, 23 (21.7%) non-alcoholic fatty liver disease, 22 (20.8%) chronic viral hepatitis, and 17 (16%) other etiologies. Median SSM was 32.2 kPa, IQR (25.53 - 39.23) whereas median LSM was 18.3 kPa, IQR (12.23 - 27.33). EV (any grade) were present in 46/106 (43.4%) and large EV (grade II or III) were present in 21/106 (19.8%) patients. Higher SSM was significantly associated with higher LSM, higher HVPG, larger EV, presence of red signs, lower platelets, and higher Child-Pugh score (P<0.05 for all analyses). SSM at the cut-off value of 29 kPa could predict the presence of any grade of EV with 93% sensitivity, 70% specificity, 70.5% positive predictive value (PPV) and 93.3% negative predictive value (NPV), AUC 0.846, P<0.001. SSM at the cut-off value of 33.8 kPa could predict the presence of grade II or III EV with 90.5% sensitivity, 69.4% specificity, 42.2% PPV and 96.7% NPV, AUC 0.828, P<0.001.
Conclusions: SSM by 2DSWE.SSI may be reliably used to rule-out the presence of EV in patients with cACLD.
Keywords: Elastography, Spleen stiffness measuremets, Esophageal varices, Chronic liver disease, Cirrhosis.

PP 26

PERFORMANCE OF A P-SWE IMPLEMENTED ON A NEW ULTRASOUND SYSTEM FOR PREDICTING ADVANCED LIVER FIBROSIS

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Objectives: Background: Ultrasound-based elastography techniques became in the last years reliable tools to predict the severity of liver fibrosis in chronic hepatopathies. Usually, these techniques are integrated in high-end US machines but recently they became available in medium-range ones.
Aim: To evaluate the performance of point Shear-Wave Elastography from Siemens, implemented on the new ACUSON Juniper Ultrasound System, for the non-invasive assessment of liver fibrosis, and to identify liver stiffness (LS) cut-off value for predicting advanced fibrosis, using Transient Elastography (TE) as the reference method.
Materials: Material and method: We included 201 consecutive subjects (60% men, mean BMI = 28.7 ± 4.9 kg/m2, mean age 59 ± 18.4 years) with or without chronic hepatopathies in whom LS was evaluated in the same session by means of 2 elastography techniques: TE and p-SWE from Siemens. Reliable LS measurements were defined for TE as the median value of 10 measurements with an interquartile range/median (IQR/M) <30%, and for p-SWE as the median value of 10 measurements acquired in a homogenous area and an IQR/M <30%. A cut-off of ≥ 9.5 kPa by TE was used to define advanced fibrosis (F≥3) [1].
Results: Valid liver stiffness measurements (LSM) were obtained in 97.5% of patients using both elastography methods. Therefore, 196 subjects were included in the final analysis (27.8% with TE ≥ 9.5 kPa). A moderate positive correlation was found between the LS values obtained by the 2 methods: r=0.68, p<0.0001 (Spearman correlation). LS values obtained by p-SWE were significantly lower than those obtained by TE: 8.3 kPa vs. 10.12kPa (p<0.0001). The best p-SWE cut-off value for advanced fibrosis (F≥3) was 7.4 kPa (AUC- 0.95; Se-81.5%; Sp-98%; PPV-95.7%; NPV-93.3%)
Conclusions: Using the new US system, the best p-SWE cut-off value for predicting advanced fibrosis was 7.4 kPa.
Keywords: point-SWE, liver fibrosis, elastography.

References:

1. Tsochatzis EA, Gurusamy KS, Ntaoula S, Cholongitas E, Davidson BR, Burroughs AK. Elastography for the diagnosis of severity of fibrosis in chronic liver disease: a meta-analysis of diagnostic accuracy. J Hepatol. 2011 Apr;54(4):650-9. doi: 10.1016/j.jhep.2010.07.033. Epub 2010 Sep 24. PMID: 21146892.

PP 27

COMPARISON BETWEEN TWO 2D-SWE TECHNIQUES USING TRANSIENT ELASTOGRAPHY AS A REFERENCE METHOD FOR LIVER STIFFNESS ASSESSMENT

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Objectives: Ultrasound-based liver elastography techniques are non-invasive methods used for the assessment of liver stiffness (LS). In addition to Transient Elastography (TE), new methods were developed.
Aim: to compare the performance of 2D-SWE technique implemented on two different ultrasound probes from different vendors for the assessment of liver stiffness measurements (LSM) using transient elastography (TE) as reference method.

Materials: A prospective study was conducted in which LSM were performed in 201 consecutive patients with or without chronic liver disease, evaluated in the same session by 2D-SWE and TE implemented on the following systems: Siemens ACUSON Sequoia (5C-1 convex transducer and Deep Abdominal Transducer-DAX), Aixplorer Mach 30 (C2-1X convex transducer) and FibroScan Compact M 530 (M and XL probes). Reliable measurements were defined as the median value of 10 measurements and an IQR/M<0.3. For significant fibrosis a cut-off value for TE of 7 kPa was used, for advanced fibrosis 9.5 kPa and for liver cirrhosis 12 kPa [1]
Results: From 201 patients, 198 patients had reliable measurements in all techniques and were included in the final analysis, mean age 54.8± 13.3 years, mean BMI28.8 ± 5.0, 58% (116/198)men. 58.5% were without or with mild fibrosis, 14.1% had significant fibrosis, 6.2% had advanced fibrosis and 21.2% had liver cirrhosis. For significant fibrosis the performance was slightly better for 2D-SWE.SSI (AUROC=0.89, p<0.0001, >7.3 kPa, Se=85.1%, Sp=87.9%) followed by 2D-SWE.5C1 (AUROC=0.79, p<0.0001, >6.9 kPa, Se=33.7%, Sp=96.7%) and 2D-SWE.DAX (AUROC=0.78, p<0.0001, >6.3 kPa, Se= 36.4%, Sp=96.7%), p=0.01. For advanced fibrosis the best performance was slightly better by 2D-SWE.SSI (AUROC=0.92, p<0.0001, >8.8 kPa, Se=92.5%, Sp=91.9%), and by 2D-SWE.DAX (AUROC=0.86, p<0.0001, >7.6 kPa, Se= 38.8%, Sp=99.3%), followed by 2D-SWE.5C1 (AUROC=0.84, p<0.0001, >8.6 kPa, Se=38.8%, Sp=96.5%), p=0.02. For liver cirrhosis the performances were similar: 2D-SWE.SSI (AUROC=0.91, p<0.0001, >10.3 kPa, Se=92.8%, Sp=90.3%), followed by 2D-SWE.DAX (AUROC=0.90, p<0.0001, >10 kPa, Se= 23.8%, Sp=98.7%) and 2D-SWE.5C1 (AUROC=0.84, p<0.0001, >9.9 kPa, Se=33.3%, Sp=96.7%), p=0.10. The cut off values for predicting different stages of fibrosis ranged from 6.3-7.3 kPa for F2, 7.6-8.8 kPa for F3 and 9.9-10.3 for F4.
Conclusions: The performance of the evaluated 2D SWE techniques for liver fibrosis assessment was similar.
Keywords: Liver elastography, 2D-SWE tehniques,Chronic liver disease.

References:

1. Tsochatzis EA, Gurusamy KS, Ntaoula S, Cholongitas E, Davidson BR, Burroughs AK. Elastography for the diagnosis of severity of fibrosis in chronic liver disease: a meta-analysis of diagnostic accuracy. J Hepatol. 2011 Apr;54(4):650-9. doi: 10.1016/j.jhep.2010.07.033. Epub 2010 Sep 24. PMID: 21146892.

PP 28

LIVER ELASTICITY IN HEALTHY INDIVIDUALS USING P-SWE AND 2DSWE IMPLEMENTED ON TWO NEW ULTRASOUND SYSTEMS USING TRANSIENT ELASTOGRAPHY AS THE REFERENCE METHOD

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Objectives: Ultrasound (US) based elastographic techniques have become in the last years reliable tools for predicting the severity of liver fibrosis in chronic hepatopathies. Usually, they are integrated with high-end US machines but recently they also became available in medium-range ones. The aim of this study was to present the normal liver stiffness (LS) values obtained using 2 different ultrasound machines (one high-end and one medium-range) as well as 3 different probes
Materials: We evaluated LS using shear wave elastography (SWE) methods, both point SWE (p-SWE) and 2DSWE, integrated with 2 ultrasound machines: Siemens Sequoia, using the 5C1, DAX and 4V1 probes and Siemens Juniper using 5C1 probe. Patients without known liver pathology, with a normal US examination aged 26 – 76 years were included. All patients underwent conventional ultrasound examination, and transient elastography (TE) measurements were performed as a reference method for fibrosis severity assessment. Patients with LS values higher than 7kPa were excluded (considered to have at least significant fibrosis). We made 10 measurements by each probe, using each elastography technique available and median values were calculated
Results: Conventional US and TE were performed in 66 patients without known liver pathology. After applying the exclusion criteria, 50 patients remained (mean age – 50.88 years, mean BMI - 29.09 kg/m2). The mean LS value by p-SWE using Siemens Juniper with the 5C1 probe was 3.02 ± 0.84 kPa, significantly lower than TE 4.84 ± 1.08kPa (p < 0.005). The mean value using p-SWE Siemens Sequoia with the 5C1, DAX and 4V1 probes were 3.29 ± 0.74 kPa, 2.96 ± 0.6kPa and 3.09 ± 0.71 kPa, all significantly lower than TE (p < 0.005). 2D SWE measurements were made using the Siemens Sequoia with the 5C1 probe and the DAX probe, with mean LS values of 2.66 ± 0.75 kPa and 2.8 ± 0.99 kPa, these values were also significantly lower than those obtained by TE. A comparison was made between all the probes both using 2DSWE and p-SWE, no significant differences were found (p > 0.05).
Conclusions: In healthy individuals, average liver stiffness values by Siemens Juniper point SWE (5C1 probe) as well as by Siemens Sequoia using 2DSWE (5C1, DAX probes) and point SWE (5C1, DAX and 4V1 probes) ranged between 2.66 kPa and 3.09 kPa and were significantly lower as compared to TE. No significant differences were found when comparing point and 2DSWE measurements with the two systems among different probes.
Keywords: Liver elasticity, P-SWE, 2DSWE,Transient elastography,.

PP 29

POINT SHEARWAVE ELASTOGRAPHY TECHNIQUES FOR THE ASSESSMENT OF LIVER STIFFNESS

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Objectives: Non-invasive ultrasound-based techniques for liver stiffness assessment (LS) were developed as an alternative to liver biopsy. Transient Elastography (TE) is the first method validated by several guidelines and other new methods were developed recently. The aim

of this study was to evaluate the performance of two point Shear Waves Elastography (pSWE) techniques implemented in the same ultrasound system for liver stiffness assessment, using TE as reference.
Materials: A prospective study was conducted, in which 271 consecutive patients with or without previously diagnosed liver disease were included. LS was evaluated by point Shear Wave Elastography (pSWE and Auto pSWE) implemented on Siemens ACUSON Sequoia system (Deep Abdominal Transducer-DAX) and by TE using FibroScan Compact M 530 system (M and XL probes).For Auto pSWE, 15 measurements/values are automatically obtained in a single evaluation and the median and IQR are calculated. For p-SWE and TE, reliable measurements were defined as the median value of 10 measurements with IQR/M<0.3 for all probes. For significant fibrosis, a cut-off value by TE of 7 kPa was used, and for liver cirrhosis 12 kPa [1].
Results: Valid LSM were obtained in all 271 (100%) patients using both elastographic methods. A very good positive correlation was found between the LS values obtained by TE and both Auto pSWE and pSWE: r=0.78, p<0.0001; and between Auto pSWE and p-SWE: r=0.92, p<0.0001. The best pSWE and Auto pSWE cut-off value for significant fibrosis (F≥2) was 5.1 kPa (p-SWE: AUC- 0.81; Se-58.3%; Sp-94.6%; PPV-83.1%; NPV-83.5%; Auto pSWE: AUC- 0.82; Se-63.1%; Sp-90.4%; PPV-76.8%; NPV-84.4%) and for liver cirrhosis (F4) was 6.7 kPa (p-SWE: AUC- 0.92; Se-73.8%; Sp-94.3%; PPV-83.8%; NPV-95.3%; Auto pSWE: AUC- 0.93; Se-78.5%; Sp-97.8%; PPV-86.8%; NPV-96.1%).
Conclusions: The two techniques, pSWE and Auto pSWE have very good correlations with TE and similar performance for predicting significant fibrosis and liver cirrhosis in a mixed cohort of patients.
Keywords: liver fibrosis, elastography, point shearwave.

References:

1. Tsochatzis EA, Gurusamy KS, Ntaoula S, Cholongitas E, Davidson BR, Burroughs AK. Elastography for the diagnosis of severity of fibrosis in chronic liver disease: a meta-analysis of diagnostic accuracy. J Hepatol. 2011 Apr;54(4):650-9. doi: 10.1016/j.jhep.2010.07.033. Epub 2010 Sep 24. PMID: 21146892

PP 30

PERFORMANCE OF A 2D-SWE METHOD FOR THE DIAGNOSIS OF LIVER FIBROSIS USING TRANSIENT ELASTOGRAPHY AS REFERENCE METHOD

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Objectives: Liver fibrosis is a progressive process leading to liver cirrhosis. Several non-invasive elastography techniques were developed in order to perform liver stiffness measurements (LS). The aim of this study was to evaluate the performance and feasibility of 2D-Shear Wave Elastography (2D-SWE) for liver fibrosis (LF) assessment using Transient Elastography (TE) as the reference method.
Materials: 67 subjects were included, 65% (44/67) male, mean age 55.6 ± 13.2, in which LS was evaluated in the same session by TE (FibroScan Compact M 530) and 2D-SWE (Samsung-Medison RS85). Reliable LS measurements were defined for TE the median value of 10 measurements with an IQR/M≤30%, while for 2D-SWE the median value of 10 measurements, with a reliability measurement index (RMI)≥ 0.5 and IQR/M ≤30%. For classification of LF severity we used TE as reference method with cut-off value ≥ 7 kPa for at least significant liver fibrosis [1].
Results: Reliable measurements by TE and 2D-SWE were obtained in all 67 cases. A strong correlation was found between 2D-SWE and TE, r=0.83. The best cut-off value for 2D-SWE in identifying at least significant fibrosis (F≥2) was >7 kPa [AUROC=0.91, 95% CI (0.82;0.97), p<0.0001, Se=81.8%, Sp=80.0%, PPV=66.7%, NPV=90.0%].
Conclusions: 2D-SWE is a feasible method for assessing liver fibrosis, that strongly correlates with TE results.
Keywords: liver fibrosis, elastography, 2D-SWE.

References:

1. Tsochatzis EA, Gurusamy KS, Ntaoula S, Cholongitas E, Davidson BR, Burroughs AK. Elastography for the diagnosis of severity of fibrosis in chronic liver disease: a meta-analysis of diagnostic accuracy. J Hepatol. 2011 Apr;54(4):650-9. doi: 10.1016/j.jhep.2010.07.033. Epub 2010 Sep 24. PMID: 21146892

PP 31

NONINVASIVE BIOLOGICAL FIBROSIS SCORES, USEFUL TOOLS FOR EVALUATING NAFLD PATIENTS

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Objectives: Several noninvasive biological scores were developed to predict liver fibrosis (LF) in patients with non-alcoholic fatty liver disease (NAFLD). We aimed to assess the correlation between AST to Platelet Ratio Index (APRI), Fibrosis 4 (FIB-4) Index and BARD score vs. Transient Elastography (TE), in a group of NAFLD patients.
Materials: We conducted a prospective study, which included 74 patients with NAFLD, (mean age 54.5 ± 11.6 years, 49.4% female). All patients were evaluated clinically (Body mass index- BMI, waist circumference), by serum markers (aspartate transaminase-AST, alanine aminotransferase -ALT, platelets count, gamma glutamyl transferases- GGT, triglycerides), as well as by TE (FibroScan Compact M 530). Based on specific formulas, we calculated APRI, FIB-4 index and, BARD, scores [1]. To discriminate advanced fibrosis (F≥3) by means of TE, we used the cut-off value of 9.7 kPa [2].
Results: Out of 74 patients with NAFLD, 10.8% (8/74) patients had advanced fibrosis based on TE measurements. Using APRI cut-off <2 (100% patients) to rule out advanced fibrosis, we found a NPV of 91.7%. A weak, but significant correlation between liver stiffness (LS) assessed by TE and APRI score was found (r=0.31, p<0.0001). Using

FIB-4 cut-off <2.6 to rule out advanced fibrosis (91.2% - 68/74 patients), we found out a NPV of 92.8%. FIB-4 score was weakly correlated to TE measurements, but statistically significant (r=0.20 , p=0.006). Regarding BARD score, 36.4% (27/74) of patients had a BARD score <2, used to rule out advanced fibrosis, with a NPV of 100%.

Conclusions: APRI, BARD and FIB-4 can rule out advanced fibrosis. These simple scores could be the basis for evaluation on LF in order to evaluate the need for further investigations

Keywords: Non-alcoholic fatty liver disease, Liver fibrosis.Non-invasive biological scores: APRI, FIB-4, BARD.

References:

1. McPherson S, Stewart SF, Henderson E, et al Simple non-invasive fibrosis scoring systems can reliably exclude advanced fibrosis in patients with non-alcoholic fatty liver disease Gut 2010;59:1265-1269.
2. Eddowes PJ, Sasso M, Allison M, et al. Accuracy of FibroScan Controlled Attenuation Parameter and Liver Stiffness Measurement in Assessing Steatosis and Fibrosis in Patients with Nonalcoholic Fatty Liver Disease. J Gastroenterol. 2019 Oct 25. doi: 10.1053/j.gastro.2019.01.042.

PP 32

LIVER FIBROSIS AND STEATOSIS ASSESSMENT USING ELASTOGRAPHIC TECHNIQUES: A COMPARISON BETWEEN NONALCOHOLIC FATTY LIVER DISEASE AND ALCOHOLIC LIVER DISEASE

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Objectives: Alcoholic liver disease (ALD) and Non-alcoholic fatty liver disease (NAFLD) are becoming the most common causes of chronic liver diseases and the leading causes of liver transplantation. Developing non-invasive methods for liver fibrosis and steatosis assessment are needed in these patients. In addition to Transient Elastography (TE), new methods were developed.

Aim: to evaluate and compare the performance of two point shear wave elastography techniques (pSWE and Auto pSWE) for the assessment of fibrosis and of Ultrasound Derived Fat Fraction (UDFF) for the assessment of steatosis, in patients with NAFLD and ALD using TE with Controlled Attenuation Parameter (CAP) as a reference methods.

Materials: A prospective study was conducted in which 166 consecutive patients with previously diagnosed ALD and NAFLD were included. All were evaluated in the same session by pSWE, Auto pSWE and UDFF, implemented in a Siemens ACUSON Sequoia system, using a Deep Abdominal Transducer (DAX), and by TE with CAP, implemented in a FibroScan Compact M 530 system (M and XL probes).

Reliable measurements were defined as the median value of 10 measurements with an IQR/M<0.3. The following TE cut-off values were used: for significant fibrosis (F≥2) - 9 kPa for ALD and 8.2 kPa for NAFLD [1,2]. For mild (S1) steatosis, the following CAP cut-off values were used: 268 dB/m for ALD and 294 dB/m for NAFLD [3].

Results: Fibrosis distribution was the following: in the ALD group F≥2 -10% (5/48) patients and F4 -25% (12/48) patients; in the NAFLD group, F≥2 -4.2% (5/118) patients and F4- 6% (7/118) patients. In the ALD group 50% (24/48) had severe steatosis and in the NAFLD- 39% (46/118), with no significant differences between the two groups, p-values >0.05.

The best cut-off values for identifying significant fibrosis (F≥2) with p-SWE and Auto pSWE in ALD patients were: >7 kPa, with AUCs (0.94 and 0.90), Se (83.3% and 41.6%), Sp (83.3% and 100%); in NAFLD patients: >5.2 kPa, AUCs (0.71 and 0.75), Se (40% and 60%), Sp (100% and 96.2%). For the presence of at least mild steatosis, UDFF cut-off value in ALD patients was >5%, AUC=0.94, Se=96.6%, Sp=83.3% and in NAFLD patients was >12%, AUC=0.87, Se=78.5%, Sp=84.2%.

Conclusions: The cut-off values by pSWE and Auto pSWE for identifying significant fibrosis were >7 kPa in ALD patients and > 5.2 kPa in NAFLD patients. The cut-off values for UDFF in diagnosing at least mild steatosis were >5% in ALD patients and >12% in NAFLD patients.

Keywords: Liver fibrosis, Steatosis, ALD, NAFLD, Auto pSWE, UDFF.

References:

1. Nguyen-Khac, E.; Thiele, M.; Voican, C.; et al.; et al. Non-invasive diagnosis of liver fibrosis in patients with alcohol-related liver disease by transient elastography: an individual patient data meta-analysis. Lancet Gastroenterol. Hepatol. 2018, 3, 614−625, doi:10.1016/S2468-1253(18)30124-9.
2. Petroff D, Blank V, Newsome PN, et al. Assessment of hepatic steatosis by controlled attenuation parameter using the M and XL probes: an individual patient data meta-analysis. Lancet Gastroenterol Hepatol. 2021 Mar;6(3):185-198. doi: 10.1016/S2468-1253(20)30357-5. Epub 2021 Jan 16. PMID: 33460567.
3. Eddowes PJ, Sasso M, Allison M, et al. Accuracy of FibroScan Controlled Attenuation Parameter and Liver Stiffness Measurement in Assessing Steatosis and Fibrosis in Patients With Nonalcoholic Fatty Liver Disease. Gastroenterology. 2019 May;156(6):1717-1730. doi: 10.1053/j.gastro.2019.01.042. Epub 2019 Jan 25. PMID: 30689971.

PP 33

COMPARISON OF EUS PARAMETERS IN PATIENTS WITH ESOPHAGEAL VARICES ON PRIMARY AND SECONDARY PROPHYLAXIS ON COMBINATION THERAPY

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Objectives: Variceal hemorrhage (VH) remains the second most frequent decompensating event after ascites in patients with cirrhosis. It is a life-threatening complication with an overall mortality of each episode of VH around 15% to 25% at six weeks [1]. Combination therapy with nonselective beta blockers (NSBBs) and endoscopic band ligation

(EBL) is recommended to reduce the risk of first episode of bleeding or rebleeding.

Materials: Eighty patients with cirrhosis and high grade esophageal varices were enrolled and classified into two groups – patients on primary and patients on secondary prophylaxis with combination therapy. All patients received EUS examination with Olympus GF-UE160-AL5 and *A*loka ProSound alpha 7 to compare EUS parameters – the size of esophageal varices, peri-ECV, para-ECV and presence of EUS detectable perforant vessels. Independent endoscopic evaluation was performed after each session of EBL.

Results: Approximately 41% of the patient were with viral hepatitis, 29 % with alcoholic liver cirrhosis and the rest with AIH, NASH and mixed etiology. 38/80 patients were on primary prophylaxis, and 42/80 were on secondary prophylaxis after at least one proven episode of VH. In the group on primary prophylaxis the mean EUS parameters were: size of esophageal varices 9.3 mm, para-ECV 4.4 mm, peri-ECV 3.3 mm and presence of detectable perforant vessels in 87.5% of the cases. In the secondary prophylaxis group, the mean endosonographic parameters were: size of esophageal varices 10.2 mm, para-ECV 6.4 mm, peri-ECV 4.6 mm, and detectable perforant vessels in 96.3% of the cases. A statistically significant difference between the groups was only achieved for para-ECV (p=0.026).

Conclusions: EUS provides valuable data facilitating decision making in patients with cirrhosis and high-grade esophageal varices. Our study shows that the sizes of esophageal varices, para-ECV and peri-ECV, were greater in patients on secondary prophylaxis with a higher percentage of detectable perforant vessels and statistically significant difference for the size of para-ECV. Therefore, the results support primary prophylaxis with combination therapy, especially in patients with larger para-ECV.

Keywords: Esophageal varices, EUS, combination therapy.

References

1. The European Association for the Study of the Liver. EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis. J Hepatol (2018), https://doi.org/10.1016/j.jhep.2018.03.024

PP 34

THE ROLE OF INTESTINAL ULTRASOUND IN MONITORING PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Objectives: The treatment targets in patients with inflammatory bowel disease are to achieve clinical and endoscopic remission and, ideally, to achieve histological remission. In our study we aimed to evaluate the usefulness of transabdominal intestinal ultrasound (GIUS) in combination with contrast-enhanced ultrasound (CEUS) and various inflammatory markers, to monitor patients with inflammatory bowel disease, to reduce the need for colonoscopy.

Materials: The study included 20 patients, 13 patients with Crohn's disease (M / W ratio = 1.1 / 1) and 7 patients with ulcerative colitis (M / W ratio = 1 / 1.3), with an average age of 32 years. Patients were evaluated via GIUS + CEUS, using a Hitachi Arieta ultrasonography system with a 7.5 MHz linear transducer. The contrast agent used was SonoVue. The assessed parameters included: the thickness of the intestinal wall, parietal stratification, Doppler parameters, motility, lymphnodes and mesenteric fat along to contrast enhancement parameters. Various inflammatory markers such as C-reactive protein, ESR, fibrinogen, fecal calprotectin, and other acute phase proteins, were assessed as well.

Results: Most patients presented with moderate or severe disease in terms of clinical activity (Truelove-Witts score) and the mean severity index (CDAI, respectively HBI-Harvey-Bradshaw Index) was 241.77 for CDAI, respectively 9 for HBI. Approximately 69% of patients experienced complete loss of parietal stratification, and hyper-enhancement on CEUS was found in 92.3% of patients. The mean values of the biological markers were 1314.4 ug / g for fecal calprotectin, 53.53 mm / h for ESR, 63.99 mg / L for CRP, 391.89 mg / dL for fibrinogen and 3.26 g / dL for albumin. Thus, we observe the existence of correlations between ultrasound parameters (including contrast enhancement parameters), biological markers and the scores used to assess the severity of the disease.

Conclusions: GIUS is proving to be a useful investigation for monitoring the severity of the disease and treatment response in patients with inflammatory bowel disease, but there is a need for further larger and comprehensive studies.

Keywords: Crohn's disease, ulcerative colitis, GIUS, CEUS, monitoring.

PP 35

SUCCESS RATES OF LIVER STIFFNESS MEASUREMENTS USING POINT SHEAR-WAVE ELASTOGRAPHY AND 2D SHEAR WAVE ELASTOGRAPHY USING DIFFERENT ULTRASOUND PROBES. DOES A NEW BARIATRIC PROBE INCREASE LIVER STIFFNESS MEASUREMENTS SUCCESS RATES IN OBESE?

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Objectives: To evaluate liver stiffness measurements success rates (SR) by pSWE and 2D-SWE implemented on different ultrasound probes from different vendors and evaluate the input on the success rate of a new bariatric probe (DAX) in obese patients.

Materials: A prospective study was conducted in which liver stiffness measurements (LSM) were performed in 201 consecutive subjects (60.1% men, average BMI = 28.7 ± 4.9 kg/m2, average age 59 ± 18.4 years, 38% obese) with or without chronic hepatopathies evaluated during the same session by point Shear Wave Elastography (pSWE), 2D Shear Wave Elastography (2D SWE), and Transient Elastography (TE) implemented on the following systems: Siemens ACUSON Sequoia (5C-1 convex transducer with pSWE and 2D SWE, Deep Abdominal Transducer (DAX) with pSWE and 2D SWE, 4V-1 linear transducer with pSWE), Aixplorer Mach 30 (C6-1X convex transducer with 2D SWE) and FibroScan Compact 530 (M and XL probes). Reliable LS measurements were defined as the median value of 10 measurements and an IQR/M<0.3.

Results: Valid LSM were obtained in 99%(199/201) using TE, 99% (199/201) using 2D SWE (C6-1X), 98.5% (198/201) using 2D SWE (5C-1), 99%(199/201) using 2D SWE (DAX), 97.5%(196/201) using pSWE (5C-1), 97.5%(196/201) using pSWE (DAX) and 91.5% (184/201) using pSWE (4V-1). No significant difference were found

between the SR of TE, 2D SWE using C6-1X, 5C-1, DAX and pSWE using C5-1 and DAX ($p>0.05$. pSWE using the linear probe 4V-1 had significantly lower SR compared to the other probes ($p< 0.001$). 38% (77/201) of subjects were obese. Valid LSM were obtained in 100% of the obese (77/77) using 2D SWE DAX, in 98.7% (76/77) using TE, 2D SWE C6-1X, and pSWE DAX, in 97.4% (75/77) using pSWE and 2D SWE 5C-1 and in 83.1% (64/77) using pSWE 4V-1. No significant differences were found between the SR of TE, 2D SWE using C6-1X, 5C-1, DAX and pSWE using C5-1 and DAX in obese subjects ($p>0.05$). pSWE using the linear probe 4V-1 had significantly lower SR compared to the other probes in obese subjects ($p<0.001$).

Conclusions: 2D SWE and pSWE implemented on convex ultrasound probes have very high success rates for liver stiffness measurements in general population and in obese, with no significant differences between them. pSWE implemented on 4V-1 linear ultrasound probe has a significantly lower success rate for liver stiffness measurements compared to pSWE and 2D SWE implemented on convex ultrasound probes. 2D SWE DAX probe had the highest SR (100%) in obese, with no significant differences compared to the other 2D SWE and pSWE implemented on convex ultrasound probes.

Keywords: liver elastography, 2D-Shear Wave Elastography, Point-Shear Wave Elastography, Transient Elastography.

PP 36

LONG-TERM ULTRASOUND FOLLOW-UP IN PATIENTS WITH SMALL GALLBLADDER POLYPS

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Objectives: The aim of this study was to examine long-term follow-up growth in gallbladder polyps < 6 mm in size and to explore the risk of developing gallbladder cancer.

Materials: All patients diagnosed with a gallbladder polyp < 6 mm in size from 2007 to 2009 [1] were invited to attend a ten-year follow-up ultrasonography examination at the department of Radiology Vejle Hospital. Patients that accepted the invitation had an abdominal ultrasonography from October 2019 to February 2020. Participation was voluntary and informed consent was mandatory.

The patients fasted for a minimum of four hours prior to the examination. The patients were placed in the supine position and, when needed, in the lateral decubitus position. The Gallbladder were scanned in both longitudinal and transverse planes using the intercostal or subcostal method.

Polyps were identified if the lesion was immobile without acoustic shadowing. The polyps largest diameter was measured. An increase of polyp size of 2 mm was considered a significant growth.

Results: A total of 154 patients with previously diagnosed gallbladder polyps were included, of which 54 (35%) were men and 100 (65%) women. The median age was 62 years (range: 22-89 years).

Gallbladder polyps were confirmed in 101 out of 154 (65.6%) patients.

A total of 53 (34.4%) of the patients did not have a gallbladder polyp diagnosed at the ten-year follow-up scan.

Conclusions: This study showed that gallbladder polyps less than 6 mm has a low probability of increasing in size. No cases of gallbladder cancer were observed in the included patients.

The need for follow-up in patients with small gallbladder polyps is still up for debate

Keywords: small gallbladder polyps, sonography, follow-up program.

References

1. Pedersen MR, Dam C, Rafaelsen SR. Ultrasound follow-up for gallbladder polyps less than 6 mm may not be necessary. Dan Med J 2012; 59(10):A4503.

PP 37

A HYBRID MACHINE LEARNING MODEL BASED ON SEMANTIC INFORMATION CAN OPTIMIZE TREATMENT DECISION FOR NAIVE SINGLE 3-5CM HCC PATIENTS

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Objectives: To build a hybrid machine learning model to recommend optimized first treatment (Laparoscopic hepatectomy (LH) or Microwave ablation (MWA)) for naïve single 3-5cm HCC patients based on early recurrence (ER, ≤2 years) probability.

Materials: This retrospective study collected 20 semantic variables of 582 patients (LH:300, MWA:282) from 13 hospitals with at least 24 months follow-up. Both groups were divided into training, validation and test set, respectively. Five algorithms (Logistics Regression, Random Forest, Neural Network, Stochastic Gradient Boosting (SGB) and eXtreme Gradient Boosting (XGB)) were used for model building. Model with highest AUC in validation set of LH and MWA was selected to connect as a hybrid model which made decision based on ER probability. Model testing was performed in a comprehensive set composing of LH and MWA test set.

Results: Four variables in each group were selected to build LH and MWA model, respectively. LH-XGB model (AUC=0.744) and MWA-SGB (AUC=0.750) model were selected for model building. In comprehensive set, a treatment confusion matrix was established based on recommended and actual treatment. The predicted ER probabilities were comparable with the actual ER rates for various types of patients in matrix ($p>0.05$). ER rate of patients whose actual treatment consistent with recommendation was lower than that of inconsistent patients (LH:21.2%vs46.2%, $p=0.042$; MWA:26.3%vs54.1%, $p=0.048$). By recommending optimal treatment, hybrid model can significantly reduce ER probability from 38.2% to 25.6% for overall patients ($p<0.001$).

Conclusions: The hybrid model can accurately predict ER probability of different treatments, and thereby provide reliable evidence to make optimal treatment decision for patients with single 3-5cm HCC.

Keywords: hepatocellular carcinoma, Laparoscopic hepatectomy, Microwave ablation, treatment decision.

PP 38

STRATIFICATION OF LIVER STEATOSIS BY THE ATTENUATION COEFFICIENT MEASUREMENT (ACM) OF THE HAND-HELD ULTRASOUND DEVICE

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Objectives: Liver steatosis in the population has predominantly metabolic causes and has the features of an epidemic.

The aim is to evaluate the ability to stratify hepatic steatosis by the attenuation coefficient measurement (ACM) of the hand-held ultrasound device (HHUSD) in comparison with magnetic resonance imaging-proton density fat fraction (MRI-PDFF).

Materials: 28 subjects (average age – 50.13±11.95 years) were examined by the ACM (dB/cm) and MRI-PDFF (%). B-mode and ACM were performed on US systems Soneus P7, weight 13 kg (Ultrasign, Ukraine) by a C1-5 MHz convex probe (HandyUsound initiative). The duration of the ACM procedure was only 1-3 minutes (on an average 2) due to the simple and intuitive navigation of the region of interest by the profilogram of attenuation. Preliminary training of doctors was carried out on a multimodal handmade US steatophantom. MRI-PDFF as reference method were performed on Toshiba Titan 1.5 Canon systems with US simultaneously.
Results: MRI-PDFF was used to determine the degree of steatosis. The median values, 25th and 75th percentiles of MRI-PDFF were as follows: S1 - 7,11 (4,7 – 9,09); S2 - 15,18 (12,25 – 16,54) and S3 - 21,11 (18,73 – 23,88). For ACM: S1 - 2,25 (2,18 – 2,49); S2 - 2,77 (2,39 – 2,94) and S3 - 2,85 dB/cm (2,62 – 2,99). Correlation ACM and MRI-PDFF was r=0.709 (p<0.001).
Conclusions: 1. The attenuation coefficient measurement (ACM) and MRI-PDFF are strongly correlate. 2.Stratification of liver steatosis by ACM of the hand-held ultrasound device can be usefull for the goal of screening non-alcoholic fatty liver disease (NAFLD). 3. The ACM is easily performed by the HHUSD and the ACM duration is no more than 2 minutes.
Keywords: ultrasound, liver steatosis, attenuation coefficient measurement, AC, non-alcoholic fatty liver disease, MRI-PDFF.

PP 39

ABLATION COMBINED WITH SYSTEMIC TREATMENT FOR COLORECTAL LIVER OLIGO-METASTASES: WHAT'S THE OPTIMAL SEQUENCING?

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Objectives: Thermal ablation combined with systemic therapy has been approved effective in colorectal liver oligo-metastases (CLOM) with favorable tolerance, while the optimal sequence of thermal ablation and systemic therapy has not been clarified. Aimed to compare the long-term results between thermal ablation plus peri-ablation first-line systemic therapy (SAS) and thermal ablation plus post-ablation systemic therapy (AS) for CLOM.
Materials: From October 2009 to December 2020, 543 patients with CLOM from 9 hospitals were enrolled in this retrospective cohort study. The crude analysis, multivariable analysis and inverse-probability-weighted were used to analyses eligible cases between the two groups (SAS, n=322 and AS, n=118). Propensity score matching (PSM) and adjusted propensity score model were used to balance between the two groups (n =108 in each matched group).
Results: In the crude analysis, the 5-year PFS was 21.3% (95% confidence interval (CI) 16.0%-28.3%) and 41.3% (95% CI 33.1%-51.5%) in SAS and AS group during 7.8 years of median follow-up (hazard ratio (HR) 0.62, P=0.001), respectively. The 5-year OS was 56.4% (95% CI 49.3%-64.8%) and 61.7% (CI 51.4%-74.1%) in SAS and AS group (HR 0.79, P=0.217). After the PSM, the 5-year PFS was 25.0% (CI 17.7%-35.4%) and 42.7% (CI 34.1%-53.4%) in SAS and AS group (HR 0.60, P=0.005), respectively. The 5-year OS was 64.1% (CI 53.7%-76.4%) and 60.7% (CI 49.9%-73.9%) in SAS and AS group (HR 0.96, P=0.879). There were no differences in ablative complication (5.9% and 8.5%, P=0.335) and adverse events (12.4% and 10.2%, P=0.517) between SAS and AS group.
Conclusions: Our findings approve that thermal ablation plus post-ablation systemic therapy can benefit CLOM patients with better PFS, which could provide an additional reference for making clinical decisions.
Keywords: Thermal ablation, Systemic therapy, Liver metastases, Colorectal cancer, Overall survival, Progression-free survival.

PP 40

DYNAMICS OF PORTAL VEIN VELOCITY – A POTENTIALLY USEFUL TOOL FOR DETECTING CLINCALLY SILENT TIPS DYSFUNCTION

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Objectives: Background: The role of ultrasound (US) surveillance for transjugular intrahepatic portosystemic shunt (TIPS) dysfunction has long been a matter of debate, and clear-cut criteria have yet to be conventionally defined.
Aim: To evaluate the role of US parameters in detecting hemodynamic TIPS dysfunction in the absence of clinical signs of decompensation.
Materials: We included all the patients treated with TIPS for portal hypertension-related complications who had a scheduled TIPS revision within the first six weeks after the procedure, irrespective of the clinical and US variables. Clinical TIPS dysfunction (CD) was defined as the recurrence of variceal bleeding or inadequate control of ascites. Hemodynamic TIPS dysfunction (HD) was defined by a PPG exceeding ten mmHg at the first revision. Thus, we have comparatively analyzed the US parameters of 86 patients at TIPS placement and first TIPS revision.
Results: Recurrent variceal bleeding was the main indication for TIPS in 72 patients (83.7%). While 14 patients (16.3%) had intractable ascites as the main TIPS indication, 51 patients (59.3%) had ascites prior to TIPS. The rate of CD at the first revision was 2.7% (n=2/72) for variceal bleeding and 33% (n=17/51) for inadequate control of ascites. HD occurred in 44 cases (51.2%). Among the patients with CD for inadequate control of ascites, 13 also had HD. Patients with HD had a significantly lower PVV when compared to patients with a revision PPG below ten mmHg (36 ± 14.7 cm/s vs. 45.7 ± 19.2 cm/s, p=0.008). However, the discriminative capabilities of PVV in detecting HD were modest, with an AUROC of 0.655 for a cut-off value of 30.5 cm/s. Patients with HD also had a significant decrease in PVV at the first revision (-5.4 ± 20 cm/s), compared o patients without HD, which more frequently had an increase in PVV (+6.1 ± 20.9 cm/s), p=0.01.
Conclusions: Patients with hemodynamic TIPS dysfunction had a significantly lower PVV and have shown a decreasing PVV compared to the baseline value. A low or decreasing PVV might be sufficient to prompt hepatic catheterization in the absence of clinical recurrence, given the substantially higher rate of clinically silent HD.
Keywords: Portal Hypertension, Transjugular Intrahepatic Portosystemic Shunt, Doppler Ultrasonography, Vascular Ultrasonography.

PP 41

COMPLEX ULTRASOUND EXAMINATION IN THE DIAGNOSIS OF EARLY FORMS OF HEPATIC STEATOSIS

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The goal: Assessing the possibilities of complex ultrasound in the early diagnosis of hepatic steatosis.

Materials and methods: 164 patients aged 22 to 78 years (mean 56 ± 3 years) with suspected hepatic steatosis were examined. B-mode ultrasound, shear wave elastography (ESW), laboratory diagnosis were used: FibroTest, SteatoTest; ELISA for hepatitis B and C. The examination was performed on a Philips Affiniti 70 ultrasound, in grayscale and shear wave elastography using a 1-6 MHz convex probe and a 2-10 MHz linear probe. Grayscale ultrasound determined hepatic steatosis based on increased liver size, increased parenchymal echogenicity, and distal attenuation of the echo signal, rounding of the liver edges, and attenuation of the vascular pattern. The results of ecoelastography were interpreted based on quantitative and qualitative indicators of color mapping.
Results: According to SteatoTest, hepatic steatosis was present in 91% of patients (n = 151). According to the results of module B ultrasound, steatosis was detected in 85% of patients (n = 140). In shear ultrasound mode, liver parenchyma stiffness indicators were increased in 90% of patients (n = 148) and ranged from 5.7-9.7 kPa to an average of 7.5 kPa in the remaining 10%. (n = 17) patients, the stiffness indicators were within normal values in the range 3.1-5.7 kPa with an average value of 4.3 kPa.

The sensitivity of the parameters of ultrasound in gray tones in the diagnosis of steatosis was 93.3%, specificity - 100%, the predictive value of a positive test - 100%, the predictive value of a negative test - 58.3%, accuracy - 93.9 %. The sensitivity of ultrasound shear wave ultrasound in the diagnosis of steatosis was 98.6%, the specificity was 100%, the predictive value of a positive test was 100%, the predictive value of a negative test was 87.4 % and the accuracy was 98.6%.
Conclusion: Reliability estimates show that shear wave elastography technology can be used for early diagnosis of steatosis, as in only 1.3% of cases it will lead to an incorrect assessment of the condition of the liver parenchyma.

PP 42

UTILIZATION OF SONOGRAPHIC QUANTITATIVE TECHNIQUES FOR DETECTION OF STEATOSIS IN PATIENTS WITH NONALCOHOLIC FATTY LIVER DISEASE FROM NOTHERN CAUCASUS REGION

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Objectives: The aim of this study was to determine the cut-off values of sonographic attenuation (TAI) and scatter-distribution (TSI) coefficients and analyze parameters of sensitivity (S) and specificity (Sp) of TAI and TSI in detection of steatosis in patients from Nothern Caucasus region with nonalcoholic fatty liver disease (NAFLD).
Materials: The presence of steatosis in patients with NAFLD was determined according to clinical, laboratory and ultrasound data (B-mode Hamaguchi's scoring system). 22 subjects (male 9, mean age 46.7 years (95% CI: 40.7-52.7)) without clinical, laboratory and sonographic signs of steatosis (1-st group) and 19 subjects (male 11, mean age 56.0 years (95% CI: 49.2-62.8)) with steatosis signs (2-d group) underwent ultrasonographic exam with utilization of ultrasound quantitative techniques and evaluation of TAI and TSI (scanner RS 85, Samsung Medison, convex probe CA1-7A). To obtain attenuation and scatter-distribution coefficients we used right intercostal approach and placed standard fan-shaped region of interest (ROI) near the level of the hepatic hilum during calm breathing at phase of inspiration. 3 data acquisitions at the same location of ROI in the right lobe were performed consistently and mean value of the coefficients were calculated. Receiver-operating characteristic analysis (ROC) was used and cut-off values of TAI and TSI, S, Sp, area under the curve (AUC) in identification of steatosis were determined.
Results: Mean values of TAI in 1-st and 2-d groups were 0.57 (95% CI 0.54-0.60) and 0.78 (95% CI: 0.72-0.84) dB/cm/MHz (p= 0.003) and of TSI - 80.1 (95% CI: 76.4-83.9) and 98.6 (95% CI: 96.7-100.6) ($p < 0.0001$), respectively. The cut-off values of TAI (> 0.64) and TSI (> 0.92) differentiated subjects of 1-st from 2-d group with S of 94.7% and 94.7% and Sp of 90.9% and 86.4%, respectively. AUC parameter in both cases was equal to 0.984.
Conclusions: Sonographic attenuation (TAI) and scatter-distribution (TSI) coefficients are effective in detection of steatosis in patients with NAFLD. The cut-off values of TAI and TSI in detection of steatosis for ultrasound machine RS 85 and subjects from Northern Caucasus region were determined.
Keywords: Nonalcoholic fatty liver disease (NAFLD), steatosis, sonographic attenuation (TAI) and scatter-distribution (TSI) coefficients.

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UTILIZING ULTRASOUND IMAGING FOR EVALUATING FATTY LIVER DISEASE IN MOUSE MODEL

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Objectives: Fatty liver diseases are increasing worldwide, and among them, nonalcoholic steatohepatitis may cause irreversible progression of fibrosis, and follow-up is important clinically. Here we evaluate a new mouse model of fatty liver disease by ultrasonography. A methionine/choline deficient diet was developed as a model for steatohepatitis, but weight loss is observed in this model. To improve this, a choline deficient L-amino acid diet was developed. The disadvantages were that it took as long as 20 weeks and fibrosis was mild. We established a dietary model of fatty liver disease in a short period by using choline deficient, L-amino acid defined and high fat diet [1].
Materials: C57BL/6 mice, 6-week-old males were fasted for 18 hours and then administered choline deficient, L-amino acid defined and high fat diet and 10% sucrose water for 3 days. After percutaneous ultrasonography was performed to confirm fatty liver, the blood was collected from the inferior vena cava, and the liver was removed under general anesthesia. Gene expression analysis and histopathological analysis were performed.
Results: Liver weight increased. Blood tests revealed that liver enzymes were significantly elevated, causing hepatocellular injury. Gene expression analysis showed an increase in inflammatory cytokines. Histopathological analysis showed lipid droplets, ballooning and fibrosis.
Conclusions: This model fed with choline deficient, L-amino acid defined and high fat diet and 10% sucrose water can induce fatty liver disease in a short period of time, and ultrasonography is a useful modality.
Keywords: ultrasonography, fatty liver.

References

1. Matsumoto M et al. An improved mouse model that rapidly develops fibrosis in non-alcoholic steatohepatitis. Int J Exp Pathol.;94 (2):93-103,2013.

PP 44

VALIDATION OF NONINVASIVE ALGORITHMS FOR DIAGNOSING ESOPHAGEAL VARICES IN PATIENTS WITH COMPENSATED ADVANCED CHRONIC LIVER DISEASE

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Introduction: Non-invasive elastography-based and biochemical approaches have been evaluated for diagnosing high-risk esophageal varices (HRV). Here we aimed to validate diagnostic performance of several available non-invasive methods for HRV among the patients with compensated advanced chronic liver disease (cACLD).
Material and methods: Retrospective analysis of patients who underwent liver stiffness measurement (LSM) by transient elastography (TE) in a single centre over the 5-year period, with available results of esophagogastroduodenoscopy (EGD). Only patients with suspicion of cACLD as defined by LSM≥10 kPa, with no previous decompensation were included in the final analysis. Original and expanded Baveno VI criteria (B6C), Controlled attenuation parameter (CAP), Platelets count (Plt), APRI, FIB4 index, and MELD score were evaluated against the results of EGD that served as the reference method.
Results: Of 861 patients with available results of LSM and EGD, 73 had LSM≥10 kPa and EGD performed within 3 months (median age 62 years, 80.8% (59/73) males, 74% (54/73) alcoholic/non-alcoholic fatty liver disease, 21/73 (28.8%) with HRV). In multivariate logistic regression analysis only LSM and platelets were independently associated with HRV. The best performing tests for ruling-out HRV (% of spared EGD; % of missed HRV) were respectively: LSM<20 kPa (53.4%; 0%), B6C (38%; 0%), Expanded B6C (47.9%; 4.8%); Plt>214 (21.9%; 0%); FIB4≤1.8 (21.4%; 0%), APRI≤0.34 (12.3%; 0%). CAP, MELD=6 alone or combined with Plt>150 did not show acceptable performance in our cohort.
Conclusion: The best performing noninvasive algorithms for ruling-out HRV in our cohort of patients with cACLD are based on LSM, whereas biochemical tests might also be used, but with lower number of potentially spared endocopies.
Keywords: Portal hypertension, Cirrhosis, Esophageal varices, Non-invasive tests, Diagnosis.

PP 45

ENDOTHELIAL DYSFUNCTION ASSOCIATED WITH NONALCOHOLIC FATTY LIVER DISEASE IN LOW CARDIOVASCULAR RISK PATIENTS

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Objectives: Nonalcoholic fatty liver disease (NAFLD) is associated with increased risk of cardiovascular disease while flow mediated dilation (FMD) is an independent predictor of future cardiovascular events and death. The aim of this study is to evaluate endothelial dysfunction measured by flow mediated dilation in patients with nonalcoholic fatty liver disease and low cardiovascular risk (CV risk).
Materials: This observational case-control study was designed to evaluate endothelial function in patients with documented NAFLD and low CV risk by assessing the FMD of the brachial artery. The study included 54 patients over 40 years of age, divided in two groups: 34 patients with NAFLD and a control group of 22 individuals without NAFLD. Exclusion criteria were diabetes mellitus type 2, history of cardiovascular, cerebrovascular or peripheral vascular disease, viral hepatitis, chronic liver disease, significant alcohol consumption, smoking, uncontrolled hypertension, body mass index ≥ 40 kg/m^2. NAFLD was diagnosed by ultrasound (bright liver with posterior attenuation) and quantified by Controlled attenuation parameter (CAP) implemented on the FibroScan device. FMD of the brachial artery was evaluated using B mode vascular ultrasound, measuring the maximum percentage variation of the brachial artery diameter before and after a 5-minute occlusion of the forearm blood flow induced by inflation and deflation of a proximal upper arm cuff. All patients underwent B-mode ultrasound, CAP and FMD assessment.
Results: There were no significant differences between the two groups regarding age, gender and CV risk (assessed by SCORE risk calculator). FMD was significantly lower in the NAFLD group as compared to the control group (8.7±7.8% vs 11.5±6.5%, p=0.007). CAP was 306,1±38,7 dB/m in the NAFDL patients and 194,8±31,5 in the control group. In a multivariable regression analysis, we found that the severity of steatosis (evaluated by CAP) was independently associated with FMD (β=-0,44, p=0,022).
Conclusions: Endothelial dysfunction is associated with nonalcoholic fatty liver disease in patients with low cardiovascular risk.
Keywords: flow mediated dilation, endothelial dysfunction, nonalcoholic fatty liver disease, controlled attenuation parameter.

PP 46

NEW PROMISING METHODS OF TREATMENT WITH INJECTIONS AND APPLYING DIFFERENT FRACTIONS OF PLASMA IPRF AND APRF IN MUSKULOSKELATAL INJURIES AND ARTHROSIS. FILMS FROM TESTS AND INJECTIONS OF PLASMA FRACTIONS.

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Objectives: Treatment of simple post-traumatic, overload and sports injuries in GP's surgery. Films from tests and injections of plasma fractions.
Materials: Using an 8-20 Mhz head ultrasound device, the author in the GP's office introduces plasma fractions such as IPRF to the sites of tendon, muscle and ligament damage.

Very frequent post-traumatic interventions and the availability of simple and inexpensive high-frequency heads of ultrasound devices

from 10-20Mhz allow to depict damage of the smallest areas. Most frequently injuries to the anterior fibula ligament, tennis elbow, golfer's elbow, damage to the rotator ring, overload of the sinewy goose's foot.

Plasma administered under the control of the ultrasound head is fixed on an electronic medium using the CINE loop and given to the patient together with the description of the procedure.

Results: As a result of the treatment, in about 70% of younger patients we obtain an improvement after the first injection, the treatment is slightly less effective in the older population. After a few weeks we can repeat the injections, which brings further relief to the patients; after the third injection, if there is no improvement, the treatment is considered pointless.

Conclusions: The method of treatment with centrifuged plasma fractions is extremely safe, harmless, free of side effects, simple and cheap. However, a good knowledge of anatomy, a certain hand and a minimum of 12-14 Mhz linear heads are required. As well as centrifuges in where you can set the appropriate parameters.

For some this method may look complicated, for little clinics it could be an interesting solution to many cases. Administering plasma fraction to muscles, tendons and ligaments is a relatively simple, inexpensive and safe procedure. However, the head of the ultrasound must be in the hand of an experienced doctor.

Keywords: Iprf, aprf, plasma fractions,.

PP 47

ULTRASONOGRAPHIC CHARACTERISTICS OF THE NORMAL ANTEROLATERAL LIGAMENT OF THE KNEE JOINT

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Objectives: Ultrasonographic characteristics of the anterolateral ligament (ALL), recently described anatomical structure, are essential to have a starting point in its injury diagnostics.

Materials: We studied forty-seven volunteers without a history of injuries of the knee joints (94 knee joints) with a multi-frequency linear sensor Philips HD-11 XE №USD0874946.

Results: The ALL was visualized in all 94 knee joints. ALL looked like an anisotropic fibrillar structure and seemed to be symmetrical in 93.62% of patients. However, we were able to assess the integrity of the ALL in only 82.98% of the knee joints without a history of injuries.

The minimum thickness of ALL was always in its meniscal part and came up to 1.43 ± 0.54 mm (range 0.6 - 2.5 mm), the thickest part was the area of attachment to the tibia - 3.26 ± 0.47 mm (range 1.9 - 4.1 mm), the width of the tibial ALL attachment was 12.83 ± 2.64 mm (range 7.0 - 17.2 mm). The thickness of the ALL femoral attachment was difficult to estimate in most cases due to the braiding of the ALL and fibular collateral ligament fibers together. It was about 3.6-4.2 mm, but the boundaries were often indistinct. So we can't precisely measure this parameter in most patients.

We could visualize the tibial and meniscal portion in 100%, femoral - in 95.74%, menisco-tibial - in only 4.26%. There is a violation of the cortical layer integrity at the site of the tibial ALL attachment in at least one knee joint in 25.53% of patients without a history of injuries. So it can't be the evidence of Segond fracture in case of the absence of the other signs of injury, as previous researchers suggested.

Conclusions: Ultrasonographically, the ALL looks identical on both knee joints in 93.62% of patients, which allows the contralateral knee joint to be a reference for comparison for the injured ALL. Ultrasonographic signs of the cortical layer discontinuity at the site of the tibial ALL attachment are not an indisputable symptom of Segond fracture in case of their isolated detection.

Keywords: anterolateral ligament, ALL, Segond fracture.

PP 48

PREVALENCE OF ULTRASOUND - DETECTED PLANTAR FASCIA ABNORMALITIES IN SPONDYLOARTHROPATHIES BY HIGH-END ULTRASOUND IMAGING

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Objectives: Plantar fasciitis(PF) is the most common cause of heel pain(10% cases) induced by repetitive microtrauma [1]. Spondyloarthropathy(SpA) is frequently associated with PF[2]. Ultrasound(US) was found to be an accurate tool compared to MRI in the diagnosis of PF. The most common outcome measure used in major articles was the plantar fascia thickness (at the site of calcaneal insertion) measured by ultrasound ranging from 4.2±1.1 mm to 6.67±1.53 mm for all systematically reviewed groups, using any thickness above 4.0 mm as a positive result [3]. Other evaluated US features are echogenicity, the presence of bony spurs or perifascial fluid, vascularity of the plantar fascia.

Materials: The study included 50 patients with active(BASDAI>4, DAS28>3,2) SpA(Ankylosing Spondylitis(AS), Psoriatic Arthritis (PsA)). Clinical assessment of plantar fascia included its palpation for pain(yes/no), the non-dominant side was tested. One experienced sonographer performed examinations using a diagnostic US system (CANON TUS-AI800) equipped with a linear transducer of 14 MHz. B mode scale evaluated enthesophytes, entheseal thickness, hypoechogenicity of the enthesis, bony erosions; Doppler modalities (Power Doppler and Superb Microvascular Imaging(SMI)) - vascularity detection at the entheseal site. Statistical analyses were conducted using the R studio package and $P<0.05$ was considered significant.

Results: The total number of participants/entheses is 50. Women-26 (52%). The mean age was 49.76±11.41(SD) [95% CI 46.51;53.0] years. BMI, kg/m2 28.88±5.76(SD)[95% CI 27.24; 30.52]. Psoriatic arthritis forms 72%. Plantar fascia enthesis was painful 13 (26%). PF thickness 4.7±1.2(SD)[95% CI 4.43; 5.12] $p<0.05$. PF thickness exceeds the standard rate > 4 mm of 70% of cases. The US revealed other abnormalities: hypoechoic enthesis in 24(48%), entesophyte in 4 (8%), bony erosion in 4(8%). Both US features hypoechogenicity and PF thickness are detected in 40% entheses, $p<0.05$. There was no significant correlation between PF thickness and age, BMI. The vascularity in the entheseal site with both Doppler modalities was not detected.

Conclusions: B mode sonographic features(entheseal thickening, hypoechogenicity) are most associated with PF. PF mean thickness was found to be more than 4 mm in most patients with SpA and is commonly asymptomatic or masked by the treatment. Evaluation of vascularity does not provide any additional information for setting the diagnosis.

Keywords: plantar fasciitis, plantar fascia enthesitis, high-end ultrasound, spondyloarthropathy.

References

1. Goff JD, Crawford R. Diagnosis and treatment of plantar fasciitis. Am Fam Physician. 2011 Sep 15; 84(6):676-82.

2. Maatallah K, Triki W, Riahi H, Ferjani H, Salem FB, Kaffel D, et al. Plantar fascia enthesitis: clinical, radiographic and ultrasound findings in patients with axial spondyloarthritis. Egyptian Rheumatol. 2020;42(4):267−70.
3. Radwan A, Wyland M, Applequist L, Bolowsky E, Klingensmith H, Virag I. Ultrasonography, an effective tool in diagnosing plantar fasciitis: a systematic review of diagnostic trials. Int J Sports Phys Ther. 2016;11(5):663-671.

PP 49

UPDATED TECHNIQUE FOR MEASURING SYNOVIAL THICKNESS AND INFLAMMATION ACTIVITY IN KNEE JOINT BY HIGH-END ULTRASOUND: PICTORIAL CASE SERIES

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Objectives: Evaluation of synovial thickness(ST) and vascularity by ultrasound(US) is used to assess the extent of synovitis [1,2]. As a standard, the maximal diameter of the synovium is usually measured in the suprapatellar longitudinal axis. New Doppler modality - superb microvascular imaging mode(SMI) demonstrates a greater sensitivity in evaluating synovitis than conventional power Doppler(PD)[3,4]. Today's knowledge about the value of SMI for the evaluation of large joints is limited.

Materials: We present pictorial case series of three patients diagnosed with active(DAS28(ESR)>5) inflammatory arthritis with knee joint synovitis (painful and swollen joint). The attention is focused on the interpretation of US images from the SMI aspect, compared to PD. A diagnostic ultrasound system(CANON TUS-AI800) equipped with a linear transducer of 14 MHz was used to measure the maximal ST(in millimeters) in the longitudinal, transverse(lateral/medial) planes of the suprapatellar bursa in a standard manner according to the OMERACT [5]. PD and SMI signals observed in the synovial membrane were scored using a semi-quantitative grading system, from 0 to 3(0=absent, 1=mild, 2=moderate, 3=severe) [6].

Results: Case 1 51-year-old woman with rheumatoid arthritis of 17 years, Case 2 65-year-old woman with psoriatic arthritis of 8 years, and Case 3 62-year-old woman with rheumatoid arthritis of 17 years. Accordingly, diameter of ST in the suprapatellar longitudinal axis: 1.5; 0; 3; transverse medial: 2.61; 0; 4.29, and lateral: 3.64; 2.16; 6.3 planes. Vascularity of thickest synovia was observed(PD vs. colorSMI, monochromeSMI): suprapatellar longitudinal: 0 vs.1,1; 0 vs. 0,0; 0 vs.0,1; transverse medial: 1 vs. 2,3; 0 vs. 0,0; 1 vs. 3,3; transverse lateral: 1 vs. 3,3; 0 vs. 2,2; 1 vs. 3,3 planes. ST diameter is higher on the lateral side compared to other planes. All parts of the quadriceps muscle create the pressure for the suprapatellar bursa longitudinally and push the excess of synovia to sides. Both SMI modes distinguish the thickest synovia dimension more precisely.

Conclusions: High-end US with SMI technique adds a new perspective in measuring ST and pathological vascularity. Supprapatellar bursa has to be checked in all planes for measuring ST. It might be useful for studies of knee joint synovial abnormalities.

Keywords: synovial thickness, Doppler modality, superb microvascular imaging, high-end ultrasound.

References

1. Anand B, Kharat A, Singh A, Franklin J, Naware S, Thind SS. High-resolution ultrasound evaluation of synovial thickness as a marker to assess response to deep tissue heating for pain relief in knee osteoarthritis. Med J DY Patil Univ 2012;5:129-36.
2. Karim Z, Wakefield RJ, Quinn M, et al. Validation and reproducibility of ultrasonography in the detection of synovitis in the knee: a comparison with arthroscopy and clinical examination. Arthritis Rheum.2004;50(2):387-394. doi:10.1002/art.20054.
3. Kandemirli SG, Cicek F, Erdemli Gursel B, Bilgin C, Kilic SS, Yazici Z. Superb Microvascular Imaging in Assessment of Synovitis and Tenosynovitis in Juvenile Idiopathic Arthritis. Ultrasound Q. 2021;37(1):56-62.
4. Artul, S., Nseir, W., Armaly, Z., Soudack, M. Superb Microvascular Imaging: Added Value and Novel Applications. Journal of Clinical Imaging Science, 2017; 7, 45.
5. Bruyn GA, Naredo E, Damjanov N, Bachta A, Baudoin P, Hammer HB, et al. An OMERACT reliability exercise of inflammatory and structural abnormalities in patients with knee osteoarthritis using ultrasound assessment. Ann Rheum Dis. 2016;75(5):842−6.
6. Iagnocco A, Meenagh G, Riente L, Filippucci E, Delle Sedie A, Scire CA, et al. Ultrasound imaging for the rheumatologist XXIX. Sonographic assessment of the knee in patients with osteoarthritis. Clin Exp Rheumatol. 2010;28(5):643−6.

PP 50

IMAGING METHODS IN ASSESSING THE COURSE OF RA

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Objectives: Rheumatoid arthritis (RA) is the most prevalent chronic inflammatory joint disease, and it is responsible for structural damage.

Ultrasound (US) changes in early RA are considered as one of the ways of predicting disease outcomes too.

Materials: 61 RA pts, mean age 50,0 [38,0; 59,0] yrs, mean disease duration 7 [4; 20] months were treated with MTX and biologics according to Treat-To-Target concept. Among them 40 patients with early RA, mean age 51,0 [43,0; 60,0], disease duration 5 [3; 6,5] months.

The wrist, MCP2 and MCP3, PIP2 and PIP3 joints, as well as MTP2 and MTP5 joints of the clinically dominant side were examined by ultrasound (US).

Hands and feet US with gray scale (GS), power Doppler (PD) and destructive changes (erosion), according to the criteria of OMERACT, were analyzed before initiation of treatment and in 3, 6, 9 and 12 months after. A binary scoring system (presence/absence of erosions) of the joints examined was used. Radiographs were obtained at baseline, at 12 months, 4 years and 7 years, radiographic changes were assessed using Sharp/van der Heijde modified scoring method. Radiographic progression was documented based on Sharp/Van der Heijde modified score changes during the follow up.

Results: RA progression by 4 years FUP was identified in 36% (22 p) of pts, by 7 years FUP was identified in 69% (42 p) of pts.

During the 7 years FUP 42 of 61 patients had radiographic progression: the count of erosion increased from 0 [0; 3] to 3 [1; 11]. At the same time, on the background of therapy during the first year, a decrease in ultrasound signs of inflammation was determined according to the GS and PD: from 6 [4; 9] to 4 [2; 6] $p = 0.000$ and from 2 [1; 6] to 0 [0; 2] $p = 0.000$, respectively, and increase in the number of joints with erosions (from 1 [0; 2] to 2 [0; 3], $p = 0.000$).

All pts divided into groups based increase in erosions according to radiography (Rg +) and without it (Rg-). GS at baseline was significantly higher in the group Rg + than in Rg- group (6 [5; 10] and 5 [1; 8], respectively, p=0.04). CRP at 3 months and at 6 months was significantly higher in RG+ group than in RG- group (4,15 [1,2; 8,7] and 1,2 [0; 3,5], respectively, p=0.03 and 2,35 [0,8; 10,1] and 0,4 [0; 4,3], respectively, p=0.025).

Conclusions: Thus, we obtained the first data on the important prognostic role of ultrasound in assessing the progression of early RA in a prospective seven-year follow-up.

Keywords: rheumatoid arthritis, gray scale, power Doppler, radiographic progression,.

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DIAGNOSIS AND PROGNOSIS OF RHEUMATOID ARTHRITIS: FOCUS ON DIAGNOSTIC METHODS.

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Objectives: Rheumatoid arthritis (RA) leads to destructive changes and dysfunction of joints. Ultrasound (US) changes, especially in early RA, are considered as one of the ways of assessing the course of the disease and predicting its outcomes.

Objective(s): to identify the features of the course of RA using imaging methods.

Materials: 85 RA pts, mean age 53,0 [44,0; 61,0] yrs, mean disease duration 8 [4; 24] months were treated by Treat-To-Target concept. After first year of therapy management was following real clinical practice rules until the termination of the study (4 years FUP). The wrist, MCP2 and MCP3, PIP2, PIP3, MTP2 and MTP5 joints of the clinically dominant side were examined by US (gray scale (GS) and power Doppler (PD). Clinical, laboratory parameters and US examination was performed at baseline, at Mo 3, 6, 9 and 12. The X-ray was conducted before treatment, at 12 Mo and in the end of the study. Structural damage progression was evaluated by change in the Sharp van der Heijde score (ΔSHS) between baseline and 4 year.

We categorized pts into 2 groups according to duration of the course of the disease: 1) early RA (the duration of the disease is less than 12 months), 2) non-early RA (more than 12 months).

Results: 56 early RA pts (66%) and 29 non-early RA pts (34%) patients presented among the 85 patients with RA.

RA progression by 4 years the follow-up period was identified in 17 pts (30%) of early RA group and in 16 pts (55%) of non-early RA group.

RA progression by 4 years the follow-up period was identified in 39% of pts.

In non-early RA group the count of erosion at baseline, at 12Mo and 4 years was significantly higher than in early RA group (1 [0; 5] and 0 [0; 2], 2 [0; 6] and 0 [0; 3], 3 [2; 10] and 1 [0; 4], respectively, p=0.03, p=0.03 and p=0.001 respectively).

Also in non-early RA group the GS at 6 and 12Mo was significantly higher than in early RA group (5 [3; 8] and 3 [2; 7], 5 [3; 8] and 3 [1; 5], respectively, p=0.02 and p=0.02 respectively).

Conclusions: This study shows the importance of timely therapy in the development of destructive changes in RA.

Keywords: imaging methods, rheumatoid arthritis, ultrasound, gray scale, power Doppler, structural damage.

PP 52

ULTRASOUND SIGNS OF JOINT INFLAMMATION IN PATIENTS WITH ARTHRALGIA INDUCED BY HORMONAL THERAPY OF BREAST CANCER

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Objectives: Arthralgia develops in almost half of women with breast cancer receiving hormonal therapy. However, the nature of this complaint still remains unclear. The aim of the study was to determine ultrasound findings in affected joints in patients with arthralgia induced by hormonal therapy of breast cancer.

Materials: 13 women (mean age 60.8±14.7) with arthralgia induced by hormonal therapy of breast cancer were enrolled. 12 patients were treated with aromatase inhibitors (letrozole [n=6] anastrozole [n=5] exemestane [n=1]) and 1 patient received antiestrogen therapy with tamoxifen. Ultrasonography of affected joints was performed using classic ultrasound scanners, i.e. Philips Epiq 5 with 18−5 MHz linear transducer. The ultrasound features were joint effusion with\without synovial hypertrophy (gray scale [GS] and power Doppler [PD]), destructive changes (bone erosions) and tenosynovitis, according to the criteria of OMERACT.

Results: We examined hands (10 patients) and feet (1 patient) joints, knee (5 patients), shoulder (4 patients) and hip (2 patients) joints. Inflammatory ultrasound signs were found in all patients. Synovitis was detected in 11 patients (85%), among them in 2 patients PD+ synovitis was found. Tenosynovitis was detected in 12 (92%) patients, and ultrasound erosion was detected in 2 (15%) patients.

Conclusions: Ultrasound findings were presented with inflammatory changes in affected joints and tendons in all patients with arthralgia induced by hormonal therapy of breast cancer. It is required to exclude the inflammatory rheumatic disorders.

Keywords: breast cancer, ultrasound, hormonal therapy, aromatase inhibitors, antiestrogen therapy, gray scale, power Doppler.

PP 53

CAROTID INTIMA MEDIA THICKNESS IS A VALUABLE TOOL FOR THE ASSESSMENT OF CARDIOMETABOLIC RISK IN OBESE CHILDREN

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Objectives: Given the growing obesity rates among children [1], a more complete evaluation of their potential cardiometabolic risk is needed [2]. Carotid intima-media thickness (CIMT), a marker of endothelial distress and a predictor of atherosclerotic progression in

adulthood [3,4], may complete the day-to-day evaluation of children at risk, as it correlates to most of the clinical and paraclinical parameters used for the assessment of obese patients [5].

Aim: To show that CIMT can be used as a predictor of subclinical atherosclerosis in obese children.

Materials: We analyzed 60 patients aged 6−18 years old by measuring their CIMT using the Aixplorer MACH 30 echography machine automatic measurement software (SuperSonic Imagine, Aix-en-Provence, France). Three study groups were defined, depending on the severity of weight excess: obese and overweight, and normal-weight patients as controls. The study was centered on the impact of excess adipose tissue on CIMT and how CIMT correlates to BMI, waist circumference and blood pressure as clinical tools and to usual blood parameters: lipid panel, triglycerides and fasting glucose.

Results: Weight excess and abdominal adiposity in children is clearly linked to increased CIMT. Moreover, waist circumference and TG/HDL-c are significant predictors of CIMT. Significant correlations were detected between CIMT and the entire lipid panel. Although each parameter of the lipid panel (HDL-c, LDL-c, total cholesterol and triglycerides) is correlated to CIMT, fasting glucose is not. Furthermore, correlations between CIMT values and non-HDL-c, TC/HDL-C ratio, and TG/HDL-C ratio were detected, and their correlation strengths grew as weight severity based on BMI grew.

Conclusions: Weight excess in children is associated with increased values of CIMT, and the severity of the excess increases the expected values of CIMT.

Abdominal adiposity of obese children, a clinical marker of metabolic distress, is very reliably positively correlated to CIMT values.

Waist circumference and TG/HDL-c are significant predictors of CIMT.

All evaluated blood parameters showed correlations to CIMT, except for fasting glucose.

Keywords: cardiometabolic risk, carotid intima-media thickness, childhood obesity, subclinical atherosclerosis.

References:

1. Browne, N.T.; Snethen, J.A.; Greenberg, C.S.; Frenn, M.; Kilanowski, J.F.; Gance-Cleveland, B.; Burke, P.; Lewandowski, L. When Pandemics Collide: The Impact of COVID-19 on Childhood Obesity. J. Pediatr. Nurs. 2021, 56, 90−98. https://doi.org/10.1016/j.pedn.2020.11.004
2. Thompson, M.; Mansfield, B.; Stringer, M.; Stewart, B.; Potter, J.; Fernengel, K. An evidence-based resource for the management of comorbidities associated with childhood overweight and obesity. J. Am. Assoc. Nurse Pract. 2016, 28, 559−570.
3. Farello, G.; Antenucci, A.; Stagi, S.; Mazzocchetti, C.; Ciocca, F.; Verrotti, A. Metabolically healthy and metabolically unhealthy obese children both have increased carotid intima-media thickness: A case control study. BMC Cardiovasc. Disord. 2018, 18, 1−6.
4. A., Chrousos, G., de Herder, W.W., Dhatariya, K., Dungan, K., Hershman, J.M., Hofland, J., Kalra, S., et al., Eds.; MDText.com, Inc: South Dartmouth, MA, USA, 2000. Available online: https://www.ncbi.nlm.nih.gov/books/NBK395576/
5. Magnussen, C.G.; Venn, A.; Thomson, R.; Juonala, M.; Srinivasan, S.R.; Viikari, J.S.; Berenson, G.S.; Dwyer, T.; Raitakari, O.T. The association of pediatric low- and high-density lipoprotein cholesterol dyslipidemia classifications and change in dyslipidemia status with carotid intima-media thickness in adulthood evidence from the cardiovascular risk in Young Finns study, the Bogalusa Heart study, and the CDAH (Childhood Determinants of Adult Health) study. J. Am. Coll. Cardiol. 2009, 53, 860−869.

PP 54

LUNG ULTRASOUND IN NEONATES WITH COVID-19 PNEUMONIA – THE START OF A NEW ERA

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Objectives: Newborns with SARS-CoV-2 infection that developed respiratory symptoms are a special category of patients, due to the fact that irradiating imaging tools are not recommended at their age. Because of their high cellular division rate, the X-ray and computer tomography scans should be avoided. The aim of this paper is to investigate the relevance of lung ultrasound (LU) in surveillance of neonates with SARS-CoV-2 infection.

Materials: In our study we searched PubMed, ScienceDirect and Embase databases based on the following keyword: 'newborn', 'neonate', 'COVID-19', 'sonography', 'lung ultrasound'. The found articles were selected using inclusion and exclusion criteria, such as: lung ultrasound as diagnostic tool, newborns, neonates and <28 days of life as population of interest and COVID-19 pneumonia as pathology criteria.

Moreover, we analysed a group of 11 patients with infection who was admitted at 'Pius Brinzeu' County Emergency Clinical Hospital at Neonatology Department.

Results: From the total of articles, we selected 8 of them, based on the inclusion and exclusion criteria, and we analysed their results. After that, we compared their resulted data with the ultrasound findings from our evaluated newborns. The main changes found using LU include decreasing to disappearing physiological A-lines, rare or confluent B-lines, subpleural consolidations, and pleura abnormalities such as thickening and irregularities. Furthermore, the severity of lung injuries was analysed based on a 12-area score.

Conclusions: Regarding neonates, lung ultrasound is an important tool in the evaluation of lung injuries associated with this infection, being demonstrated in several reviewed studies. Also, this imaging technique come with the benefits of being a repetitive, radiation-free, easy-to-use and reliable procedure for observing the impact and surveillance of COVID-19 on the neonates' respiratory system.

This imaging method was proved useful also in other respiratory diseases and could eventually be an indispensable item in the management and monitoring of newborns with respiratory infections, contouring new horizons in using it.

Keywords: neonates, newborns, respiratory, COVID-19 pneumonia, SARS-CoV-2, lung ultrasound.

PP 55

SEMI-QUANTITATIVE EVALUATION OF THE HEPATIC AND PANCREATIC STEATOSIS BY GRAY SCALE ECHOGENICITY

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Objectives: It is traditionally believed that the US echogenicity of the parenchyma is increased in hepatic steatosis (HS) and pancreatic steatosis (PS). Previously, it was proposed to calculate the hepato-renal index (HRI) - the ratio of echogenicity of the liver parenchyma to the cortex of the right kidney. We proposed a new pancreato-lienalis index (PLI) - the ratio of echogenicity of the parenchyma of the pancreatic tail to the spleen.
Aim: To determine the possibility of semi-quantitative assessment of hepatic and pancreatic steatosis by relative hepato-renal (HRI) and pancreato-lienalis indices (PLI).
Materials: HRI and PLI were compared in 54 patients with reference data from native multidetector computed tomography (CT) in diffuse liver and pancreatic diseases. The control group included 20 subjects without clinical, instrumental and laboratory signs of liver and pancreatic pathology. Ultrasound was performed by Soneus P7 scanner (Ultrasign, Ukraine) with convex probe 1-5 MHz. Fundamentally, a special baseline was used to position all control volumes to measure the average echogenicity of the organ parenchyma at the same depth from the probe.
Results: According to our data, the HRI in healthy subjects should not exceed the threshold of 1.2. The diagnostic efficiency HRI is for HS: sensitivity - 75%, specificity - 33.3% ($p < 0,05$). Normally, in adult subjects, the PLI should not exceed 1.5. The diagnostic efficiency PLI is for PS: sensitivity - 75%, specificity - 33.3% ($p < 0.001$).

When PLI used as non-invasive marker for PS detection AUROC was 0.795 (95 % CI 0.642-0.949, $p < 0.004$). The cut-off value was >1.35, with sensitivity, specificity, PPV and NPV – 91.7 %, 58.3 %, 93.3 %, 52.3 % respectively.
Conclusions: Preliminary data suggest that the new relative semi-quantitative US parameter PLI allow more objectively characterize the condition of the pancreatic steatosis in same way as hepatic steatosis by HRI.
Keywords: ultrasound, hepatic steatosis, pancreatic steatosis, computed tomography pancreas.

PP 56

PREDICTION OF THE SEVERITY OF ACUTE PANCREATITIS USING ULTRASOUND DATE

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Objectives: Early correct assessment of the severity of acute pancreatitis (AP) allows distinct therapeutic algorithms and can result in better outcome. Transabdominal ultrasound (US) is the imaging method of choice in patients with acute abdomen due to its wide availability. We disclosed the usefulness of abdominal ultrasound for prediction of the severity of acute pancreatitis.
Materials: Our study included 319 hospitalized patients with AP. According to the Atlanta criteria, 51,1% of patients had mild and 48,9 % severe AP. We studied and compare the efficacy of clinical scoring systems and radiologic data (contrast-enhanced CT (CECT) using the Balthazar grade and ultrasound data). Ultrasound examination was performed in emergency at admission to all patients. CECT is not recommended in the early phase of AP. CECT was performed at different times of hospitalization to 15,67% patients.
Results: The pancreas wasn't visible by ultrasound in 17.55 % of all patients at admission, in a significantly higher number of cases in severe AP as compared with in mild AP 23,08 % vs. 11,66 % ($p<0,001$). Acute peripancreatic fluid collections was observed in a significantly higher number of patients with severe AP vs. mild AP 52,56 % vs. 6,13% ($p<0,001$). Detection of free intraperitoneal fluid was observed in a significantly higher number of cases in severe AP as compared with in mild AP 37,18% vs. 6,13% ($p<0,001$). Ultrasound findings showed diagnostic accuracy 76,4% compared with the APACHE-II score 60,8%; BISAP score 62,7%; SOFA score 68%; Marshall 54.2%; Ranson 64,3%; Balthazar grade 82% and our results showed a trend of a higher AUC in the prediction of severe AP (0.789) compared with the APACHE-II score (0.603), BISAP score (0.619), SOFA score (0,686); Marshall (0,532), Ranson (0,635). Area under the ROC curve Balthazar grade showed 0.85.
Conclusions: Abdominal ultrasound examination was a useful method for early prediction of the severity of acute pancreatitis, when CECT was not recommended. Imaging of acute peripancreatic fluid collections is a useful ultrasound sign for prediction of severe outcome of AP.
Keywords: early prediction, severe acute pancreatitis, ultrasound.

PP 57

THE SIGNIFICANCE OF ULTRASOUND EXAMINATION IN DIAGNOSIS OF PALPABLE LESIONS IN THE NECK

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Objectives: Palpation examination is one of the basic actions performed by a general practitioner. If there is palpable enlargement of organs or the patient reports pain, it is necessary to perform an ultrasound examination. This method is extremely effective in diagnosing abnormalities in the neck organs. The aim of study is to evaluate the importance of ultrasound examination in the diagnosis of palpable neck lesions.
Materials: A group of 92 patients aged 8-72 years with a neck lesion found on palpation were enrolled in the study. There were 53 women/-girls and 39 men/boys. All patients underwent an ultrasound examination using B-presentation imaging and Colour Doppler. Patients in whom a neoplastic process was suspected on ultrasound examination were referred for biopsy.
Results: In the study group, an anterior and lateral neck cyst was diagnosed in 15 patients. In the salivary glands, 8 patients were diagnosed with nephrolithiasis and 2 patients with neoplastic process. Among the 23 patients who were diagnosed with extensive thyroid nodules, 7 patients were found to be neoplastic. In one patient a foreign body was diagnosed in the muscle. Another 23 patients were found to have reactive lymph nodes and another 10 patients were diagnosed with a neoplastic process within the lymph nodes. Carotid artery aneurysm was found among 2 patients. Three patients were diagnosed with fresh thrombosis of the internal jugular vein. Among 5 patients with a history of COVID-19, subacute thyroiditis was diagnosed on ultrasound. Among patients with suspected thyroid malignancy, histopathological examination confirmed this diagnosis in 6 of them. In a group of 10 patients with a suspicion of a neoplasm in the lymph nodes on ultrasound examination, histopathological examination confirmed this diagnosis in 9 patients, in 1 patient the histopathological result indicated an inflammatory process.
Conclusions: Palpable neck lesions vary widely in nature. Ultrasonography is the method of choice for the evaluation of focal neck lesions. Ultrasound image correlates highly (88%) with histopathological findings in the diagnosis of neck neoplasm.
Keywords: neck lesions, ultrasound examination.

PP 58

NEW TECHNOLOGY ULTRASOUND TOMOGRAPHY BY THYROID VOLUME ASSESSMENT

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Objectives: The aim of the study is to present our experience in the use of ultrasound tomography /tUS/ in thyroid volume assessment.
Materials: During the examination, we used a diagnostic method called tUS / 3D ultrasound tomography. The procedure consists of volumetric evaluation and analysis of a tumor or the thyroid itself and measuring the volume based on volumetric data.
Results: Comparison between the measurement of thyroid volume carried out utilizing 3D measurement and calculation from a formula. tUS as an examination taking into account any deviation from the regular shape seems to be a more accurate examination of thyroid volume measurement.
Conclusions: Previous methods of measuring thyroid volume are based on a formula in which we measure the length, thickness, and width of the lobes multiplied by a correction factor of 0.5 or more accurately 0.479. This method assumes a general thyroid-volume model to estimate the 3d volume.
Keywords: thyroid volume assessment, tUS, 3D ultrasound tomography.

PP 59

THE VALUE OF TIRADS SCORES IN THE ULTRASOUND EVALUATION OF THYROID NODULE

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Objectives: Thyroid nodules detected by high-resolution ultrasound (US) became very common during the last decade, most of them being asymptomatic. Only a minority of these nodules are malignant. The main clinical problem in these cases is to rule-out malignancy. Many US features of thyroid nodules could be analyzed, some of them linked to an increased risk of malignancy, but none of these ultrasound features is pathognomonic alone for malignancy. Due to this reason, over the last years many ultrasound-based risk stratification systems of thyroid nodules were developed, analyzing a combination of US features, with the intention to improve overall accuracy.
Materials: We report a case of a 43-year-old female patient who was referred to our clinic for evaluation of a nodular goiter. The nodule is 46 mm in the largest diameter and occupied the entire right thyroid lobe. Left thyroid lobe has a normal aspect. Hormonal values were normal. The nodule is well delineated by a fine halo, has a mixed structure, being isoechoic in the solid component and present an increased vascularization.

Based on Thyroid Imaging, Reporting and Data System (TI-RADS), developed by American College of Radiology (ACR) to define a risk stratification system for thyroid nodules, in order to guide decision on fine needle aspiration (FNA) and follow-up, the nodule has a score of 2, being considered not suspicious, with no indication for FNA (1).

In 2017, the European Thyroid Association developed another risk stratification system for thyroid nodules, named EU-TIRADS (2). Based on this scoring-system, the nodule has a score of 3, being considered with low-risk, FNA being indicated in nodules larger than 20mm.

We performed FNA and the results indicated follicular lesion of undetermined significance. The patient was operated by total thyroidectomy and the pathologic exam indicated a benign thyroid nodule.
Results: The aim of these scoring systems is to identify nodules with a greater likelihood of being clinically significant cancer and to reduce the number of unnecessary FNA (3). The management of this case was done in accordance with EU-TIRADS, but the FNA performed was not useful. Due to cytological result, total thyroidectomy was done. The final diagnosis indicated a benign lesion, in accordance with ACR-TIRADS score.
Conclusions: There are some differences between different TIRADS score, but nowadays the use of these scores to stratify the risk of malignancy in a thyroid nodule could help for a standardized management of the patients.
Keywords: thyroid nodule, malignancy, TIRADS.

References

1. Tessler FN, Middleton WD, Grant EG, et al. ACR Thyroid Imaging, Reporting and Data System (TI-RADS): White Paper of the ACR TI-RADS Committee. J Am Coll Radiol 2017;14:587-95
2. Russ G, Bonnema SJ, Erdogan MF, et al. European Thyroid Association Guidelines for Ultrasound Malignancy Risk Stratification of Thyroid Nodules in Adults: The EU-TIRADS. Eur Thyroid J 2017;6:225-37.
3. Floridi C, Cellina M, Buccimazza G, Arrichiello A, Sacrini A, Arrigoni F, Pompili G, Barile A,Carrafiello G. Ultrasound imaging classifications of thyroid nodules for malignancy risk stratification and clinical management: state of the art. Gland Surg 2019;8(Suppl 3): S233-S244. doi: 10.21037/gs.2019.07.01

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THYROID SURGERY INDICATIONS: TO WHAT EXTENT IS THE ULTRASOUND RISK-STRATIFICATION OF THYROID NODULES PERFORMED IN CLINICAL SETTING?

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Objectives: Reducing the number of unneeded thyroid surgeries could impact hospitalization costs, but also surgical complications and iatrogenic hypothyroidism. The purpose of the present study was to assess retrospectively the number thyroidectomies which had a complete presurgical clinical and imaging thyroid evaluation and respectively the overlap between the surgical indication and the final pathology result.
Materials: We included all the patients admitted in the three Surgical Departments in Timisoara Emergency County Hospital for thyroid surgery between January 1st 2018 and December 31st 2019 (2 years) and compared the pre- and post-surgical diagnosis.
Results: 1036 patients were admitted for thyroid surgery in the three surgical departments of Timisoara County Hospital “Pius Brinzeu” in Romania: 180 unilateral lobectomies, 824 total thyroidectomies and also 32 redo operations for completion of thyroidectomy. 90.3% were females and the mean age was of 53.8±13 years. Out of the total 892 cases with NG, only 218 (24.4%) presented a well-defined indication for surgery: compression, US high-risk, malignant cytology result or

hyperthyroidism. Cancer was detected in 32.9% (n=338) of the cases. A higher prevalence of thyroid malignancy in the men (55.6% vs 30.5%, p<0.01) and in woman older than 30 (16% vs. 31.8%). An important finding was the relatively high prevalence of malignancy in the lobectomy group: 22.8%, while 65% of the total thyroidectomies proved to be benign. Important discordances were detected between the clinical diagnosis and the pathology report: 46.2% of cases. The group with associated compressive symptoms presented an important malignancy rate of 42.6%. In 110 cases, the pathology report showed that chronic autoimmune thyroiditis (CAT) was misdiagnosed, clinically or on US evaluation, as nodular goiter. Rare findings included one patient with metastasis from pulmonary neoplasia and 3 cases with lymphomas (before surgery one of them was suspected to be anaplastic thyroid cancer). The number of FNAs performed and documented in the studied surgical cases is very low (121 out of 674 cases with only non-toxic nodules -17.9%).

Conclusions: We estimated that surgery could have been avoided, with correct presurgical risk stratification algorithms, in up to 46% (473/1027) of the cases. Nevertheless, the important percentage of detected thyroid cancers supports the current radical surgical attitude, given the lack of uniform and precise presurgical diagnosis.

Keywords: thyroidectomy, thyroid nodules, risk stratification, thyroid ultrasound.

PP 61

THE VALUE OF SHEAR-WAVE ELASTOGRAPHY IN THE DIAGNOSIS AND FOLLOW-UP OF POST COVID-19 SUBACUTE THYROIDITIS

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Objectives: Subacute thyroiditis is a self-limited inflammatory thyroid disease, following or coexisting with a viral infection.

COVID-19 has numerous multi-systemic effects, including thyroid disorders. Possible mechanisms involved in thyroid dysfunction associated with COVID-19 infection include apoptosis, inflammatory reaction and follicular cells damage; direct effect of the virus (SARS-CoV-2 genomes were found in patients serum); the interaction with thyroid angiotensin-converting enzyme 2 (ACE2) receptors, respectively

Materials: In the period of November 2021-February 2022, five patients with subacute thyroiditis associated with COVID-19 were evaluated in our department (4 women, one man); mean age 42.1± 11.3 years. The mean time between COVID-19 infection and onset of subacute thyroiditis was 23±10.2 days.

Results: The most common symptoms presented by the affected patients were represented by fever, painful thyroid, and thyrotoxicosis associated complaints. All the patients presented severe inflammatory syndrome, but the thyrotoxicosis clinical and biochemical picture was more severe as compared to other viral subacute thyroiditis. In 60% of the cases, 2D-ultrasonography was suggestive for subacute thyroiditis, but Share-Wave Elastography (SWE) parameters confirmed the diagnostic in 100% of cases (mean thyroid stiffness 234.2±34.5 kPa). Under steroid therapy, during follow-up, the thyroid stiffness decreased gradually at 4 weeks (65.9±15.4 kPa), respectively at 10 weeks (21.6± 5.3 kPa).

The clinical outcome was favorable in all cases. Two patients developed hypothyroidism and were treated accordingly.

Discussions: Subacute thyroiditis are characterized by significantly increased thyroid stiffness. The results of this study documented a significant difference in thyroid tissue stiffness between SAT at baseline and values recorded at the follow-up visit. It is noteworthy that changes in the elastic properties of thyroid parenchyma were associated with a gradual normalization of biochemical parameters

Conclusions: Early diagnosis of subacute thyroiditis associated with COVID-19 is crucial, as prompt treatment with glucocorticoids leads to complete resolution of the disease. Sonoelastography SWE is useful in the positive diagnosis of subacute thyroiditis

Keywords: COVID-19, Subacute thyroiditis, stiffness, Share-Wave Elastography.

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THYROID PATHOLOGY IN END-STAGE RENAL DISEASE PATIENTS ON HEMODIALYSIS

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Objectives: Chronic kidney disease is a rising cause of morbidity and mortality in developed countries, including end-stage renal disease (ESRD). The prevalence of thyroid comorbidities in persons with chronic kidney disease is documented higher than in normal population. The study aims to investigate the prevalence of morphological and functional thyroid disorders in patients with chronic kidney disease, with renal replacement therapy (hemodialysis).

Materials: A cross-sectional study was performed on 123 consecutive patients with chronic kidney disease stage 5, on hemodialysis during a period of one month (May 2019-June 2020). Thyroid work-up included serum free thyroxin (FT4), free triiodothyronine (FT3) and thyroid-stimulating hormone (TSH) before starting hemodialysis therapy.

Results: We evaluated 123 patients (male to female ratio 70/53) mean age 62.2 ± 11.01, mostly above 65 years old, enrolled in the end-stage renal disease program, on renal replacement therapy. From the cohort, 76/123 presented thyroid disease, including autoimmune hypothyroidism, nodular goiter or thyroid cancer. Among them, 63 patients presented nodular goiter, including 3 thyroid cancers, confirmed by surgery and histopathological result, 22 patients had thyroid autoimmune disease. The serum thyroid-stimulating hormone levels found in the cohort was 3.36 ± 2.313 mUI/mL, which was in the normal laboratory reference range. The thyroid volume was 13 ± 7.18 mL. A single patient in the cohort presented Graves Basedow disease, under treatment and three patients present subclinical hyperthyroidism. We have found that thyroid disease risk is increased by 3.4-fold for the female gender and also the increase of body mass index (BMI) with one unit raises the risk of developing thyroid disease with 1.083 times (p = 0.018).

Conclusions: We quantified the prevalence of thyroid disease in end-stage kidney disease population, especially nodular goiter, important for differential diagnosis in cases with secondary hyperparathyroidism. Thyroid autoimmune disease can be prevalent among these patients, as symptoms can overlap those of chronic disease and decrease the quality of life. We have found that thyroid disease has a high prevalence among patients with end-stage renal disease on hemodialysis. Thyroid goiter and nodules in ESRD patients were more prevalent than in the general population. Clinical surveillance and routine screening for thyroid disorders can improve the quality of life in these patients.

Keywords: end-stage renal disease, hemodialysis, nodular goiter, thyroid disease.

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THYROID ELASTOGRAPHY AND VOLUMETRIC DOPPLER IN THE EVALUATION OF BETHESDA III AND IV NODULES

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Objectives: Indeterminate cytology are findings described in up to 20% of the thyroid fine-needle aspiration (FNA) results and surgical indication in these cases is controversial. The aim of this study is to assess the impact of a multimodal ultrasound approach in identifying the therapeutical strategy for indeterminate cytology cases.
Materials: 2B, qualitative SE (4-scale), and 3D color Doppler were completed in one session, with a Hitachi Preirus equipment in 64 cases with indeterminated cytology, all of which had also a pathology report that confirmed the diagnosis.
Results: 25% of the cases were malignancies and papillary cancer prevailed (15/16). Benign lesions were larger than the malignant ones (mean diameter 21.1 mm vs 12.3 mm, $p<0.01$). 80% of the score-4 nodules and 66.6% of score-3 cases were confirmed malignant. Qualitative SE demonstrated very good diagnostic value in the detection of malignancies (76.2% sensitivity, 86% specificity, PPV 72.7%, NPV 88.1%, and 82.81% accuracy, AUROC 0.83, CI 0.721−0.916), correctly identifying 54/64 cases. 3D Doppler showed 90.7% specificity, 71.43% sensitivity, NPV 86.7%, PPV 78.9% and 84.37% accuracy of in predicting thyroid cancer. The majority of the cases which were confirmed malignant by the pathology report (15/21) did have significant perinodular 3D vascularity. The accuracy of the evaluation for 2B, 2B +SE, 2B+3D, 2B+SE+3D was of 64%, 68.7%, 85.9% and 90.3% respectively. Features like intranodular microcalcifications and the presence of lymph nodes with altered central hilum had 100% sensitivity in our group, but their low prevalence does not provide good specificity. The prevalence of cancer increased both with stiffness (7.8% soft lesions and 72.1% of hard lesions) and with the intensity of vascularity (18.1% and 43%).
Conclusions: The multimodal evaluation in the indeterminate cytology group improved the imaging detection of thyroid malignancy. Highly suspicious US features identified in B-mode US, in qualitative SE, and/or in 3D Doppler assessment do increase the risk of malignancy.
Keywords: indeterminate cytology, thyroid nodules, elastography, volumetric doppler.

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A 5-YEAR RETROSPECTIVE STUDY OF THE INTRODUCTION OF HIGH FREQUENCY ULTRASOUND OF THE SKIN IN THE UNIVERSITY CLINIC OF DERMATOLOGY IN TIMIȘOARA

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Objectives: In 2021 the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) published a Position statement on Dermatologic ultrasound that contained 24 points that were broadly agreed upon by experts in the field to define this emerging domain [1]. This together with the growing availability and affordability of quality ultrasound devices sets the scene for the development of point of care ultrasound in dermatology, where ultrasound done by the dermatologist informs and guides clinical decisions.
Materials: In our presentation we share a 5-year retrospective study of the high frequency ultrasound examinations of the skin (HFUS) that were performed in our clinic in the 2016-2020 period. The examinations were part of a pilot program to implement skin ultrasound in a dermatologic clinic. We review 430 cases recorded on two ultrasound devices with frequencies of 18 MHz, 22 MHz and 50 MHz. We classify them according to pathologies (melanoma, non-melanoma skin cancer, inflammatory dermatoses, vascular pathology) in order to identify the most useful applications. We also analyze the cases according to the 24 statements that define dermatologic ultrasound according to EFSUMB and share our practical experience in the application and utility of ultrasound examination done by the dermatologist.
Results: In our analysis notable applications that stand out were the preoperatory ultrasound for basal cell carcinoma and melanoma, diagnostic evaluation of tumors, skin changes in scleroderma and calcifying skin diseases. We also provide a critical appraisal of our examinations showing which position statements given by EFSUMB were in accordance with our practice and where there is room for improvement.
Conclusions: Our data suggests that there is a place for routine dermatologic ultrasound in many aspects of skin disease. Furthermore examinations done by dermatologists have the advantage of integrating aspects of patient history and clinical semiology with bedside ultrasound to guide clinical decision-making. We must be mindful to align our research efforts to international guidelines to ensure a solid base on which to build impactful clinical applications.
Keywords: High frequency skin ultrasound, Dermatology, Retrospective study, Point of care ultrasound, Melanoma.

References

1. Alfageme F, Wortsman X, Catalano O, et al. European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB) Position Statement on Dermatologic Ultrasound. Ultraschall Med. 2021;42(1):39-47. doi:10.1055/a-1161-8872

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HIGH-FREQUENCY ULTRASONOGRAPHIC ANALYSIS IN THE EVALUATION OF THERAPEUTIC RESPONSE IN PATIENTS WITH PSORIASIS VULGARIS

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Objectives: Skin ultrasonography is a non-ionizing imaging method useful in the in vivo study of skin lesions using ultrasound as a vector for imaging [1]. Plaque psoriasis is a chronic, immune-mediated disease which represents a global health problem. Our objective in this study was to evaluate ultrasonography as a tool for monitoring plaque psoriasis.

Materials: In a prospective interventional analytic study we aimed to assess whether the first chronologically obtained change in psoriasis plaque assessment in monitored patients was a decrease in psoriasis plaque thickness and subepidermal hypoechoic band as compared to baseline values. The study was carried over a period of 8 weeks and included 50 patients diagnosed with psoriasis vulgaris in the Dermatology Clinic of the "Sfântul Spiridon" Emergency Hospital, Iasi, Romania. We assessed the evolution under topical (calcipotriol/betamethasone 50 micrograms/0.5mg/g gel or fluticasone propionate 0.05% cream in combination with lipolotion urea 10%) combined with systemic therapy (Etanercept) in severe forms of disease. Target lesions of psoriasis vulgaris were analysed by classical means (clinical examination) and by non-invasive imaging techniques such as high frequency ultrasonography (HFUS using Dermascan C® 20 MHz).
Results: The results showed that the first change obtained chronologically was the decrease in psoriasis plaque thickness and subepidermal hypoechoic band in the target plaque as compared to baseline values (i.e. at week 4 compared to week 0). After comparing the mean values of psoriasis plaque tegument thickness and hypoechoic subepidermal band thickness, we found that they decrease significantly both in week 4 compared to week 0 and in week 8 compared to week 4.
Conclusions: Practical non−invasive techniques to monitor plaque psoriasis progression and treatment are necessary. High frequency ultrasonographic examination allows an objective and reproducible measurement of skin thickness and is a useful technique for a non-invasive assessment of treatment efficacy in psoriasis.
Keywords: High frequency ultrasonography (HFUS), psoriasis vulgaris, topical therapy, Subepidermal Low Echogenic Band (SLEB), monitoring.

References

1. Crisan M and Solovastru LG: Imaging techniques in the diagnosis and monitoring of psoriasis. Exp Ther Med 18: 4974-4980, 2019. (Review).

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IS BIOPSY OF RENAL TRANSPLANT ALWAYS SAFE? THE ROLE OF ULTRASOUND EXAMINATION.

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Objectives: Kidney transplantation is the most effective method of renal replacement therapy - the transplanted organ is able to take over all the functions performed by healthy kidney. The function of the kidney after transplantation should be regularly observed in laboratory tests and imaging examinations. However, in some patients, it is necessary to perform a post-transplant biopsy in order to clearly identify the pathology that may lead to damage function of the kidney or transplant rejection.

The aim of the study was to assess the type of complications occurring after a biopsy of a transplanted kidney and to assess the effectiveness of ultrasound in diagnosing them.
Materials: A retrospective evaluation of the results of US examinations in 489 patients after biopsy of a transplanted kidney was performed in terms of the incidence of complications. All ultrasound examinations were performed in the radiology department with the use of Logiq 7 and Logiq 9 devices in B-mode presentation and in color and spectral Doppler options.
Results: Complications after biopsy were found in 9 patients: 6 arteriovenous fistulas and 3 hematomas. One of the patients required the embolization of the damaged vessel by the endovascular method.
Conclusions: Ultrasound examination with the use of Doppler option is an effective method to detect complications after a biopsy of a transplanted kidney, which allows for qualification for endovascular treatment.
Keywords: ultrasound, renal biopsy, transplantation.

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BLADDER ULTRASONOGRAPHY AS FIRST STEP NONINVASIVE APPROACH IN FEMALE PATIENTS WITH IRRITABLE BOWEL SYNDROME AND OVERACTIVE BLADDER

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Objectives: Irritable bowel syndrome (IBS) could associate, especially in women, lower urinary tract symptoms: urinary urge (UU), incontinence (I) and nocturia (N), consistent with overactive bladder (OAB). Given low adherence of female patients towards invasive urodynamics, this study aimed to assess transabdominal bladder ultrasonography (TABU), as first step diagnostic approach in OAB.
Materials: 50 young female participants (aged under 45), 40 diagnosed with IBS and symptoms consistent with OAB and 10 healthy controls joined this observational study, after ruling out a lot of diseases and conditions. Micturition diary assessed UU, I and N. Questionnaires were also obtained for anxiety, migraine, fibromyalgia and temporo-mandibular joint dysfunction. Routine blood and urine work ups and pelvic CT.MRI were performed. Pre and postvoid bladder volume, bladder ejection fraction (BEF) and bladder wall thickness (BWT) were assessed by TABU in patients and controls.
Results: Significant differences of BWT and BEF were noted in study group by comparing to controls. 35% of study group patients displayed BEF below cutoffs and 65% normal bladder emptying. Anxiety strong correlated to UU and I, but not to BWT or BEF. Strong negative correlations were found between BWT and BEF ($r=-0.58$, $p<0.0001$). as well as positive strong correlations between BWT, UU($r=0.39$,$p=0.01$), I($r=0.41$,$p=0.007$) and nocturia ($r=0.39$,$p=0.01$). BEF strong negatively correlated to UU($r=-0.35$,$p=0.02$) and I($r=-0.34$.$p=0.03$.).
Conclusions: TABU was able to assess detrusor hypertrophy associated to OAB, as well as bladder motility disturbances in IBS female patients. Multiple correlations were found between various symptoms and bladder measurements. Since not all patients displayed increase of BWT or BEF disturbances, TABU could select patients eligible for invasive urodynamics., from those with modified measurements.
Keywords: transabdominal bladder ultrasonography, overactive bladder, irritable bowel syndrome.

PP 68

LOCALIZATION OF SOLID RENAL CELL CANCER BY QUANTITATIVE CONTRAST-ENHANCED ULTRASOUND IMAGING

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Objectives: Renal Cell Cancer (RCC) appears asymptomatic at its early stage until progression; therefore, most RCCs are diagnosed incidentally. The current gold standard for RCC diagnostics is a contrast-enhanced CT-scan; however, more cost-effective and practical diagnostic imaging tools are still being researched. Recently, contrast-ultrasound dispersion imaging (CUDI) has shown promise for prostate cancer localization by the extraction of quantitative perfusion and dispersion features based on contrast-enhanced ultrasound (CEUS) acquisitions. CUDI builds on the physiological process of tumor-driven angiogenesis, leading to a complex and irregular microvascular architecture that produces changes in the local blood perfusion and contrast-dispersion kinetics. Here, we investigated the feasibility of CUDI for detecting primary RCC.
Materials: At the Amsterdam University Medical Centers, nine patients underwent two-minute CEUS recordings using a Philips iU22 scanner (Philips Healthcare, WA) under approval granted by the local ethics committee. During the scanning, the patient was under anesthesia and apnea to mitigate the impact of respiratory motion. To optimize the image quality, we tested different settings on the first 4 patients, and the remaining 5 acquisitions were scanned with the optimal settings and used for the following CUDI analysis. Prior to the CUDI analysis, singular-value-decomposition-based pre-processing was implemented to remove residual tissue clutter and noise. The pre-processed data was then analyzed by two different CUDI techniques, namely time-intensity curve (TIC) fitting and spatiotemporal similarity analysis. Both approaches aim at extracting dispersion parameters that reflect the underlying microvascular architecture. Tumor and parenchyma regions were delineated by two urologists in consensus, based on the corresponding CT scans. Pixel-based classification was then performed by the obtained CUDI parameters and the area under the receiver-operating-characteristic curve (AUC) was calculated.
Results: All the AUC values obtained by the spatiotemporal similarity analysis in the 5-patient dataset were higher than 0.6, and the highest AUC=0.96 was obtained for an individual patient. Moreover, the spatiotemporal similarity analysis outperformed the TIC fitting analysis for RCC detection.
Conclusions: Our preliminary results show the potential of CUDI for solid RCC localization. However, further validation with an extended dataset and cross validation is required.
Keywords: Renal cell cancer, contrast-enhanced ultrasound imaging, perfusion and dispersion, contrast-ultrasound dispersion imaging, cancer localization.

PP 69

CLEAR CELL RENAL CELL CARCINOMA: ATTEMPT TO COMPARE SONOGRAPHIC APPEARANCES TO TNM STAGING SYSTEM OF UICC/AJCC

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Objectives: Renal cell carcinomas (RCC) are the most common malignant renal tumor. Nowadays, US is considered a feasible first-imaging option for screening renal tumors. Staging of renal cell cancer is one of the most important predictors of prognosis and treatment.
Materials: Using a Toshiba Aplio ultrasound machine with a 3-6 MHz transducer transabdominal sonography grey-scale B-mode with color Doppler was performed for 28 patients with clear cell renal cell carcinoma histologically confirmed after nephrectomy. Analysis of results was carried out using program STATISTICA 10.0.
Results: Tumors of T1a (14,3%) were <4 cm in diameter, confined to kidney, isoechoic or mildly hyperechoic. The largest number of patients (42,9%) represented T1b >4 cm but <7 cm also confined to kidney, mostly mixed echogenicity, in both stages the contour is smooth and clear, diagnostic of pseudocapsule as hypoechoic halo very important in case of partial nephrectomy. Combination grey-scale B-mode with color Doppler shows intense peripheral blood flow of the tumors (73%), intra-tumor foci (24%), penetrating vessels (25%). On the border with the tumor - echosigns of displacement of the renal vessels, breakage of one of the branches. The average value of RI in the center of the tumor 0.43±0.1, on the periphery - 0.76±0.09. Tumors of T2 (7,1%) were limited to kidney >7 cm - polypositional scanning helps determine the spread of the tumor toward the pelvic system. Tumors of T3 (32,1%) - extension into major veins (renal vein in 60%, IVC in 40%) or perinephric tissues. Tumors of T4 (3,6%) involves ipsilateral adrenal gland or invades beyond Gerota's fascia - irregular contour, decreased renal motility during respiration. There is a strong correlation between cystic inclusions and tumor aggressiveness (correlation coefficient +0.9).
Conclusions: US examination is the first imaging technique for screening and evaluating patients with suspected RCC. The greatest effectiveness of US is observed in the presence of T1b, T2 and T3 stages to localize the tumor according to the (NCIU-nephrometry), determine the presence of pseudocapsules, spread and choose treatment tactics such as partial or radical nephrectomy. Qualitative staging depends on the US apparatus and the expertise of the sonograph.
Keywords: Renal cancer, clear cell renal cell carcinoma, ultrasonography, staging renal tumor.

PP 70

CLINICAL-ULTRASOUND-SCREENING OF CHRONIC KIDNEY DISEASE(CKD) IN HIGH-RISK PATIENTS WITH KNOWN CARDIO-RENAL-METABOLIC DISORDERS AND THE CORRELATIONS BETWEEN CLINICAL METHODS OF KDIGO ASSESSMENT OF RENAL FUNCTION AND RENAL MULTIMODAL ULTRASOUND BY FAMILY PHYSICIANS

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Objectives: CKD is defined after KDIGO-guideline as abnormalities of kidney structure or function, present for more than three months, with implications for health, and CKD is classified based on cause, eGFR-category, and albuminuria category (CGA).

Diabetic Nephropathy (DN) is the leading cause of Chronic-Kidney-Disease(CKD) followed by high BP and CVD, being characterized in late stages by persistent or slight decreases of parenchyma and kidney sizes. We aimed to analyze the correlations of both, renal-tissue stiffness(Strain-Elastography) and US morphometry, with clinical-biochemical indicators in patients with CKD.
Method: We did an ultrasound screening on 1020 patients with DM, CVD, and BP. Patients were followed up with ultrasonography screening performed and also laboratory assays twice a year. Renal-parenchyma-thickness, length(volume), kidney stiffness(elastography-used/Strain-Ratio-SR) and estimated-glomerular-filtration-rate(eGFR)/albumin-to-creatinine ratio(ACR-values), were analyzed using Pearson

correlation and ROC-curve-analysis to assess the kidney function. We designed a diagnostic algorithm software. All patients were stored and counted into our electronic database.

Results: Our US screening, with an accuracy of 88%, found renal-elasticity(Strain-Ratio-SR) worsened progressively from CKD-Stage 3to5 ($p<0.001$). The renal stiffness, measured by strain-elastography, with ultrasonography, correlates well with albuminuria(ACR) and rapid renal deterioration in patients with CKD. A statistically significant positive correlation was found between eGFR and both: Strain-Ratio ($r=0.8013$, $p<0,0001$) with parenchyma-thickness ($r=0,7667$, $p<0,0001$), and degree of kidney-dysfunction.

The ROC-statistical-analysis of our US-methods confirmed a higher-level of diagnostic accuracy of Strain-Elastography, $p<0.001$, AUC=0,815, 95%CI: 0,790 to 0,838.

Conclusions: Our multimodal-US screening suggests that both, ultrasonographic- parenchyma-thickness-measurements besides the renal-stiffness(SR)measured by elastography, can be some important imaging techniques for the follow-up care of CKD patients and could predict the rapid-renal-function deterioration.

PP 71

RAPID DETECTION OF NAFLD AND ITS EVOLUTIONARY STAGES TOWARD CIRRHOSIS IN THE TARGETED POPULATION THROUGH MULTIMODAL LIVER ULTRASONOGRAPHIC SCREENING (MLUS) AND ARTIFICIAL INTELLIGENCE WITH FIBROSIS RISK STRATIFICATION BY FAMILY PHYSICIANS.

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Objectives: NAFLD is a global public health issue, which progressively covers a spectrum of liver pathology, including steatosis-steatohepatitis-fibrosis, and cirrhosis. This study aimed to evaluate the diagnostic accuracy of the multiparametric-liver-ultrasonographic screening with the uses of artificial intelligence performed by family doctors, compared to the evaluation performed by a specialist, at the patients with a high risk of NAFLD/NASH.

Methods: We conducted a multiparametric-liver-ultrasound screening (MLUS) on 4751patients, which presented as inclusion criteria: dyslipidemia, obesity, DM, metabolic-syndrome(NCEP-criteria),cirrhosis, B/C viral hepatitis.APRI-score was calculated to stratify fibrosis risk. We use "standard protocol", which could improve reproducibility and facilitate dynamic comparison, in multimodal-ultrasonography with standard liver scans. We established the cut-off/median-values(morphometric-ultrasound) of normal-ratios, between the anterior-posterior-diameters of the normal-liver-segments after Couinaud /lobes, with the kidney/spleen-long-axis(not influenced by fatty-tissue-loading).The high-risk patients with NAFLD/NASH were first examined by an experienced family doctor, subsequently compared with ultrasound-review by the specialist, and agreement was evaluated using Cohen's-kappa-coefficient. We have developed a smart-computerized-diagnostic algorithm for NAFLD/NASH.

Results: We identified 4751patients with NAFLD/NASH/cirrhosis confirmed by specialist. The positive-results of screening were:2592-steatosis, NASH/steatofibrosis-971persons, and 22-cases with Cirrhosis. The accuracy of liver-US-screening was:95,87%, with 95%CI=95.27%to 96.42%, sensitivity:97,12%, specificity:91,59%, which were subsequently confirmed by the Gold-Standard-method through fibroscan. The prevalence of liver-pathology was:77,48%with95%CI:76,26%to78.66%. Reports of both groups of specialists for identifying NAFLD/NASH showed a very-good-strength of agreement-k=0.875;95%CI=0.864−0.887, standard-error: 0,005.

Conclusions: The uses of Multiparametric-Liver-Ultrasound-Screening(MLUS), morphometric-US(MUS), and artificial intelligence (AI), performed by trained-family-physicians are comparable to diagnostic-liver-ultrasonography performed by the gastroenterologist.

PP 72

ULTRASOUND - AN EXCELLENT AND NECESSARY TOOL AT A FAMILY DOCTOR PRACTICE

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Objectives: Working away from a large medical centers, a country doctor can only count on his own experience, a stethoscope, basic laboratory tests. But there is now a new technology that penetrates deep into the most secret structures of the human body.

Greater availability of ultrasound equipment allows it to be widely used in a family doctors practice. Basic knowledge of anatomy, medical education and curiosity combined with diligence and experience allows ultrasound examinations to be included in the standard of basic medical examination.

Not only has the quality of images been revolutionized, but what is probably the most important, the price of equipment.

Materials: A simple ultrasound with linear and convex head device becomes as necessary and useful as the once criticized stethoscope. Laennec was the first but we should remember that in 1851 Irish doctor Arthur Leared invented the binaural stethoscope.

Our rural practice between 2004-2021 consisted of 16 000 patients we have focused on three basic directions: Abdomen. Vascular diagnostics. Musculoskeletal system diseases.

Results: We all know that when the first symptoms start patient usually goes to the general practitioner and depends on the fast access and quality of our diagnosis; the patient's life and fate is in our hands. In our work we present the essential benefits of including ultrasound diagnostics in the basic functions of the family doctor's office.

Conclusions: Should we take upon ourselves new duties? Is this method profitable for patients and doctors? Are we slaves to technology?

Keywords: Ultrasound at GP office.

PP 73

THE DIAGNOSTICS OF LOWER LIMB EDEMA - IMPORTANCE OF ULTRASOUND EXAMINATION

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Objectives: The importance of ultrasound examination in the diagnostics of lower limb edema.
Materials: A group of 102 patients, aged 8-80 years, with lower limb edema and pain were enrolled in the study. All patients underwent lower limb US examination using B-mode, Color Doppler and spectral options. Patients with suspected neoplasm process on US examination were referred for biopsy.
Results: In the US examination in the study group the diagnosis was as follows:

- in 15 patients Baker's cyst
- 8 patients with ruptured and diffuse intramuscular Baker's cyst
- deep vein thrombosis in 17 patients (including 2 pediatric patients)
-14 patients with intramuscular venous thrombosis
- in 3 patients Achilles tendonitis
-10 patients with shin muscle rupture/tear (including 2 pediatric patients)
- popliteal artery aneurysm in 3 patients
- 9 patients with massive lymphoedema in the course of erysipelas accompanied by reddening of the skin
- in 5 patients neoplasm lesions
- allergic edema in 3 patients (all pediatric patients after insect bites)
- 8 patients with reactive lymphadenopathy (2 pediatric patients)
- enlarged lymph nodes suspecting neoplasm in 3 patients (1 pediatric patient)
- in 4 patients hematomas.

In a group of 8 patients with neoplasm process suspected on US examination, histopathological examination confirmed neoplasm process in 7 patients, in the remaining 1 patient it revealed hematoma.
Conclusions: US examination is the method of choice in differentiating the cause of lower limb edema. US image highly correlates (87.5%) with histopathology in the diagnosis of neoplastic lesions.
Keywords: ultrasound examination, edema, neoplasm process.

PP 74

FETAL ECHOCARDIOGRAPHIC FEATURES AND CLINICAL SIGNIFICANCE OF DIFFERENT TYPES LEFT BRACHIOCEPHALIC VEIN ABNORMALITIES

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Objectives: To establish the reference range of the anteroposterior diameter of the left brachiocephalic vein (LBCV) and evaluate the characteristics of fetal echocardiography with different types of LBCV abnormalities and its clinical significance.
Materials: A retrospective study was undertaken involving 714 fetuses at 20 weeks to 38 weeks gestational age (GA). Of them, the anteroposterior diameter of fetal LBCV were continuously measured on the thymus section on the cephalic side of the three-vessel trachea. The reference range of anteroposterior diameter was created to the GA, and the relationship between both was analyzed. 20 cases were selected for reliability analysis. Moreover, the echocardiographic characteristics of 30 cases with fetal LBCV abnormalities were summarized.
Results: (1) The intra-class correlation coefficients of LBCV anteroposterior diameters detected by the same physician (0.978) and different physicians (0.970) were high. (2) With the increase of gestational age, the anteroposterior diameter of LBCV increased significantly ($P<0.01$), and the regression equation was Y(mm) =2.01+0.19*GA ($r=0.914$, $P<0.001$). (3) Among the 30 fetuses with LBCV abnormalities, 24 cases with abnormal LBCV route, including 22 cases with route under the aortic arch, 1 case with anomalous retroesophageal LBCV, and 1 case with intra-thymus route. There were 4 cases whose LBCV were absent and 2 cases were dilated. In addition, the 30 fetuses with LBCV abnormalities, complicated with aortic arch anomalies (13 cases), or conotruncal defects (4 cases), or ventricular septal defect (1 case), or anomalous pulmonary venous return with a supracardiac connection (1 case) or Galen vein aneurysm (1 case).
Conclusions: Prenatal echocardiography is useful in assessing fetal LBCV. LBCV abnormalities is usually associated with fetal heart malformations. Evaluating fetal LBCV might be practical for screening fetal congenital heart disease.
Keywords: fetal echocardiography, left brachiocephalic trunk vein, congenital heart disease.

PP 75

THE USE OF ULTRASOUND IN THE MANAGEMENT OF LABOR - UPDATE

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Objectives: Ultrasonography represents an important diagnostic tool used nowadays to better understand the complex process of delivery and its perturbations in order to ensure delivering a healthy baby to a healthy mother. Intrapartum ultrasound (IPU) offers a greater precision in evaluating fetal head position, station and descent than digital vaginal examination. Thus, IPU can become a reliable instrument in the hands of trained medical personnel for the management of normal and abnormal labor.
Materials: We reviewed all current data and we present the experience of our unit in the County Emergency Hospital of Craiova with IPU. The goal of this paper is not meant to change the classic algorithm of labor monitoring, but to provide objective additional evaluations of the traditional labor parameters of crucial importance. Sonographic measurements reviewed and used include both linear methods of measurement such as fetal head-perineum distance (HPD), progression distance (PD) and fetal head-symphysis distance (HSD) and angular methods such as the angle of progression (AOP), the angle of direction (AOD) and rotation.
Results: A HPD less than 40 mm, an AOP of more than 110−120˚, PD more than 35 mm, and an AOD of more than 105˚ represent good predictors in achieving an uncomplicated vaginal delivery. These cut-offs proved to be helpful in selecting those patients with such a high risk for Caesarean delivery that they should avoid a trial of labor. IPU has become a highly useful risk tool with the potential to greatly improve planning hospital service needs and minimizing patient risk.
Conclusions: IPU can be considered a significant part of the point-of-care-ultrasound (POCUS) and should be available in most delivery rooms, even just for verifying the correctness of clinical examination when assessing fetal presentation, position and station in labor. This 'bedside' examination with no additional requirement for advanced equipment or special training provides an immediate diagnosis of obstetrical complications that can lead to critical outcomes for the mother and the fetus. Ultrasound in labor should become standard of care.
Keywords: intrapartum ultrasound, prolonged labor, primiparous.

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DUCTUS VENOSUS AGENESIS AND PORTAL SYSTEM ANOMALIES. ASSOCIATION AND OUTCOME

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Objectives: We have limited information regarding the association and implications of portal venous system (PVS) anomalies in agenesis of ductus venosus (ADV) cases. Few cases of PVS malformations have been reported during fetal life apart from ADV. Our main objective was to evaluate the prenatal diagnosis of ADV and PVS anomalies and describe the outcome of these cases, either isolated or associated
Materials: We evaluated the intrahepatic vascular system regarding the presence of normal umbilical drainage and PVS characteristics in the second and third trimester of pregnancy. The associated anomalies and umbilical venous drainage were noted. Genetic counseling was proposed to all ADV cases. A detailed postnatal evaluation was performed in all live births, with six months follow-ups.
Results: Ultrasonography was performed in 3517 pregnant women. 19 cases were prenatally diagnosed: 18 ADV cases, 7 abnormal PVS cases, and 6 associations of the two anomalies. We noted an incidence of 5.1‰ and 1.9‰ for ADV and PVS anomalies, respectively. Out of the 18 ADV cases, 5 (27.7%) were isolated.

Karyotyping was performed in all cases: five cases (26.3%) presented genetic anomalies, Trisomy 21 being diagnosed in 60%.

PVS anomalies were found in 33.3% of the ADV cases, while ADV was present in 85.7% of the PVS anomalies. Only PPVSA was encountered when umbilical drainage was normal. All TPVSA cases were associated with extrahepatic drainage of the umbilical vein.

All abnormal PVS cases, except one case whose follow-up was not possible, worsened the outcome of ADV cases. Conversely, 66.6% of ADV cases with normal PVS presented a favorable outcome.
Conclusions: DV and PVS abnormalities were found with a higher than reported frequency. Normal DV is involved in the normal development of the PVS. Additional fetal anomalies are the best predictor for the outcome of ADV cases. The functional importance of DV may be overestimated in the classic literature and textbooks since isolated ADV apparently associates a favorable outcome. Postnatal monitoring is essential to detect the implications of portal system maldevelopment, which may represent the actual prognostic factor in isolated ADV cases.
Keywords: agenesis of ductus venosus, portal venous system anomalies, outcome.

PP 77

PRENATAL DIAGNOSIS AND OUTCOME OF UMBILICAL-PORTAL-SYSTEMIC VENOUS SHUNTS. EXPERIENCE OF A TERTIARY CENTER AND PROPOSAL FOR A NEW COMPLEX TYPE

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Objectives: The objective of this study is to share our experience in the prenatal diagnosis of umbilical-portal-systemic venous shunts (UPSVS) and to study the prognostic factors for proper prenatal and perinatal management.
Materials: A five years prospective study regarding the detection of UPSVS. We included in the analysis a series of agenesis of ductus venosus (ADV) cases previously reported by our center. We analyzed the incidence of the UPSVS types, their associations, and outcome predictors.
Results: We found a prenatal incidence of 0.2% in 14,793 scanned fetuses. UPSVS were diagnosed in all first trimester cases, except one (94.11%).

We diagnosed 19 Type I umbilical−systemic shunts (USS) (61.2%). All these cases associated major morphological and/or genetic anomalies, which worsened the outcome for this group. Anomalies of the portal venous system (PVS) were found in 87.5% of the cases.

Type II ductus venosus−systemic shunt (DVSS) was found in 12.9% of the UPSVS cases. A normal PVS was found in all cases, but half were associated with other structural anomalies. This group had the highest rate of a good outcome (75%).

16.1% of UPSVS cases were classified as Type IIIa, intrahepatic portal-systemic shunt. PVS was normal in 60% of them and 40% of the cases were associated with partial portal venous system agenesis (PPVSA). Intrauterine growth restriction (IUGR) was present in 60% of the cases. This group presented a high incidence of the major associated anomalies- with poor outcomes.

In three cases (9.6%) we noted multiple shunts, and we referred to this category as Type IV (a new UPSVS type). A normal PVS was noted in all cases. Poor hemodynamic, secondary to multiple abnormal drainages, and major associated anomalies worsen the outcome for this group.

Genetic analysis showed abnormal results in 40% of the tested cases.
Conclusions: The incidence in our study is 0.2%. Early detection is feasible. The postnatal outcome mainly depends on the presence of structural, genetic and PVS anomalies. IUGR may be associated. The new category presented a poor outcome secondary to poor hemodynamic and major associated anomalies.
Keywords: umbilical-portal-systemic venous shunt, umbilical drainage, agenesis of ductus venosus, fetal venous shunt, venous anomalies, portal system, prenatal diagnosis, color Doppler.

PP 78

FETAL SCREENING ULTRASOUND - THE EVALUATION OF THE FETAL HEART VALVES

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Objectives: We searched for the possibilities and limitations of fetal heart valves assessment when screening for fetal anomalies at 11-14 weeks, 19-23 weeks and third trimester.
Materials: This is a prospective study performed in our clinic of Obstetrics and Gynecology of Craiova between January 2020 and December 2021. In addition to the existing protocols of fetal heart assessment, we enclosed a supplementary protocol for the evaluation of the fetal heart valves- specific for every gestational age. We analyzed the extent to which it was achieved during our study, if it prolonged the examination time and whether it was helpful in detecting fetal heart valvular pathology
Results: During our study we observed the utility for the fetal heart valves assessment especially in the second and third trimester of

pregnancy. We did not notice a significant extension of time for the examination of the fetal heart.
Conclusions: The fetal heart valves assessment, although it is far away from offering the details of a postnatal heart evaluation can be integrated in the assessment of the fetal heart and can bring benefits in the prenatal diagnosis of such pathology.
Keywords: fetal heart valves, screening ultrasound, heart malformations.

PP 79

HYSTEROSALPINGO CONTRAST SONOGRAPHY (HYCOSY) IN UTERO-TUBAL PATENCY ASSESSMENT

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Objectives: The objective was to evaluate the technique in 2D and 3D assessment.
Materials: We evaluated 147 female patients with couple infertility diagnosis for two years. Ultrasound machines with dedicated contrast software for acquiring 2D and 3D images were operated. Postprocessing imaging technique was applied in most of the cases.
Results: Were counted 71 normal results, abnormal uterine shape in 12 cases, endometrial polyps in 6, adenomyosis in 3, unilateral tubal obstruction in 35 and bilateral in 14. When patient had a previous salpingectomy, the obstruction of the tube trace was counted as unilateral obstruction. Pregnancy was spontaneously obtained in about 23 cases in the first 6 month after the procedure, which may indicate the therapeutic effect of contrast substance distension of the assessment tract.
Conclusions: HyCoSy is an efficient procedure in establishing uterotubal patency or illustrating heterogenous finding correlated in most of the cases to female infertility. Also, it provides valuable information, with reduced risk factors compared to the classic HSG and offers volumetric 3D postprocessing assessment advantages with multiple viewing angles of the contrast trace acquisition. This technique for tubal probe, has not only a function in the diagnostic assessment of female infertility, but also may have therapeutic role.
Keywords: female infertility, HyCoSy, tubal obstruction, uterus, malformation.

PP 80

FETAL GROWTH RESTRICTION: ASSESSMENT AND MANAGEMENT – EXPERIENCE IN A TERTIARY CENTER

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Objectives: The diagnosis of fetal growth restriction (FGR) implies an accurately established gestational age. Acknowledging the probable cause and the severity of FGR is paramount in counselling the parents. Monitoring the fetal growth velocity and well-being parameters may be useful in deciding the optimal time and route of delivery. The study purpose was to identify those fetuses who were at the highest risk of perinatal demise and neonatal morbidity, to apply different interventions in the prenatal period, and to identify those fetuses that could benefit from preterm delivery.
Materials: We enrolled 50 cases diagnosed with fetal growth restriction. We carried out an observational, prospective cohort study. Maternal characteristics and comorbidities, ultrasonography data, and information about newborn outcomes were evaluated in two distinct groups: group A (late-onset FGR) and group B (early-onset FGR). Early-onset FGR occurs before the 32nd week of gestation, and late FGR starts from the 32nd week.Our study included cases of FGR in structurally and chromosomally normal fetuses. The management of the pregnancies with suspected early or late FGR related to uteroplacental insufficiency was different, but included serial ultrasound evaluation of fetal growth, biophysical profile, impedance to blood flow in fetal arterial and venous vessels, amniotic fluid assessment in all cases and cardiotocography in selected cases. Various proposed interventions were applied.
Results: The mean of maternal age, gestational age at diagnosis, BMI, mean arterial pressure (MAP) at diagnosis, and gestational age at delivery were 28.4 years, 33.4 weeks, 29.5 kg/m2, 107.6 mmHg, and 36.6 weeks. 10 cases were included in group A. 40 cases were included in group B. 8 newborns with early FGR required neonatal intensive care and there were 2 cases of perinatal death. There was no neonatal death in the late FGR group. There was a higher prevalence of hypertension and pre-eclampsia in group B (55%), vs. 45 % in group A. Gestational diabetes was not associated with any of the FGR types.
Conclusions: No intervention in healthy women improved the growth of growth-restricted fetuses. We confirmed that early-onset FGR has a lower prevalence but is associated with higher maternal and fetal morbidity and mortality than late-onset FGR.
Keywords: early and late fetal growth restriction.

PP 81

THE ROLE OF ULTRASOUND IN THE MULTIMODAL IMAGING DIAGNOSIS OF OVARIAN CANCER

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Objectives: Computed tomography (CT) is used to diagnose intraperitoneal metastases of ovarian cancer. The diagnostic accuracy for metastasis at the right diaphragm and omentum is usually satisfactory: however, the diagnosis can be incorrect. In this study, we investigated if ultrasonography (US) combined with CT enhances the diagnostic accuracy of those metastatic lesions.
Materials: This prospective study includes 69 patients with preoperative diagnosis stage III/IV ovarian cancer who underwent laparotomy between January 2021 and January 2022. The presence or absence of metastasis at the right diaphragm and omentum were preoperatively diagnosed by the same sonographer (S.A.) using US (US diagnosis), and then rediagnosed, referring the CT reading findings (US + CT diagnosis). Metastasis was considered by US when there was a mass lesion with a texture different from the surrounding normal tissues or irregularly thickened diaphragm or omentum. Metastasis was considered by CT when there was an increase in CT density in omentum and the diffuse or irregular thickening of diaphragma. The chi-square test was used to determine the association between image diagnosis and pathological diagnosis as a true diagnosis.
Results: In the right diaphragm, pathology was not performed in 29% of cases. True diagnosis was substituted by CT diagnosis in the group without pathology diagnosis. For the right diaphragmatic metastasis,

sensitivity, specificity, and accuracy were 96%, 74%, 90% for US diagnosis, 94%, 74%, 88% for US + CT diagnosis, and 82%, 84%, 83% for CT diagnosis. For the omental metastasis, US diagnosis was 87%, 82%, 86%, US + CT diagnosis was 87%, 76%, 84%, and CT diagnosis was 96%, 41%, 83%. The accuracy of US diagnosis was the highest, US + CT diagnosis was the same, and CT diagnosis was the lowest. US diagnosis and US + CT diagnosis were more sensitive for right diaphragmatic metastasis and more specific for omentum than CT diagnosis.

Conclusions: US combined with CT was more sensitive and specific than CT diagnosis. US diagnosis was also accurate. The use of US in the diagnosis of ovarian cancer intraperitoneal metastasis is expected to provide a more precise diagnosis.

Keywords: Ovarian cancer, Ultrasonography, Computed tomography, Intraperitoneal metastases of ovarian cancer.

PP 82

TOMOGRAPHIC ULTRASOUND NEW IMAGING TECHNOLOGY BY VEINS ASSESSMENT

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Objectives: Application of tUS/ 3 D ultrasound tomography in the mapping of superficial veins of extremities and evaluation of superficial vein thrombosis. The influence of new technology on improvement of the quality of the diagnosis of limb venous vessels.

Materials: Using an 8/20 Mhz linear head with connected device transferring data to the computer, we analyze the course of venous vessels. A detailed evaluation of the size and volume of venous thrombosis is possible.

Results: For 3 years we have been conducting research aimed to assess the importance of tUS in the diagnosis of thrombosis and mapping the course of veins. The method allows for confirmation of thrombosis, observation of the evolution of the clot and detailed imaging of the course of the veins and their quality.

Conclusions: tUS is a new, promising method that allows for a detailed examination of venous vessels, and accurate measurement of the thrombus inside the vessel.

Keywords: tUS, 3D ultrasound tomography, superficial veins.

PP 83

VALUE OF DOPPLER ULTRASOUND IN THE DIAGNOSIS OF DIALYSIS FISTULA-RELATED VASCULAR COMPLICATIONS AND IN THE QUALIFICATION PATIENTS FOR ENDOVASCULAR TREATMENT.

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Objectives: The aim of this study was to assess the value of doppler ultrasound in the diagnosis of vascular complications of arteriovenous (AV) fistulae in dialysis patients and in the qualification patients for endovascular treatment.

Materials: 79 patients were referred during 12-month period to the Department of Interventional Radiology and Neuroradiology, Medical University of Lublin for the ultrasound examination of the AV dialysis fistulae. There were distinguished two types of anastomoses within the group of examined patients. 46 subjects presented with end-to-side fistulae, whereas the remaining patients had side-to-side anastomoses. All dialysis fistulae were localized in the distal part of the forearm. Each examination was performed using LOGIQ 7, GE ultrasound scanner with 6-12 MHz linear probe. In every patient, who was qualified for endovascular treatment, after procedure control usg exam was performed.

Results: 21 cases of vascular complications were diagnosed among the study group including: 4 cephalic vein thromboses, 5 cephalic vein stenoses, 4 radial artery stenoses and 8 cases of the steal syndrome. All the patients diagnosed with either venous or arterial stenosis based on ultrasound examination were further qualified for PTA procedures. After procedures control ultrasound exam confirmed the good results of endovascular treatment in every patients.

Conclusions: Doppler ultrasound examination is the method of choice in the monitoring and diagnosing vascular complications of dialysis fistulas and for qualification patients for endovascular treatment of complications. Doppler ultrasound is a method of choice in monitoring patients after endovascular procedures.

Keywords: Doppler ultrasound, hemodialysis, arteriovenous fistula, endovascular treatment.

PP 84

ULTRASOUND TOMOGRAPHY BY CAROTID PLAQUE ASSESSMENT. NEW VISUAL TECHNOLOGY.

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Objectives: The aim of the study is to assess the usefulness of novel tUS/tomographic 3D ultrasound technology of carotid arteries.

Materials: In addition to the standard DUS examination/ carotid artery doppler/ using tUS, the author assesses carotid arteries with a linear 8-20 Mhz probe in combination with tomographic ultrasound to acquire 3D volumetric datasets with following image processing.

Results: The tUS can be used to measure and visualize the atherosclerotic plaque inside the carotid arteries in detail. This technology allows an accurate assessment of the shape and volume of the plaque. The inside of the vessel can also be visualized using virtual endoscopy. The technology is also useful in assessing the IM complex.

Conclusions: The new technology is a promising, fast, non-invasive test that allows a detailed evaluation of atherosclerotic plaque, not only because of its size but also because of its shape and ulceration. This is an important factor influencing the risk of a stroke. It is also possible to observe the state of IM/intima media/. Is it possible to assess the response to treatment by measuring plaque volume and IM quality, before and after treatment.

Keywords: tUS, tomographic 3D ultrasound, atherosclerotic plaque.

PP 85

MONITORING RENAL ARTERY EMBOLIZATION- ROLE OF ULTRASOUND

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Objectives: Embolization of the renal artery branches is indicated in case of intensely vascularized renal tumors when nephrectomy is at risk or is not accepted by the patient. We present a case with a long-standing stable evolution.
Materials: A 72-year-old male was previously diagnosed 5 years before the examination with a right renal cell carcinoma. Nephrectomy was performed and no other therapy was indicated. At presentation, a large left renal mass was identified and two options of treatment were offered: left kidney removal and preparation for renal replacement therapy or embolization of the tumor-feeding artery.
Results: Ultrasound grey-scale, Doppler and CEUS examinations revealed a 5 cm renal mass, irregular in shape, inhomogeneous, with an intense arterial and venous vascularization, with tortuous, high velocity vessels. Embolization of two feeding arteries was performed and ultrasound monitoring evaluated the tumor at 1 month, 6 months and then yearly for 3 years after the intervention. In the first year, CT scan was also performed for staging at 6 months interval. No metastases were detected and renal function remained stable after 3 years of monitoring. CEUS was performed in order to evaluate the presence and characteristics of the remaining tumor vascularization.
Conclusions: Ultrasonography is the method of choice for the examination and monitoring of tumor embolization in the case of single kidney tumors. We advise CEUS follow-up and vascular pattern analysis.
Keywords: embolization, CEUS, renal, artery, carcinoma.

PP 86

LOW SERUM MMP-9/TIMP-1 RATIO IS ASSOCIATED WITH EXTRACRANIAL ARTERY STENOSIS IN TYPE 2 DIABETES MELLITUS

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Objectives: Patients with type 2 diabetes mellitus (T2DM) have greater risk of extracranial artery stenosis (ECAS) which is important cause of cerebral ischemia. Therefore, identifying patients with DM with a high risk of developing cerebral infarction is of great clinical importance. We hypothesized that molecules active in vascular remodeling could be modified in T2DM patients, as indirect markers of the DM related generalized abnormality of vascular activity. To test the hypothesis, we measured the serum levels of matrix metalloproteinase-9 (MMP-9), tissue inhibitor of metallopeptidase inhibitor-1 (TIMP-1) and MMP-9/TIMP-1 ratio in T2DM patients with and without ECAS.
Materials: This cross-sectional study, enrolled 115 T2DM patients (59 men and 56 women, with age of 60.6±8 years (mean±SD)). All participants underwent extracranial color-coded duplex sonography to detect presence of ECAS. Serum MMP-9 and TIMP-1 levels were measured by ELISA-method. Cardiovascular risk factors were measured using questionnaires and standard laboratory methods. We used multiple logistic regression models to assess the independent correlates of ECAS.
Results: Of the 115 T2DM patients, the mean duration of diabetes was 11.6±6.6 years, and 11.3% (n=13) had ECAS. The mean MMP-9/TIMP-1 ratio differed significantly between T2DM patients with and without ECAS (0.65±0.2 vs. 1.22±0.73, $p<0.01$). Multiple logistic regression analysis demonstrated that the MMP-9/TIMP-1 ratio ($p=0.036$) was independently associated with of ECAS in T2DM patients.
Conclusions: In type 2 DM patients, low MMP-9/TIMP-1 ratio was the main independent correlates of ECAS. Serum levels of TIMP-1 is increased in T2DM patients with ECAS which may reflect abnormal extracellular matrix (ECM) metabolism.
Keywords: type 2 diabetes mellitus, extracranial artery stenosis, matrix metalloproteinase-9, tissue inhibitor of metallopeptidase inhibitor-1, matrix metalloproteinase-9/tissue inhibitor of metallopeptidase inhibitor-1 ratio.

PP 87

THE USE OF NEW CONTRAST AGENTS FOR ULTRASOUND TOMOGRAPHY

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Objectives: Greater availability of ultrasound equipment allows us to use it more and more widely in the practice of family doctors. Basic knowledge of anatomy, medical education and curiosity combined with diligence and experience allows to include contrast ultrasound examinations in the standard of basic medical examination.
Materials: The development of advanced ultrasound techniques makes it possible to view the structures of the human body not only with anatomical, but almost histopathological precision. Today's technology allows us not only to observe the movement of red blood cells inside the vessels, but also to measure their speed. We visualize the synovial membrane, the fluid filling the burettes, microcalcifications, focal tissue changes, nerves, and avulsion fractures. New probes with high frequencies of heads - above 18- 20 Mhz - illustrate in detail the eyeball, skin, while endo or intraoperative heads illustrate other internal tissues of the patient. New contrast agents allow visualization of arteries and vessels with very high precision, more efficaciously then arteriography. It may be unbelievable but contrast agents are relatively cheap and safe. Every educated GP with experience can perform this procedure. Not only has the quality of images been revolutionized, but what is probably the most important, the price of equipment and safety of contrast.
Results: After completing the first studies. It is safe method.
Reading quality - acceptable.
In our work we present the benefits of including contrast ultrasound diagnostics in the basic functions of the family doctor's.
Conclusions: We all know that the patient with the first symptoms usually goes to the general practitioner. The fast access and quality of our diagnosis depends the patient's life and fate.
Having an on-site vascular examination is a great way to make a quick diagnosis.
Keywords: ultrasound contrast agents, sonovue, peripheral arteries ultrasound.

PP 88

THE RELATIONSHIP BETWEEN CORONARY AND CAROTID ATHEROSCLEROSIS IN PATIENTS WITH RHEUMATOID ARTHRITIS.

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Objectives: Rheumatoid arthritis (RA) is a systemic inflammatory disease leading to significant increase in cardiovascular morbidity and mortality. The aim of this study was to assess the presence and degree of atherosclerotic lesions of the coronary arteries (CA) and internal carotid arteries (ICA) in RA patients (pts).
Materials: The study included 63 RA pts (38F/25M) with suspected ischemic heart disease. The mean age of RA pts was 58[52;63]years, disease duration - 11[7;23]years, disease activity-DAS 28 4,7[3,2;5,8]. All pts undertook *c*oronary angiography and carotid duplex ultrasonography. CA stenosis was diagnosed if hemodynamically significant narrowing of the artery lumen (≥50%) was present. Carotid artery plaque (CAP) are assessed by the detection of IMT≥1,2mm.
Results: Out of 63 RA pts CA stenosis was detected in 22 (35%) (7F/15M) (Group I)), while intact CA were found in 41 (65%) (31F/10M) (Group II) pts. Both Groups were comparable in terms of age, disease duration and RA activity. Males prevailed in Group I: 48% vs 10% in Group II ($p<0,05$). Serum HDL cholesterol (HDL-C) concentrations were lower in Group 1 vs Group 2 (1,2[0,9;1,4]mmol/l) vs 1,6[1,2;1,9] mmol/l), $p<0,01$). Concentration of other lipids were similar in pts from both Groups. CAP of the ICA was found in 19% and 16% in pts of Groups I and II, respectively, $p>0.05$. Carotid IMT of the left ICA was greater in Group I vs Group II (0,76[0,70;0,85] and 0,70 [0,69;0,80]mm, p=0,038), there were no differences in the carotid IMT of the right ICA. IMT of the left ICA correlated with the levels of interleukin (IL) 6, tumour necrosis factor alpha (TNFα) (R=0,49, R=0,43, $p<0,05$ in both cases).
Conclusions: In RA pts with and without CA stenosis, CAP are recorded with the same frequency. The IMT of the left ICA was greater in RA pts with CA stenosis compared to pts without CA stenosis. Male sex, low levels of HDL-C may contribute to an increased risk of coronary stenosis. IL-6 and TNFα may increase the risk of atherosclerotic lesions of the ICA.
Keywords: rheumatoid arthritis, atherosclerosis, coronary arteries stenosis, carotid artery plaque, *c*oronary angiography, carotid duplex ultrasonography.

PP 89

HYPERTENSION IN YOUNG PEOPLE- HOW A RADIOLOGIST CAN HELP?

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Objectives: Arterial hypertension occurs in about 2% in young people. It usually occurs secondary to diseases of other organs, mainly the kidneys. The aim of the study was to assess the importance of imaging techniques in the diagnosis of hypertension in young people.
Materials: The study included a group of 120 patients aged 15-30 years (68 women and 52 men), with arterial hypertension. All patients underwent Doppler Ultrasound of the renal arteries (first exam) . Patients with questionable ultrasound results were referred for repeated USG after preparation (simethicone). Patients with still ambiguous ultrasound images were referred for ANGIO-MR examination of the renal arteries.
Results: In first ultrasound examination, renal artery stenosis was diagnosed in 5 patients, including stenosis of fibromuscular dysplasia unilateral- in 3 patients, bilateral- in 1 patient. 1 patient had inflammatory stenosis. In the group of 25 patients, in whom the first ultrasound image was not diagnostic, during repeater USG 1 patient was diagnosed with unilateral stenosis of fibromuscular dysplasia in a follow-up examination. In the group of 12 patients referred for ANGIO-MR, 2 patients were diagnosed with unilateral renal artery stenosis. In the group of the remaining patients hemodynamically significant stenosis was excluded during first examination.
Conclusions: The diagnostic effectiveness of ultrasound in the imaging of renal arteries is 90%. In ultrasound examination, narrowing of the renal arteries was found in 5%. The ANGIO-MR examination revealed a narrowing of the renal arteries in 0.8%, which was not diagnosed on ultrasound examination. Ultrasound examination is the method of choice in the diagnosis of renal arteries.
Keywords: ultrasound, hypertension, renal arteries.

PP 90

VIRTUAL AUTOPSY AND CONFIRMATION OF FETAL HEART ANATOMY AND ABNORMAL ASPECTS IN THE FIRST TRIMESTER USING THREE-DIMENSIONAL (3D) RECONSTRUCTION OF HISTOLOGICAL SECTIONS

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Objectives: In this pilot study, we tested the feasibility of cardiac structures reconstruction from histologic sections in 12-13 weeks fetuses. Conventional autopsy is hampered at this gestational age because of the small size of the heart anatomical structures, while alternative non-invasive methods for pathology examination of the fetus are expensive, rarely available, and lack accurate data regarding the confirmation of first trimester heart defects suspected by early prenatal ultrasound scans.
Materials: Hearts from fetuses aged 12-13 gestational weeks were harvested for histological preparation, virtual reconstruction, and cardiac structures analysis. A detailed ultrasound scan protocol was used for heart evaluation. All sections have been scanned and a three-dimensional (3D) reconstruction of the whole organ has been rendered, based on computer-aided manual tracing. Using the 3D navigation software, the main cardiac structures were searched for proper and confident visualization.
Results: This study included normal and abnormal fetal hearts. Visualization of the normal heart cavities, including atrioventricular septum, was very good in all fetuses. The pathological aspects of abnormal heart specimens were successfully identified and confirmed through this method. A detailed review of the histological sections was necessary for confirmation of some structures.
Conclusions: The results demonstrate that this method can be applied to routine clinical practice. The use of 3D reconstruction of fetal heart histological sections in the first trimester may serve as an important audit to confirm the normalcy of heart structures. Also, the histological and post processed information is retained, and this volume can be stored, reanalyzed, or sent online for a second opinion. The method involves relatively undemanding resources, i.e., hardware, software, competences, and time. The procedure could also benefit from refinements used in other imaging techniques to limit human-computer interactions such as sections distortion.
Keywords: fetal, virtual, prenatal diagnosis, anatomy, perinatal autopsy, pathology, histology, prenatal ultrasound.

PP 91

OPTIMIZATION OF A SONCIATION VESSEL FOR THERAPEUTIC ULTRASOUND EXPERIMENTS IN VITRO

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Objectives: Interaction between ultrasound and sonication vessel during sonication experiments in vitro results to uncertain conditions experienced by samples. Main goal of this work was to construct sonication vessel that would provide highly controllable characteristics of ultrasound field within the vessel.
Materials: Ultrasound was generated by physiotherapy device with circular plane piston transducer of diameter 21 mm. It was excited at 1 and 3 MHz. Ultrasound field was scanned by 0.2 mm hydrophone in water sonication tank. To determine suitable dimensions of sonication vessel we 3D printed several testing phantoms. They were placed to last axial maximum of ultrasound field and structure of ultrasound field was scanned inside them. We used 3D printing technology for creation of body of sonication vessel and silicone membrane for creation of its bottom. Non-toxicity of several materials used for 3D printing was tested via performing MTT assay of cells incubated together with small floating blocks of these materials. Adherence of HeLa cells to silicone membrane was determined using transmitted light microscopy.
Results: Based on measurements we determined that sonication vessel should be 8 mm in diameter and 2.5 mm high for 1 MHz and 4 mm in diameter and 2.5 mm high for 3 MHz. Variation of local acoustic intensity was less than 50% at beam axis. Either decreasing vessel diameter or increasing its height resulted in variation of local acoustic intensity by hundreds of percent. Silicone membrane reduced ultrasound energy by less than 5%. Polylactic acid (PLA) was non-toxic and suitable for creation of vessel. Transmitted light microscopy revealed that cells can be successfully seeded and grown on silicone membrane.
Conclusions: We demonstrated an approach that minimizes influence of interaction between ultrasound and sonication vessel.

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Keywords: Sonication experiments in vitro, Sonication vessel.

PP 92

SONICATION VESSELS FOR IN VITRO EXPERIMENTS – REAL PROFILE OF ULTRASOUND FIELD

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Objectives: Biological effects resulting from sonication therapy are commonly studied in vitro. Many factors have impact on the outcomes and reproducibility of experiments. For instance, occurrence of standing waves leads to hardly controllable conditions within the sonication vessel. Another important factor is mutual position of the ultrasound transducer and sonication vessel and placement of the sonicated samples either into far field or near field. The main goal of this work was to determine the mechanism of interaction between ultrasound and sonication vessel.
Materials: Ultrasound field was generated by circular plane piston transducers with frequency 3.5 and 7 MHz. Whole experiment was conducted in water sonication tank filled with distilled water. Structure of ultrasound field was measured with 0.5 mm needle hydrophone using 3D positioning system. We investigated influence of sonication vessel on the structure of ultrasound field using two types of testing objects: wells of 6-96 well culture plates and 3D printed models with holes of different lengths and diameters. Testing objects were placed to the point of last axial maximum. The ultrasound field was measured inside and behind them.
Results: Placement of samples into far field did not yield expected field profile. Results show that diffraction occurs at circular bottom of sonication vessel resulting in formation of near field pattern within and behind the sonication vessel. We also confirmed this by theoretical calculation. The variability of local acoustic intensity may reach values up to several hundreds of percent (359.5% at maximum in case of a well of 24-well culture plate) when compared to reference scans measured in free field conditions.
Conclusions: Even though placed to far field sonicated samples may experience near field pattern during sonication experiments in vitro.

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Keywords: Far/Near field, Sonication, Therapeutic ultrasound.

PP 93

THE FUNCTIONAL ASSESSMENT OF THE PAROTID GLANDS IN HEALTHY SUBJECTS USING THE NOVEL SHEAR-WAVE PLUS ELASTOGRAPHY AND VISCOSITY PLUS TECHNIQUES

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Objectives: Biological soft tissues are intrinsically rather viscoelastic than entirely elastic. The shear wave propagation process proved to be influenced not only by elasticity, which is correlated to shear wave velocity but also by viscosity, which is correlated to the shear wave dispersion. This study aimed to assess the parotid glands (PG) in a group of healthy subjects using the novel 2D Shear-Wave Elastography PLUS (2D-SWE.PLUS) and Viscosity PLUS (Vi.PLUS) before and after stimulation with a sialagogue agent.
Materials: The study group included a total of 35 healthy volunteers (mean age 28, 68% females) prospectively examined between December 2021 and January 2022. The viscosity and elasticity of both PG were measured before and after the stimulation of the salivary secretions with lemon juice, using the new Aixplorer MACH 30 ultrasound system (SuperSonic Imagine, Aix-en-Provence, France) equipped with a curvilinear C6-1X transducer. The mean value of three valid measurements was considered (quantified in Pa.s for viscosity and kPa for elasticity).
Results: PG presented a mean basal viscosity of 2.09±0.18 Pa.s (assessed with Vi.PLUS) and a mean basal elasticity of 11.39±2.07 kPa (assessed with 2D-SWE.PLUS). A good correlation between Vi.PLUS and 2D-SWE.PLUS measurements was found ($r=0.73$, $p<0.001$). One minute following lemon juice ingestion, the PG mean viscosity value was significantly higher (2.43±0.22 Pa.s, $p<0.001$), while the PG mean elasticity value presented a lower increment (12.73±2.37 kPa, $p=0.03$).
Conclusions: Vi.PLUS represents an innovative and useful non-invasive imaging technique to assess the function of the parotid gland in healthy subjects, reflected by the parenchymal changes of viscosity values after salivary stimulation.
Keywords: Viscosity, ShearWave Elastography, parotid glands, functional assessment, healthy subjects.

PP 94

ULTRASOUND NAVIGATION OF LOCAL CORTICOSTEROID ADMINISTRATION IN PERONEAL TUNNEL SYNDROME OF COMMON FIBULAR NERVE.

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Objectives: Evaluation of the possibilities of ultrasound imaging in the treatment of tunnel syndrome CFN.
Materials: Ultrasound examination in B-mode and Doppler mapping of 12 patients with tunnel syndrome CFN and local administration of a corticosteroid drug under continuous ultrasound control were performed.
Results: Ultrasound of the CFN revealed a zone of compression-ischemic changes, the signs of which were: deformation of the nerve trunk, an increase in the cross-sectional area of adjacent fragments, a decrease in echogenicity, loss of normal nerve architectonics and the inability to differentiate into individual fascicules, a decrease in the echogenicity of the perineurium, increased vascularization. The criterion of differential diagnosis with polyneuropathy was the absence of the described changes on the remote segments of the nerve.

The locus of the detected changes was considered a n aim for perineural corticosteroid administration. The administration and distribution of the drug were monitored echographically. If the distribution of the drug in the tissues did not correspond to the desired, the position of the injection needle was changed without removing it from the tissues.

Stable improvement was determined within 1-7 days after injection: reduction of pain syndrome, regression of clinical symptoms, improvement of foot mobility, improvement of conductivity during electoromyography by 25-30%. No complications were observed.
Conclusions: The advantages of ultrasound imaging in the treatment of tunnel syndrome CFN consist in the precise determination of the localization of the nerve lesion site as a target for exposure, the possibility of controlling needle insertion and correcting the process of formation of the depot of the drug.
Keywords: common fibular nerve, ultrasound navigation, tunnel syndrome.

PP 95

CHANGES IN THYROID NODULES CAUSED BY COVID-19, ACCORDING TO ULTRASOUND. FIRST OBSERVATIONS.

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Objectives: The COVID-19 pandemic has posed a number of issues of medical and social significance to doctors of various specialties. In particular, the issue of the impact of COVID-19 on the course of chronic diseases and conditions is relevant and little studied.

The aim of the work is to study changes in the structure of thyroid nodules after COVID-19 according to ultrasound data.
Materials: Dynamic ultrasound examinations was performed in 39 patients with verified benign thyroid nodules and pseudonodular changes in autoimmune thyroiditis. The duration of follow-up before COVID-19 disease was 0.5-10 years, after the disease - 2-6 months.
Results: In 8 (42%) of 19 patients with autoimmune thyroiditis, an increase in pseudonodes in size and the fusion of several small pseudonodes into large ones were noted without significant changes in echographic characteristics. Enlargement and fusion of pseudonodes can be caused by the intensification of lymphoid infiltration due to the activation of autoimmune processes determined by the COVID-19.

In 11 (55%) of 20 patients with benign nodules, a change in their echostructure in the form of microcalcifications was noted, in 6 of them the nodule size increased. A possible cause of such changes may be the destruction of small blood vessels with pinpoint hemorrhages because of COVID-19, followed by their calcification. A fine-needle biopsy of the altered nodes was performed, in one case precancerous proliferation was detected.
Conclusions: Postponed COVID-19 causes multidirectional changes in benign thyroid nodules, determined by ultrasound. Further studies are needed to assess their nature and impact on the course of the disease.
Keywords: COVID-19, ultrasound, thyroid nodules.

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FREQUENCY AND CONSEQUENCES OF SONOGRAPHIC INCIDENTAL FINDINGS IN ELDERLY HOSPITAL PATIENTS IN BRANDENBURG - ESTABLISHMENT OF A PROSPECTIVE REGISTER

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Objectives: Due to the widespread use of abdominal ultrasonography, incidental findings of varying clinical relevance are frequently detected in hospitalized patients, many of whom are very elderly [1]. There is no general consensus on how to deal with incidental findings. The aim of this project is to assess the frequency and clinical relevance of incidental sonographic findings in a Brandenburg hospital, especially in elderly patients. This pilot study is part of preparations for a registry of sonographic incidental findings and aims to to broadening the evidence for the World Federation of Ultrasound in Medicine and Biology recommendations on the management of sonographic incidental findings [2].
Materials: In a retrospective unicenter cross-sectional study of 231 patients who had undergone abdominal ultrasonography between 01/01/2020 and 01/31/2020 at a Brandenburg primary care hospital, we looked in ultrasound reports for described incidental findings and evaluated comments on clinical relevance and further action in the physicians' letters to the General Practitioners.
Results: A total of 161 incidental findings were found in 102 patients (44.2%), of which 36.7% were in the genitourinary system, 21.1% in the liver, 16.8% in the pancreas, and 14.9% in the biliary system (frequently cholecystolithiasis). Fifty-eight (36%) of the incidental findings were classified as primary relevant. After accounting for age and comorbidity, only 16 incidental findings in 12 patients (5.9%) retained secondary clinical relevance.
Conclusions: Only a minority of abdominal sonographic incidental findings are clinically relevant, for example, as severe/malignant

disease or its precursor. This is mainly due to the fact that advanced age and severe comorbidity often prevent further evaluation and therapy. The medical, psychological, and economic relevance of incidental sonographic findings should be further evaluated in a nationwide prospective registry.

Keywords: incidental findings.

References

1. Görg C, Kunsch S, Neesse A. Zufallsbefunde in der Abdomensonographie. Charakteristika und klinische Interpretation. Der Internist. 2014;55(9):998-1018.
2. Dietrich CF, Westerway S, Nolsoe C, Kim S, Jenssen C. Commentary on the World Federation for Ultrasound in Medicine and Biology Project "Incidental Findings". Ultrasound Med Biol. 2020;46 (7):1815-20.

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ORAL CASE REPORTS

OCR 01

DIFFICULTIES IN THE ULTRASONOGRAPHIC DIAGNOSIS OF A GALLBLADDER TUMOR

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Objectives: There are many types of pseudotumoral gallbladder. In conformity with Globocan2020, gallbladder carcinoma is the 23rd worldwide frequency carcinoma. The Helicobacter pylori is considered one of the risk factors. Also, there are some studies which have shown the usefulness of CEUS in the differential diagnosis between benign and malignant gallbladder lesions. Chronic cholecystitis is associated with cholelithiasis over than 90-95% of cases.
Materials: We report a case of patient, male, 53 years old with personal history of perforated duodenal ulcer (in 1995), who presented in our department accusing epigastric pain, weight loss of 5kg in the last month and weakness. The physical examination revealed epigastric pain and positive Murphy's sign. Paraclinical investigations indicated a normocytic normocromic anemia, a high level of hepatic transaminses (with aspartate amino-transferase predominance) and erythrocytes sedimentation rate, neutrophilic leukocytosis, a little high level of conjugated serum bilirubine and normal seric values of tumor markers CA19-9 (Antigen Carbohidrate 19-9), CEA (Carcino-Embrionar Antigen) and AFP (Human Alpha-Fetoprotein). The stool test for Helicobacter pylor antigen was positive. Abdominal ultrosonography showed irregular thickened gallbladder walls, molded on gallstones – pseudotumoral aspect.
Results: In CEUS, are revealed an inomogenous and chaotic enhancement in the arterial phase in the whole gallbladder wall, with some non-enhancement inner areas and a slowly one in the late phase. Computer-Tomography indicated next informations about the gallbladder and the nearness structures (76.4/53.4mm-dimension, marked thickened, irregular shape, stratified in patches, incorporating mixed gallstones disposed in the hole gallbladder cavity; hepatic hilum adenopathy and the infiltration of the fatty tissue from around the gallbladder, with removal the anatomical space between it and liver). Surgery intervention was made for radical cholecystectomy. The intraoperative appearance was for gallbladder carcinoma. The histopatological examination remarked in macroscopy a gray-whitish gallbladder wall in multiple sections and generalized thickened till 1cm, with inomogenous inflammatory infiltration to the hepatic tissue and in microscopy - diffuse, polymorphic inflammatory infiltration of gallbladder wall with a parcelar ulceration of mucosae and an amply inflammatory hepatic reaction.
Conclusions: Establishing the diagnosis of differite types of cholecystophaty may be difficult only by imagistic methods, being obviously necessary histopatological examinations.
Keywords: pseudotumoral, gallbladder carcinoma, ultrasonography, CEUS, CA19-9.

OCR 02

AN ULTRASOUND "SURPRISE" MEDIASTINAL MASS – THYMIC HODGKIN'S LYMPHOMA

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Objectives: We report the case of a 25-year-old woman, with no previous pathological history, who requested an ultrasound examination for a left supraclavicular mass, which appeared 1 month prior to the presentation and was not influenced by NSAIDS and/or antibiotic treatment. She had no other complains.
Materials: Conventional ultrasound revealed bilateral cervical and left supraclavicular (3/2 cm) lymph nodes. Thyroid gland examination was normal, but lower to it was discovered a large-sized tumoral mass with an inhomogeneous structure, thus a thymoma was suspected.

CEUS examination was performed, which revealed a rapid inhomogeneous enhancement, followed by early wash-out, confirming the suspicion of malignant thymoma. The patient was referred to surgical department for biopsy of the left supraclavicular lymph node.
Results: Histological exam and immunohistochemistry were performed, confirming typical Hodgkin lymphoma – nodular sclerosing type, so a positive diagnosis of Thymic Hodgkin's lymphoma was established. She was advised to hematological and surgical consults.
Conclusions: Thymic Hodgkin's lymphoma was considered in the past as a peculiar morphologic variant of thymoma; nowadays Hodgkin's lymphoma represents the most common type of thymic lymphoma and should be considered among the diagnostic options.
Keywords: Hodgkin's lymphoma, thymus, thymoma, lymph node, ultrasound.

OCR 03

ULTRASOUND ASSESSMENT OF HEPATIC POST-TRAUMATIC INJURIES IN PATIENTS WITH CARDIAC DISEASE

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Objectives: Patients with cardiac pathology that require permanent antithrombotic therapy involve a higher bleeding risk, even in minor

traumas, leading to severe consequences. Ultrasound imaging represents a quick and accessible investigation, in order to acquire valuable information, diagnosis and to monitor. The aim is to evaluate the ultrasound aspects in a patient with cardiac pathology, who experienced an apparently minor trauma, but with severe hepatic impact.
Materials: It is presented the case of an elderly patient, diagnosed with multiple cardiac pathology: arrhythmia (atrial fibrillation, ventricular extrasystoles), hypertension, moderate heart failure, with permanent antithrombotic medication and also other associated pathologic conditions, such as: osteoporosis and spondylosis, who experienced a minor trauma (falling in the same plane), with right thoraco-abdominal impact. Post-traumatic, clinical and imagistic investigations (ultrasound and X-ray) showed costal fractures favored by osteoporosis, as well as contusions and a large hepatic hematoma, which required medical-surgical supervision. During this process, ultrasound investigation played an important role.
Results: Emergency ultrasound allowed rapid and complex diagnosis of the lesions in the cardiac patient with minor trauma. Severe lesions were found: a large, hypoecogen intrapanchimal hepatic hematoma, along with other cardiac disturbances (signs of heart failure, suprahepatic veins dilatation, cardiac cavities modifications). Differential diagnosis of the hepatic focal lesion was required [1,2]. Against the background of chronic heart disease and anticoagulants, the presence of large hepatic hematoma required ultrasound monitoring for the assessment of bleeding and hematoma aspect, together with control of medication, regarding anticoagulants and hemostatics [3].
Conclusions: Ultrasound investigation is important in the rapid diagnosis and assessment of post-traumatic injury, such as large hepatic hematoma, in patients with risk factors such as arrhythmic and hypertensive heart disease, antithrombotic chronic therapy, osteoporosis and rib fractures.

Complex abdominal, cardiac, thoracic and vascular, non-invasive, risk-free ultrasonography allows the diagnosis of severe lesions, especially hematomas and hemorrhagic acumulations.

Post-traumatic injuries, even after minor trauma, require ultrasound investigation, useful in cardiac patients with arrhythmias, hypertension and heart failure, involving the adjustment and control of therapy.
Keywords: Hepatic hematoma, post-traumatic ultasound, antithrombotic therapy, cardiac pathology.

References

1. Roberts R, Sheth RA . Hepatic trauma. Ann Transl Med. 2021 Jul;9 (14):1195.
2. Luhning K, MacCormick H, Macaulay B, Saunders M, Craig G. Subcapsular hepatic hematoma as a complication of severe pre-eclampsia: a case report. J Med Case Rep. 2021 Dec 17;15(1):625.
3. Sengupta N, Feuerstein JD, Patwardhan VR, et al. The risks of thromboembolism vs. recurrent gastrointestinal bleeding after interruption of systemic anticoagulation in hospitalized in patients with gastrointestinal bleeding: a prospective study. Am J Gastroenterol. 2015; 110:328-35.

OCR 04

AN UNUSUAL CEUS FINDING IN A PATIENT WITH CARCINOID SYNDROME

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Objectives: Midgut carcinoid tumors are rare neuroendocrine tumors that can spread to the intestinal mesentery. Although the mesenteric tumor is usually the first finding due to abdominal discomfort, some patients with hepatic metastases might experience symptoms of carcinoid syndrome. We present the case of a 74 year old male with weight loss, diffuse abdominal pain, facial flushing and diarrhea for about 2 months who was diagnosed with an ill-defined mesenteric mass andhepatic, pulmonary and lymph node metastatic lesions.
Materials: To better characterize the hepatic lesions, contrast-enhanced ultrasonography (CEUS) was performed.
Results: It revealed hypervascular lesions in the arterial phase and complete washout during the portal phase, suggestive for liver metastases. Surprisingly, a reflux of contrast into the inferior vena cava was also noticed in the arterial phase. This can be an uncommon finding on contrast-enhanced ultrasound (CEUS) or computed tomography (CECT) that may indicate right-sided heart disease or high flow contrast injection rates. Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) confirmed the diagnosis of peripancreaticlymph node and liver metastases of neuroendocrine tumor.
Conclusions: This case report illustrates the role of ultrasound imaging for the diagnosis of rare tumors such as carcinoid tumors and also a peculiar finding on liver CEUS.
Keywords: neuroendocrine tumor, carcinoid syndrome, CEUS, EUS.

OCR 05

THE ROLE OF ULTRASONOGRAPHY AND ADDED VALUE OF CONTRAST-ENHANCED ULTRASONOGRAPHY IN EMERGENCY DIAGNOSIS OF RUPTURED HYDATID CYSTS - A CASE REPORT

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Objectives: Hydatid disease, also known as echinococcosis, is a serious endemic condition, potentially fatal, caused by infection with larval stage of Echinococcus granulosus. The larvae may lodge in different organs, frequently in liver (50%) and lungs (40%).
Materials: We present the case of a 64 years old female who was already diagnosed with hydatid cyst but refused surgical treatment. After 3 years she presented to our department with right upper quadrant pain, excessive sweating, chills, fever, jaundice which started 7 days before admittance and weight loss of approximately 10 kg in a short time.
Results: Ultrasonography (US) was performed and showed multiple liver masses in both hepatic lobes, highly suggestive for hydatid cysts of different developmental stages. We noticed that at least two lesions communicated with the bile ducts. The dilated right hepatic bile duct (12,5 mm) had isoechoic material with hyperechoic inner bands (along 8 cm) highly suggestive for proliger membrane. Due to the fragile health status and pacient's iodine contrast media allergy, a multidisciplinary team (represented by surgeon, echographist and internist) gathered and decided to performe CEUS for rapid diagnosis. The CEUS helped to localize with precision multiple masses (more than on B-

mode US), some of them most likely being abscessed. Subsequently, surgery was performed based only on CEUS results. During surgery, seven infected hydatic cysts were extracted, four of them were ruptured into biliary duct and for three of them was performed pericystectomy.
Conclusions: The most important features of this case are the precise localization of the cysts and the emergency decision for surgery based on CEUS results without CT scanning, due to pacient's clinical status and iodine contrast media allergy.
Keywords: Contrast enhanced ultrasound, hydatid cysts, liver, emergency.

OCR 06

CONTRAST-ENHANCED ULRASONOGRAPHY IN DIAGNOSIS AND FOLLOW UP OF PANCREATIC PSEUDOANEURYSM – CASE REPORT

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Objectives: Pancreatic pseudoaneurysm is a rare condition usually associated with pancreatic disorders: pancreatitis, neoplasm, or cystic lesions of the pancreas. Almost 10% of patients with chronic pancreatitis develop during disease progression a pseudoaneurysm. Usually appears secondary to a communication between a pseudocyst and a nearby artery.
Materials: We present the case of a patient with chronic pancreatitis, with recurrent exacerbations and pseudocyst of 4 cm diameter located posterior of the pancreatic body.
Results: The conventional abdominal ultrasound revealed the hypoechoic mass, suspected at that moment for complicated pseudocyst. Contrast enhanced ultrasound revealed a hypervascular area 1.5 cm diameter inside de cystic lesion, suspected of pseudoaneurysm. The digital arteriography confirms the diagnosis of pseudoaneurysm originated form first branch of superior mesenteric artery (SMA), but without treatment options at that time. EUS confirmed the diagnosis of chronic pancreatitis and pancreatic pseudoaneurysm, no other suspected masses were detected. Two weeks later, the patient presented again in the emergency room for severe abdominal pain, laboratory tests showing an increased serum amylase and lipase level. Ultrasound revealed the same lesion of 5 cm diameter posterior of the body, with color Doppler suggestive of pseudoaneurysm, this time 3 cm in diameter. During hospitalization patient presented upper GI bleeding without any lesion found at upper GI endoscopy. Further emergency arteriography was performed, with coils angioembolization of the lesion, without complications. CT scan and ultrasound performed at one week confirm the successful treatment of pseudoaneurysm.
Conclusions: The review of the literature in the field of pancreatic pseudoaneurysm revealed isolated cases reports, few data series. Although the role of CEUS in pancreatic disorders is largely discussed in the literature, in pancreatic pseudoaneurysm, due to the rarity of the cases, is not well standardized.
Keywords: CEUS, Pseudoaneurysm, angiography.

OCR 07

A RARE AND UNEXPECTED CASE OF INTESTINAL OBSTRUCTION - GALLSTONE ILEUS

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Objectives: We report the case of an 80-year-old man who was admitted in the Gastroenterology department for nausea, vomiting, abdominal pain, and absence of stool for 5 days. He does not have any significant diseases or treatment.
Materials: A conventional abdominal ultrasound exam was performed, which revealed dilated small intestine loops (jejunum) in the periumbilical region, without peristaltic movements. Following anterogradely the dilated jejunal loops, a hyperechoic 3 cm mass, with posterior attenuation was detected, which was not followed by another dilated intestinal loop, and was considered as the cause of intestinal ileus. Because of its round-oval shape, a bezoar or a gallstone was suspected.

Biliary tract exam revealed a collapsed gallbladder and pneumobilia, so a bilio-duodenal fistula with secondary biliary ileus was considered. Contrast-enhanced abdominal and pelvic CT scan confirmed the ultrasound diagnosis of intestinal obstruction but could not recognize the gallstone as the cause of obstruction (due to a radio-transparent stone).
Results: The patient underwent surgery that further confirmed the diagnosis: bilio-duodenal fistula and secondary biliary ileus. The postoperative evolution was favorable.
Conclusions: Gallstone ileus is a rare cause of mechanical intestinal obstruction, occurring in less than 5% of patients who present with a mechanical small bowel obstruction, but a high level of suspicion is required in at-risk groups, and in patients with known gallstone disease.
Keywords: ileus, gallstone, obstruction, intestine, small bowel.

OCR 08

DIAGNOSTIC ACCURACY OF CONTRAST ENHANCED ULTRASOUND IN MALIGNANT THYROID NODULE – CASE REPORT

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Objectives: Thyroid nodules are the most common type of neoplasm in the cervical region and are also one of the most common disease of the endocrine system. Nowadays, conventional ultrasound is the cornerstone in the evaluation of thyroid morphology. At the same time, it is known that angiogenesis is the basis for the growth of tumor cells. Therefore, clinical and paraclinical evaluation must be adapted to detect all indications that could suggest a potentially malignant disease. Advances in ultrasound technology may facilitate better characterization of benign and malignant thyroid nodules. Contrast enhanced ultrasound (CEUS) is currently the focus of medical ultrasound research, because it can show microvascular blood flow clearly and assess tumor

perfusion and vascular distribution in real time after intravenous administration of microbubble contrast agent. The aim of this presentation is to assess the value of CEUS in differentiating between malignant and benign thyroid nodules.

Materials: We report a case of a 25-year-old female patient who was referred to our clinic for evaluation of a thyroid nodule. She reported that this nodule was found incidentally 2 years ago. An increase in nodule diameter was observed on ultrasound in time. The nodule is 14mm in the largest diameter and the patient is clinically euthyroid. The patient has no other associated pathologies. 2D-ultrasound showed a solid, moderate hypoechoic thyroid nodule with punctate echogenic foci, shape taller than wide, intense vascularization and irregular margins (13/12/14mm), indicating ACR TI RADS SCORE of 5. 2D-Shear Wave Elastography (SWE) indicated an inhomogeneous aspect, with very high stiffness. The parameters measured by this technique were suggestive for a stiff structure: the SWE-mean elastography index (EI) for the lesions was 91.3 kPa. CEUS showed inhomogeneous hypoenhancement lesion, without ring enhancement, indicating that the nodule was suspected of malignacy. FNAB revealed „atypia of undetermined significance" Bethesda III.

Results: In this case, CEUS achieved good performance in discriminating between malignant and benign thyroid lesions. The patient was operated by total thyroidectomy based on US and CEUS data. The pathology confirmed the diagnosis of papillary thyroid carcinoma.

Conclusions: Early detection, early diagnosis and early treatment are key in the treatment and prognosis of thyroid malignant nodules. CEUS is an additional tool that could be used in cases with unclear results from cytology.

Keywords: Thyroid nodule, Ultrasonography, CEUS, Malignant, Carcinoma.

OCR 09

IMPORTANCE OF STANDARD ABDOMINAL ULTRASONOGRAPHY IN INCIDENTAL DIAGNOSIS OF PSEUDOMYXOMA PERITONEI IN A POOR SYMPTOMATIC PATIENT

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Objectives: Pseudomyxoma peritonei (PMP) is a rare condition (2 cases per million) characterized by an extensive accumulation of mucinous material within the peritoneal cavity, secondary to the peritoneal dissemination of a mucinous neoplasm.

In this case report, we present incidental sonographic finding of pseudomyxoma peritonei in a female patient presented in the outpatient unit and admitted in the internal medicine clinic.

Materials: We present the case of a 76-year-old female patient with past medical history of hypertension, presented in the outpatient unit for abdominal distension, edema in the lower limbs and dyspnea, symptoms that appeared 3 months prior to the presentation and worsened in the last 2 weeks. Physical examination revealed a distended, non-tender abdomen and no other significant finding. Abdominal ultrasound describes non-mobile echogenic gelatinous ascites separated by septation, scalloping the liver and spleen margins. Therefore, the patient is immeadiately admitted in the internal medicine clinic for further investigation.

Results: Standard serum investigations showed severe inflammatory syndrome, moderate anemia, CA 19-9 above detection limit, CA 125 and CEA-moderate values. CT scan interpretation revealed PMP with appendicular origins, large ascites with septa in mucinous material, visceral scalloping and normal ovaries. Paracentesis could not be performed. 5 days after hospitalization, the patient becomes confused, has a syncope event, with progression to coma and unresponsive cardiopulmonary arrest. No acute neurological or cardiac lesions were found. The necropsy brings no other causes of the death, only PMP secondary to the appendicular mucinous adenocarcinoma.

Conclusions: The peculiarity of the case is the rarity of the condition, the insidious way of onset, the high suspicion of PMP using only ultrasound and not during surgery for appendicitis-like syndrome-as most cases are diagnosed, but also, the rapid death progression. More importantly, standard abdominal ultrasonography performed on admission was crucial for the diagnosis and following investigations. The opportunity to establish the diagnosis preoperatively using non-invasive methods such as ultrasound can lead to an early diagnosis, moreover that many studies agree on typical ultrasonography findings such us scalloping of the liver margin and ascitic septations as being highly suggestive for PMP.

Keywords: pseudomyxoma peritonei, standard abdominal ultrasonography, appendicular mucinous adenocarcinoma.

OCR 10

ABDOMINAL ULTRASOUND: THE MOST USEFUL METHOD IN DIAGNOSING A RARE CASE OF WILKIE'S SYNDROME

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Objectives: Wilkie's syndrome or superior mesenteric artery (SMA) syndrome is a rare etiology of duodenal obstruction due to compression of the third portion of the duodenum between the superior mesenteric artery and the aorta. The aorta−SMA angle ranges from 38˚ to 65˚ and the distance between the two is 10-28 mm. The main anatomical feature of SMA syndrome is the narrowing of the aorta−SMA angle to < 25˚ and a decrease in the aortomesenteric distance < 10 mm, causing the specific duodenal obstruction symptoms.

Materials: A 17-year-old female presented in our outpatient clinic with persistent epigastric pain, early satiety, pyrosis, and weight loss (cca. 8 kg) in the last year, that had worsened at the time of presentation. An abdominal ultrasound (US) was performed after 14 hours of fasting. It revealed gastric dilatation suggesting upper gastrointestinal outlet obstruction. We admitted the patient to our hospital where we performed gastric decompression via a nasogastric tube. Blood work was unremarkable. The abdominal computer tomography (CT) suggested duodenal stenosis, while the upper gastrointestinal endoscopy revealed mild gastritis and esophagitis without an obvious obstruction. SMA syndrome was included as a differential diagnosis and we performed another abdominal ultrasound, this time measuring the angle

between the aorta and SMA which was 17°, and the distance between the two was 5 mm. We also asked the radiologist to perform the same measurements on the abdominal CT performed earlier and the results were compatible with our US findings. Thus, we establish the diagnosis of SMA syndrome, and the patient was managed conservatively.

Results

Conclusions: In this case, the abdominal US has proven to be the most useful tool in establishing the diagnosis and we suggest routine measurement of the aorta-SMA angle and distance in cases suggesting upper gastrointestinal obstruction.

Keywords: Abdominal ultrasound, Wilkie's syndrome, SMA syndrome.

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POSTER CASE REPORTS

PCR01

ATYPICAL HEPATIC HEMANGIOMAS

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Objectives: Hepatic hemangioma is the most common benign liver lesion in the general population. It often exhibits a uniform pattern of characteristics, thus being called "typical". However, a certain number of hepatic hemangiomas have special or uncommon characteristics and are termed "atypical." We report on a 47-year-old patient with an atypical hepatic hemangioma.
Materials: A 47-year-old female patient with a history of chronic hepatitis C was admitted to the Gastroenterology clinic for further paraclinic exams and imagistic investigations. The physical examination showed spider nevi in the superior vena cava trajectory, sharp liver edge with firm consistency and 1st grade splenomegaly. The biological panel in this case showed mild thrombocytopenia, moderate hepatic cytolysis syndrome, hyperbilirubinemia, and AFP in normal values. Abdominal US showed an irregular liver contour and inhomogeneous structure. In the right hepatic lobe was detected a hepatic lesion, oval form with diameter 6,9 cm, inhomogeneous, hypo-echoic, delineated, irregular contour with posterior acoustic shadow. Portal vein=14 mm, spleen=14cm with venous dilatation.
Results: In CEUS the liver lesion presented peripheral enhancement in arterial phase. It presents continued "filling in" of the lesion in the late phase. Regarding to CEUS LI-RADS categories is CEUS LI-RADS 1, definitely benign. Superior digestive endoscopy was performed which shown 1st grade esophageal varices and a portal-hypertensive gastropathy mild form.

The MRI findings shows in T1: Hypointense, T2: hyperintense. After contrast administration the lesion showed peripheral enhancement which progresses centripetally, uncompleted, without wash out in portal phase. The diagnostic based on the imaging findings was Hepatic Hemangioma. The patient has been supervised with abdominal US and AFP every 6 months. The last evaluation showed a hepatic stable formation, without modifications of the US characteristics.
Conclusions: An atypical hepatic hemangioma performing a standard US in a cirrhotic patient requires differentiation from hepatic malignancies. The confirmation of the diagnostics asks for an investigation with contrast enhancement which most frequently is CEUS
Keywords: Atypical hemangioma, MRI, CEUS, normal AFP.

PCR 02

ROLE OF CONTRAST-ENHANCED ULTRASONOGRAPHY IN THE DIAGNOSIS OF LIVER METASTASIS IN CIRRHOSIS PATIENTS

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Objectives: The cirrhotic liver is hypothesized to provide protection against liver metastases, the occurrence of focal liver lesions in patients with cirrhosis is rare, accounting for only 1,7% of all cases. CEUS has improved the detection of liver metastases when other imaging methods can not be performed.
Materials: We present the case of a 74-year-old patient, known for 20 years of chronic viral B hepatitis without any antiviral treatment, who came to the emergency room complaining of enlargement of the abdomen and yellowing of the skin, symptoms that started for the past two weeks. He does not smoke, and drinks only occasionally.

On examination, his skin and sclerae were icteric, his abdomen was distended, with mild diffuse tenderness, shifting dullness to percussion, and a fluid wave, consistent with ascites. He had no peripheral edema.

Laboratory studies showed elevated liver enzymes (AST 439 U/L; ALT 997 U/L; FAL 801 U/L), creatinine 3,4 mg/dl, tumor markers CA 19-9 576 U/ml, AFP 12 UI/ml.

2D abdominal ultrasound illustrated the presence of a hypoechoic, inhomogeneous image with a diameter of 30 mm and another one which occupied 1/3 of the hepatic right lobe. The portal vein was 15 mm with umbilical vein repermeabilization, and there was a large volume of fluid within the peritoneal cavity.

Because of the renal impairment, we performed a native CT examination of the abdomen that revealed a liver with an intensely inhomogeneous structure due to the presence in the segments IV, V, VII and VIII of hypodense images that deform the liver capsule and intestinal loops with a slight infiltration of mesenteric fat.

Additional investigations included CEUS that pointed out multiple hypoechoic solid images with a diameter of 2 cm, some of them causing a distortion of the hepatic contour and a „ring" enhancement of the lesions during the arterial phase, suggestive for liver metastasis.
Results: Colonoscopy illustrated an ulcero-vegetative mass in the transverse colon, and histopathological examination confirmed the diagnosis of adenocarcinoma.
Conclusions: The singularity of this case is that CEUS can be a useful primary imaging tool for evaluating incidentally detected liver masses in patients who have renal failure, contrast agent allergies, or claustrophobia, when other imaging techniques are not available.
Keywords: Liver, metastases, cirrhosis, cancer, CEUS, diagnosis.

PCR 03

ENDOSCOPIC ULTRASOUND DIAGNOSIS OF UNUSUAL SUBEPITHELIAL TUMORS: CASE SERIES

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Objectives: Subepithelial tumors (SETs) are generally asymptomatic and clinically insignificant and have malignant, borderline, and benign variants. Endoscopic ultrasound (EUS) is the most accurate method of diagnosing gastric subepithelial tumors with increased sensitivity and specificity. We present 2 cases misinterpreted as subepithelial tumors, with EUS shifting the therapeutic management.
Materials: Case 1: A 63-year-old female, known with hepatitis C virus-related cirrhosis, who performed an upper digestive endoscopy describing in the gastric body a subepithelial lesion of about 2.5 cm, with normal covering mucosa, raising the suspicion of the stromal tumor.

Case 2: A 54-year-old man, known for type II diabetes with insulin treatment, with acute pancreatitis in 2005 and cholecystectomy for cholelithiasis one year before. He was admitted to the Gastroenterology Department accusing pain in the epigastrium and right hypochondrium.

On clinical examination, the abdomen was sensitive in the epigastrium and right hypochondrium, with a normal-looking postoperative scar.

Results: Case 1: EUS of upper digestive tract revealed on the posterior wall of the stomach, immediately below the eso-gastric junction a transonic mass of 4/4.3 cm, with Doppler signal inside which seemed to belong to the aorta, possible ascending aortic aneurysm. The patient was referred to a CT-angiography scan to confirm the diagnosis.

Case 2: An inhomogeneous mass was observed on abdominal ultrasound, with transonic content and hyperechoic areas inside; Upper digestive endoscopy revealed within the gastric antrum, a subepithelial tumor mass of about 6 cm, with normal covering mucosa. EUS was performed and a tumor mass of 6 cm was visualized, starting from the own muscular level with liquid content and multiple hyperechoic masses inside, without Doppler signal. Suspicion of foreign body was raised and the patient was directed to surgery, which confirmed the diagnosis of textiloma.

Conclusions: Although in both cases endoscopy suspected subepithelial tumors, EUS provided more information which changed the patient's management, thus emphasizing its potential when assessing gastric subepithelial lesions.

Keywords: Gastrointestinal subepithelial tumors, aortic aneurysm, textiloma, endoscopic ultrasound.

PCR 04

THE ROLE OF ULTRASONOGRAPHY AND ADDED VALUE OF CONTRAST-ENHANCED ULTRASONOGRAPHY IN DIAGNOSIS OF SPLENOSIS – A CASE REPORT

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Objectives: Splenosis is defined as auto transplantation of splenic tissue in the abdomen or pelvis following trauma or surgery. Ectopic splenic tissues in many cases are misinterpreted as pathological masses if the history of splenectomy is ignored. Contrast-enhanced ultrasound (CEUS) is very useful in diagnosis of splenosis. On CEUS an ectopic spleen tissue has the same enhancement pattern as normal spleen, with long lasting late phase enhancement, more than 5 minutes after injection. However, in some situations, the diagnosis is not so easy.

Materials: We present the case of a 71-year-old male, known with posttraumatic splenectomy 20 years ago, who was sent to our department with suspicion of neoplasm due to incidental discovery of liver and peritoneal nodules. A previous contrast-enhanced CT scan showed a liver nodule and few small intraperitoneal nodules interpreted as a hypervascular liver metastasis and peritoneal pathologic adenopathies.

Results: At admittance the patient had no symptomatology and biological tests were normal. Ultrasonography (US) was performed and showed a well-delineated homogeneous nodule, extrahepatically located, in contact with the liver capsule. The nodule was isoechoic with the liver, with its own vascular hilum, measuring 35/45 mm. On CEUS, the nodule presented homogeneous arterial enhancement, more intense than the liver, and became isoechoic in the venous phase, without wash-out in the late phase. Considering the patient's history of splenectomy, the CEUS diagnosis was splenosis. Exploratory laparotomy with biopsy from the nodule was performed and the histology proved normal splenic tissue.

In this case, the diagnosis difficulty was generated by the close contact between liver and nodule, by the differences in enhancement, more intense in spleen tissue and by the similar contrast dynamics, with 3 phases, that made spleen tissue to mimic liver tumour.

Conclusions: CEUS was a very useful diagnosis tool when integrated in clinical context and correlated with the medical history of the patient.

Keywords: Contrast enhanced ultrasound, spleen, splenosis.

PCR 05

MULTIPLE RETROPERITONEAL METASTASIS BURKITT LYMPHOMA: A CASE REPORT

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Objectives: Hematologic malignancies are heterogeneous entities in terms of clinical presentation, biological findings, treatment response and overall prognosis. Burkitt lymphoma (BL) represents a rare and highly aggressive tumour, with a fast growth rate, being held accountant for 1% to 5% of all non-Hodgkin lymphomas. Although histopathological examination is always required for diagnosis, the use of contrast-enhanced ultrasound (CEUS) can play an important role in identifying definitory characteristics of the tumoral masses.

Materials: We present the case of a 22-year-old male referred to our department for unspecific abdominal pain, weight loss, nausea, vomiting and change in bowel habits, while having recent history of bilateral pleural effusion and pleural drainage in another hospital.

Results: Conventional ultrasonography (US) was performed at admission, describing a large retroperitoneal multilobulated mass, that extended throughout the entire abdominal cavity. On CEUS, the mass presented rapid arterial enhancement, followed by rapid and pronounced wash-out, suggesting malignancy. The patient also underwent a full-body computed tomography (CT) describing a large infiltrative lesion within the abdominal and pelvic cavity, as well as the presence of one mediastinal mass and the recurrence of bilateral pleural effusion – all imagistic features suggesting primarily a hematologic malignancy. Testicular US revealed multiple bilateral testicular masses. A bone marrow aspiration was soon performed and revealed atypical lymphocytes with cytoplasmic vacuoles. The abdominal mass biopsy showed the classic "starry-sky" pattern, as well as CD20 and CD10 positivity, thus the diagnosis of Burkitt lymphoma was made and specific treatment was initiated.

Conclusions: In the presented case, the imagistic findings (both CEUS and CT scan) suggested a hematologic malignant process, but the exact diagnosis was made on biopsy. However, conventional US and CEUS both proved to be extremely important tools in guiding the clinician towards the best management of the case.

Keywords: Contrast enhanced ultrasound, Burkitt lymphoma, retroperitoneal metastasis.

PCR 06

A CASE OF ESOPHAGOGASTRIC CANCER: THE GREAT MASQUERADER

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Objectives: To emphasize the role of the US in raising the suspicion of digestive tumor by describing the thickened gastric wall. The essential contribution of CEUS in differentiating metastatic adrenal tumor from primary adrenal tumor.
Materials: We present you the case of a 59-year-old male, active smoker (22 P/Y). His main symptoms are weight loss and dysphagia. He was sent to our department with the suspicion of right primary adrenal tumor (based on prior imagistic investigation). Blood samples were taken, US, CEUS and upper endoscopy were made.
Results: Laboratory tests yielded: white blood cell count increased, Hgb 8,2 g/dl, CA 19.9 610 UI/ml, CEA > 100 ng/ml.

US was performed: multiple small lymphadenopathies in the upper abdominal floor. In the left retroperitoneal space-nodular mass with irregular but clear contour, size 10/10,5 cm and transonic areas inside. In the right adrenal lodge, delimited nodular mass hypoechoic of 6/4 cm. On CEUS-the adrenal mass were hypoenhancing for the arterial phase with non-enhancing areas inside and a rapid wash in the venous phase.

Regarding the liver, in the portal and late phase-multiple small masses (largest 2,5 cm) well-delimited, with progressive and accelerated washout.

Upper endoscopy revealed vegetant obstructive tumor invading the cardia, continuing in the stomach with a large vegetative mass which occupies the small and the lesser curvature. Three endoscopic biopsies were made (fragments of 0,2-0,4 cm with pavement structure): poor differentiated adenocarcinoma G2/G3 with invasion trough the connective tissue.
Conclusions: This is the case of a misinterpreted primary adrenal tumor that proved to be an esophagogastric adenocarcinoma with hepatic and right adrenal metastasis.
Keywords: CEUS, liver metastasis, adrenal metastasis, esophagogastric cancer.

PCR 07

ACUTE VARICOCELE THROMBOSIS AFTER VACCINATION WITH MRNA SARS-COV-2 VACCINE- A CASE REPORT

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Objectives: The dilatation of the pampiniform plexus, the venous system that drains the testicle, causes varicocele. Varicocele thrombosis is rare, with few reported cases in the medical literature [1-6]. Patients may present with acute scrotal pain, mimicking a testicular torsion or strangulated hernia. Diagnosis is difficult, therefore, when based solely on clinical history and examination. Our objective is to present an unusual case of varicocele thrombosis, after Covid 19 vaccination.
Materials: Ultrasonography (US) with Doppler interrogation is the first-line imaging choice for diagnosis [1]. The therapeutical management is primarily conservative; however, some cases might require surgery [1,6]. The Coronavirus 2019 pandemic stimulated the development of vaccines with unprecedented speed and employing novel technologies. Serious adverse effects remained low after worldwide vaccination [7,8].
Results: We report the case of a 35-year-old male patient who presented in the Urology Department accusing intense, continuous scrotal pain and swelling, with onset the next day after receiving the second dose of an mRNA Covid-19 vaccine (BNT162b2, Cominarty, Pfizer/BioNTech). There were no associated urinary signs and no fever. The patient was a healthy young man, with no known malignancy or blood dyscrasia. He could not recall suffering any local trauma between the vaccination and the appearance of the symptoms.

The clinical exam revealed a tender, scrotal swelling inferior to the left testicle.

The ultrasound exam demonstrated homogenous, normal echogenic testicles without changes in vascularity on Doppler US. Multiple variceal dilatations with a spontaneous diameter of up to 5 mm were observed around the left testis. The lumen of several dilated veins appeared filled with echogenic debris. The blood flow was slow in the remaining veins, with a sluggish aspect. Continuous, progressive probe compression was applied, with no complete venous collapse observed. The greyscale aspect was consistent with partially obstructing thrombi. The venous filling defects were confirmed on Colour Doppler. No signs of thrombosis were present at the level of the spermatic cord or the inguinal canal.
Conclusions: Pampiniform plexus thrombosis should be considered in the differential diagnosis of acute testicular pain.

This case report reveals an unprecedented etiology of varicocele thrombosis, as a side effect of an mRNA SARS-COV2 vaccine.
Keywords: ultrasound, thrombosis, varicocele, Pfizer-BioNTech COVID-19 vaccine.

References

1 Lomboy JR, Coward RM. The Varicocele: Clinical Presentation, Evaluation, and Surgical Management. Semin Intervent Radiol. 2016 Sep;33(3):163-9.
2 Amador RA, Rodríguez TJ, Ballesta MB, et al. Deep Vein Thrombosis: A Rare Cause of Acute Testicular Pain. Case Report: Literature Review. Urol Int. 2018;101(1):117-120.
3 Kamel K, Gassen S, Mohamed M, et al. Bilateral spontaneous thrombosis of the pampiniform plexus; A rare etiology of acute scrotal pain: A case report and review of the literature. African Journal of Urology; 2018;24(1):14-18.
4 Ouanes Y, Sellami A, Chaker K, et al. Thrombosis of the pampiniform plexus: About a case report. Urol Case Rep. 2018;20:28-29.
5 Ünal E. Thrombotic and Nonthrombotic Types of Intratesticular Varicoceles: Value of Sonography for the Diagnosis. J Ultrasound Med. 2017;36(11):2355-2360.
6 Raghavendran M, Venugopal A, Kiran Kumar G. Thrombosed varicocele - a rare cause for acute scrotal pain: a case report. BMC Urol. 2018;18(1):34.
7 Konstantinides S. Thrombotic complications of vaccination against SARS-CoV-2: what pharmacovigilance reports tell us - and what they don't. Eur Respir J. 2021:2101111.
8 Hernández AF, Calina D, Poulas K, Docea AO, Tsatsakis AM. Safety of COVID-19 vaccines administered in the EU: Should we be concerned? Toxicol Rep. 2021;8:871-879.

PCR 08

A CASE OF TRICUSPID, AORTIC AND MITRAL VALVES ENDOCARDITIS

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Objectives: Introduction:Endocarditis is a rare disease associated with high mortality and severe complications.
Materials: We present the case of a 70 years old man, with history of chronic kidney disease stage III.He is presenting symptoms and signs of heart failure and altered general condition for one month.
Results: Following the corroboration of biological and imaging data, including TTE and TEE, acute endocarditis was diagnosed on the mitral and aortic valves and old endocarditis on tricuspid valves.
Conclusions: Data from literature are poor about tricuspid valves endocarditis . The damage of the aortic, mitral, and tricuspid valves of the endocarditis at the same patient is rare.The single predisposing factor was chronic kidney disease
Keywords: endocarditis,aortic valves, tricuspid valves, mitral valves.

PCR 09

IMPORTANCE OF ULTRASONOGRAPHY IN THE DIAGNOSIS AND THE MANAGEMENT OF PREGNANT WOMEN WITH HELLP SYNDROME

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Objectives: Ultrasound in pregnancy is the only imaging method that allows the evaluation of the fetus and the mother's pregnancy pathology without adverse effects and without limiting the number of examinations.

Pregnancy pathology with hepatic manifestations is the most complicated to manage because of its complexity. One of these pathologies is HELLP syndrome - a severe form of eclampsia with potentially lethal effects on both the fetus and the mother.

Maternal mortality in this situation can reach up to 50% of diagnosed cases, the major complication being fulminant liver damage with evolution to liver rupture.

For this reason, early diagnosis and management, as well as pregnancy delivery conduct are extremely important.
Materials: We present the case of a 34-year-old pregnant woman, II G., II P., in the 38th week of pregnancy. The patient is regularly monitored during gestation, without any biological changes, normotensive, presenting to the gastroenterology department for abdominal pain in the right hypochondrium.

On ultrasound examination, a mild hepatomegaly, diffuse inhomogeneous liver structure and the presence of extensive hypoechoic sectors, well defined in both lobes, were detected.

The biological examination shows a significant hepato-cytolytic syndrome, thrombocytopenia, mild normocytic anemia and proteinuria.

Summarizing the gathered data, all these corroborated, plead for the diagnosis of HELLP syndrome.

Following biological optimization, surgical intervention was performed under general anesthesia with cesarean delivery of a healthy live fetus and hemostatic hysterectomy.
Results: Daily ultrasonographic monitoring of the liver revealed an accentuation of hepatic hypoperfusion changes with multiple hypoechoic images of about 10 mm, disseminated in both liver lobes.

Postoperatively at 10 days, the ultrasonographic appearance revealed a normal sized and slightly non-homogenous liver structure, correlating with the biological status.
Conclusions: Hepatic hypoperfusion is a specific modification of HELLP syndrome.

Ultrasound monitoring as a non-invasive imaging method brings a significant plus in the management of HELLP syndrome.
Keywords: HELLP syndrome, pregnancy.

PCR 10

CONTRAST ENHANCED ULTRASOUND IN THE DIAGNOSIS OF HEPATIC VASCULAR PSEUDO-LESIONS – A CASE SERIES

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Objectives: Hepatic pseudolesions are non- neoplastic abnormalities of the liver which may be sub- divided into parenchymal pseudolesions and vascular pseudolesions. Vascular pseudolesions include non- neoplastic hepatic pseudolesions such as intrahepatic shunts and vascular abnormalities associated with Budd- Chiari syndrome or portal vein thrombosis.
Materials: We present several cases of hepatic vascular pseudolesions, exemplified by 2D and contrast- enhanced ultrasound imaging (CEUS), to be considered in the differential diagnosis of real liver tumors.
Results: First case belongs to a 63-year-old patient who was diagnosed with a liver abscess (LA) two years ago. Significant resolution of the LA was observed in the follow- up evaluation. In the vicinity of the residual abscess, Doppler US examination revealed a blood flow pattern with arterial and venous communication suggestive of arterio- portal shunt (APS). CEUS showed a homogeneous enhancement of this area and it also indicated the presence of the APS. Furthermore, an imprecisely delimited area with late and incomplete wash out was depicted in the late phase which led to differential diagnostic challenges with malignant tumors.

Another case of a 74- years- old man with vascular abnormalities associated with Budd- Chiari syndrome secondary to multicentric hepatocellular carcinoma is illustrated in this topic.

three cases with enhancement anomalies caused by portal vein thrombosis are also detailed in this paper.
Conclusions: The main clinical difficulty is to detect the non- neoplastic lesions and to discriminate between them and benign and malignant hepatic neoplasms. CEUS may be an useful tool for the characterization of hepatic vascular pseudolesions.
Keywords: contrast enhanced ultrasound, pseudolesions, liver.

PCR 11

ABSCESS AFTER THREAD-LIFTING

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Objectives: Facial thread-lifting has more popularity, but the incidences of complications following thread-lifting remain controversial [1].
Materials: Represent case that demonstrates possibly of ultrasound in the assessment of complications after thread-lifting.
Results: A 44-year-old woman with pain and swelling in the left submandibular region, fever. Two weeks ago, thread lifting was performed. During ultrasound on the right in the subcutaneous adipose tissue of the submaxillary region, when scanning with a 18 MHz

frequency transduser, a thread is determined in the form of two contour hyperechoic structures around which invariable adipose tissue. On the left the double-contours hyperechoic linear structure in the lateral part is surrounded by anechoic fluid accumulation, which extends to the angle of the lower jaw, with a total volume up to 20 ml. Around are the enlarged lymph nodes, the salivary glands are intact. A aspiration was performed, 15 ml was removed.

Conclusions: Ultrasound is a quick, affordable and cheap way to assess the condition of soft tissues after face thread lifting, which can assess the position of the threads, as well as the presence of complications.

Keywords: Filler complications, filler, complication, ultrasound in cosmetology, thread-lifting.

References

1 Niu Z., Zhang K., Yao W. Meta-Analysis and Systematic Review of the Incidences of Complications Following Facial Thread-Lifting. Aesth Plast Surg (2021) 45:2148–2158 https://doi.org/10.1007/s00266-021-02256-w

PCR 12

THE ROLE OF US EXAMINATION IN THE DIAGNOSIS AND PERCUTANEOUS APPROACH OF HEPATIC ABSCESSES – A CASE REPORT

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Objectives: The ultrasound characteristics of pyogenic liver abscesses are heterogenous and variable in evolution. Thus, the diagnosis may be challenging as these lesions may sometimes be difficult to differentiate from focal liver masses. In this setting, contrast-enhanced ultrasound (CEUS) is extremely helpful in the differential diagnosis [1]. The traditional paradigm of surgical treatment has been challenged and surgery is no longer the first option in these cases, which are usually treated with intravenous antibiotics and ultrasound-guided percutaneous drainage [2].

Materials: We present the case of a 44-year-old patient, without any known prior disease, who presented in the Emergency Department of the Craiova Clinical County Emergency Hospital for chills and high fever that had debuted for about 72 hours.

Results: The initial CT scan raised the suspicion of a 30/40 mm liver abscess, located in segment VII. Transabdominal ultrasound showed an ill-defined heterogenous hypoechoic lesion with anechoic areas and septa, located in segment VII of the liver, with a diameter of 35/41 mm. CEUS performed with microbubble contrast agent (SonoVue) revealed only peripheric and septa enhancement in the arterial phase with washout in the late venous phase, supporting the diagnosis of pyogenic abscess. As the patient was clinically stable, close follow-up and broad-spectrum intravenous antibiotics were initially administered. Another ultrasound, performed one week later, showed a well-demarcated lesions that had grown in size to 70/54 mm. As progression was noted, we decided to perform an ultrasound-guided percutaneous catheter drainage of the collection. A safe percutaneous route was identified with US and the lesion was punctured with a needle. 10 millilitres of pus were aspirated and sent for bacteriological examination. A guidewire was then advanced through the needle, the tract was repeatedly dilated and a catheter was inserted into the collection, with efficient drainage. The general state of the patient improved rapidly after the procedure and he was discharged asymptomatic three days later without any complications.

Conclusions: Ultrasound is nowadays used not only for establishing the positive diagnosis of pyogenic liver abscesses but also for the minimally invasive percutaneous drainage of these lesions, with excellent results due to reduced hospitalisation time and fast recovery.

Keywords: pyogenic liver abscess, ultrasound-guided drainage, CEUS.

References

1 General Ultrasound. T. Ciurea, I. Rogoveanu, Medical University Publishing House, Craiova, 2020.

2 Serraino C, Elia C, Bracco C, et al. Characteristics and management of pyogenic liver abscess: A European experience. Medicine (Baltimore). 2018;97(19):e0628. doi:10.1097/MD.0000000000010628

PCR. 13

DIFFERENT RESPONSES TO PARVOVIRUS INFECTION IN TWIN PREGNANCY: DEATH VERSUS HEALTHY FETUS

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Objectives: Parvovirus B 19 fetal infection is normally asymptomatic but serious in pregnant woman. The infection during pregnancy can cause non immune fetal hydrops culminating with death in some cases. The biggest problem is the lack of maternal symptoms. In addition to fetal death parvovirus infection during pregnancy can cause spontaneous abortion in early gestation, intrauterine growth retardation and meconium. However the fetal infection can also be asymptomatic and most neonates are born normal. We present a twin pregnancy dichorionic, diamniotic case report with 2 different responses to placental invasion by parvovirus.

Materials: A twin dichorionic pregnancy in a 32 year old woman with no complications until 30 weeks and 2 days, when one had normal movements, doppler velocimetry, biometry, placenta and amniotic fluid and the other was found dead. Dead fetus was hydropic and pronounced placental edema that suggested infection. The mother didn't have any clinical disturbance. All possible serologies were requested . The remaining fetus was delivered by cesarean section with 34 weeks of gestation, healthy, with 1670 g. He left the hospital 1 month later without complications.

Results: The mother serology was positive for B19 Parvovirus.

Conclusions: This case illustrates how B 19 Parvovirus can be aggressive and depends of fetal immunological response. Unfortunately infection is silent in mothers and there's no way to prevent it's occurrence.

Keywords: Parvovirus B19 infection, pregnancy, fetal non immune hydrops, fetal death, twin pregnancy.

PCR 14

ABDOMINAL PAIN AND ULTRASONOGRAPHY IN CHILDREN - TOO EASY TO BE TRUE?

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Objectives: Although not all cases of abdominal pain in children have an ultrasonically detectable cause, the latter has a well-established place in the management of pediatric emergencies, and it should be performed right after the initial assessment, based on ABCDE approach. Bedside ultrasonography has been successfully used in trauma (FAST) and in many other medical and surgical emergencies and may be the only imaging tool needed for diagnosis.
Materials: The authors present 2 patients presented at emergency room with abdominal pain and distention. The first case, a 7 years old boy with cerebral palsy was admitted with a 2 days history of sudden abdominal distention and oliguria, noted by parents. The second is a 9 years old girl, with abdominal distention, pain and constipation that developed within 6 weeks.

We have studied the medical files, laboratory results, other consultations, ultrasonography reports and abdominal CT reports. In both cases, ultrasonography was performed by the first author, and all collected information and images were studied by the team, the co-authors of this article.
Results: In the first case, a CT was performed first and abdominal ultrasonography after few days. The CT scan showed a huge bladder with urinary retention due to external compression caused by constipation. Abdominal ultrasound was delayed due to the patient's decubitus ulcers, and the examiner's limited experience in performing ultrasound in the child with a poor general condition. The second case presented with abdominal pain and distension, originally considered to be due to constipation. After few days she developed a pleural effusion (Chest X-ray and thoracic CT were performed) and pleural fluid was examined to rule out infection with Mycobacterium tuberculosis. The radiologist made the recommandation for further examination - finally, a gynecology consult and ultrasound raised the question of ovarian tumor. After 6 weeks the patient was admitted to our hospital, where the ultrasonography performed the next day showed a large size (88/120 mm) pelvic tumor, relatively well defined, with inhomogeneous content, with hypo and hyperechoic areas, occupying the entire left iliac fossa, the supravesical region and partially, the right iliac fossa. The tumor has a Doppler signal, it does not appear to be very vascularized. After surgical removal, the tumor turned out to be a cystic ovarian teratoma.
Conclusions: Abdominal pain is one of the most common symptoms in children, but in some cases may be the main symptom of a serious disease. Abdominal ultrasonography must be offered to any child with abdominal pain, distention, constipation and sudden and unexplained signs and symptoms, as this examination can easily and quickly detect important organic changes, such as abdominal and pelvic tumors.The need for CT scan should be considered only after performing abdominal ultrasonography, in order to avoid unnecessary, costly and potentially harmful CT examinations.
Keywords: pediatric, ultrasonography, abdominal pain, constipation.

PCR 15

ROLE OF CONTRAST-ENHANCED ULTRASONOGRAPHY IN THE DIAGNOSIS OF LIVER METASTASIS IN CIRRHOSIS PATIENTS

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Objectives: The cirrhotic liver is hypothesized to provide protection against liver metastases, the occurrence of focal liver lesions in patients with cirrhosis is rare, accounting for only 1,7% of all cases. CEUS has improved the detection of liver metastases when other imaging methods could not be performed.
Materials: We present the case of a 65-year-old male patient, non-smoker, occasional drinker, known for 20 years of chronic viral B hepatitis without any antiviral treatment, who came to the emergency room complaining of enlargement of the abdomen, yellowing of the skin, 2 weeks prior to the presentation.

Physical exam showed, jaundice, abdominal distension, with mild diffuse tenderness and ascites. He had no peripheral edema.
Results: Laboratory results showed AST=439 U/L, ALT=997 U/L, FAL=801 U/L, creatinine 3,4 mg/dl, tumor markers CA 19-9=576 U/ml, AFP=12 UI/ml.

2D abdominal ultrasound illustrated a hypoechoic, inhomogeneous image with a diameter of 30 mm and another one which occupied 1/3 of the hepatic right lobe, umbilical vein repermeabilization, and a large volume of ascites.

Because of the renal impairment, we performed a native CT examination of the abdomen that revealed a liver with an intensely inhomogeneous structure due to the presence in the segments IV, V, VII and VIII of hypodense images that deform the liver capsule and intestinal loops with a slight infiltration of mesenteric fat, but could not differentiate a hepatic carcinoma from liver metastasis. So, we decided to continue the investigation with CEUS that pointed out multiple hypoechoic solid images with a diameter of 2 cm, some of them causing a distortion of the hepatic contour and a „ring" enhancement of the lesions during the arterial phase, suggestive for liver metastasis. Due to CEUS result we performed gastroscopy and colonoscopy where an ulcero-vegetative mass in the transverse colon was found. Histopathological examination confirmed the diagnosis of adenocarcinoma.
Conclusions: The singularity of this case is that CEUS can be a useful primary imaging tool for evaluating incidentally detected liver masses in patients who have renal failure, contrast agent allergies, or claustrophobia, when other imaging techniques are not available.
Keywords: Liver, metastases, cirrhosis, cancer, CEUS, diagnosis.

PCR 16

IMAGING IN THE INITIAL DIAGNOSIS OF PANCREATIC INSULINOMA

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Objectives: Insulinoma is the most common functional neuroendocrine tumor that originates from the islet of beta cells [1]. Advances of various diagnostic imaging methods have dramatically increased our ability to detect pancreatic diseases [2]. In particular, the ultrasonography plays an important role in the screening of pancreatic ailments [3]. Due to the small dimension of the mass, the clinicians face difficulties in diagnosing it.
Materials: We present the case of a 69 years old patient diagnosed with pancreatic insulinoma which underwent imagistic examination. The patient known with hypertension and non-alcoholic steatohepatitis presented in the clinic for syncopes, sweating, anxiety and severe wight-loss. In the patient medical history, we found an emergency admission one month earlier for episodes of loss of consciousness,

tremor of the upper limbs, sweating and disorientation in time and space.

Results: Abdominal ultrasonography and computed tomography showed a heterogenous 1,4 cm tumour localized in the pancreatic body with features of insulinoma. The prolonged supervised fast test that was applied induced hypoglycaemic symptoms. The level of glucose and insulin was at the lower range of the fast test. The presence of tumor was confirmed by endoscopic ultrasound, but the cytopathologic examination suggested an aspect of chronic pancreatitis.

Conclusions: Through imaging methods and with an evocative clinical portrayal, we identified the pancreatic tumor as being an insulinoma. Even though cytology didn't support the diagnosis, we tend to believe that a false negative result cannot be ruled out. We underline the need of other specific tests in this situation.

Keywords: pancreas, insulinoma, hypoglycemia.

References

1 D'Onofrio M, Mansueto G, Vasori S, et al. Constrast-enhanced ultrasonographic detection of small pancreatic insulinoma. J Ultrasound Med. 2003;22:413−7.
2 Itoi T, Sofuni A, Itokawa F, et al. Interpreting extratransabdominal ultrasonographic findings in patients with pancreaticobiliary diseases. Jpn J Med Ultrason. 2008;35:155−62.
3 Takeda K, Goto H, Hirooka Y, et al. Contrast enhanced transabdominal ultrasonography in the diagnosis of pancreatic mass lesions. Acta Radiol. 2003;44:103−6.

PCR 17

CONTRAST-ENHANCED ULTRASOUND IN THE DIAGNOSIS OF RENAL CELL CARCINOMA

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Objectives: Renal cell carcinoma (RCC) is the most common-and deadly-renal tumor in the adults and clear cell type is the most spread. Contrast-Enhanced Ultrasonography (CEUS), consisting of gas microbubbles, non toxic and easily eliminated by breathing is an alternative of diagnosis to contrast-enhanced computed tomography (CECT) in hepatic focal lesions in patients with renal failure. CEUS, Standard Abdominal Ultrasonography, but also CECT are important imagistic investigation in discovering RCC.

Materials: We present the case of a 54-year-old male patient, construction worker, obese, nonsmoker with medical history of hypertension, presented in the outpatient unit and admitted in the internal medicine clinic for quasi-permanent lumbar pain exacerbated by exercise with the onset 3 weeks prior to the presentation. Standard serum investigations, there is only a moderate inflammatory syndrome, with no other changes. Standard abdominal ultrasonography shows 5 cm diameter mid-renal round lesion, distortioning the anatomical architecture, with possible intratumoral necrosis. CEUS was performed and revealed hyperenhancement during the cortical phase, subsequent washout in late phase, clues for renal tumor. A 3rd imagistic investigation was performed and the CECT reveales renal tumoral mass without cleavage space with the liver and infrarenal cave thrombosis.

Results: The patient is transferred to the urology department where nephrectomy is performed within days from the diagnosis preventing the growth of the tumor. Histopathology after open radical nephrectomy revealed a 6 cm large, grade 4, clear cell renal carcinoma, with extension into the renal vein.

Conclusions: The particularity of the case is the lack of symptoms, the incidental finding of a large renal mass, without cleavage space with the liver, with extension into the renal vein, but also the fast nephrectomy due to possible malign thrombosis. Sonography is important in detecting renal masses and more recent interest is in using CEUS as a diagnosis method. In contrast to focal liver lesions, where CEUS is a diagnosis method, the accuracy to predict malignancy renal tumors was intensively studied, with different results among authors. Recently, meta-analysis of different studies, found a high sensitivity and a moderate specificity in differentiation between malignant and fat-rich angiomyolipoma, which is still questioned by some authors.

Keywords: renal cell carcinoma, contrast-enhanced ultrasonography, radical nephrectomy.

PCR 18

POSTPRANDIAL HYPOGLYCEMIA IN A PANCREATIC INSULINOMA: A CASE REPORT

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Objectives: Insulinoma is the most common functional pancreatic neuroendocrine tumor, with a reported incidence of 0.5−5 per million person-years. Endoscopic ultrasound (EUS) is a high-performance endoscopic technique used for pancreatic disease assessment which allows tissue harvesting and may establish the diagnosis.

Materials: We present the case of a 58-year-old female patient with multiple episodes of hypoglycemia, with a blood glucose value of 19 mg/dl, manifested by dizziness, cold sweats, and loss of consciousness. Standard abdominal ultrasound revealed a round mass in close contact with the main pancreatic duct (MPD), within the head of the pancreas. A high level of insulinemia was recorded (71μU/ml with normal range 2.6-24.9) and imaging examination was completed with abdominal CT and MRI. The patient underwent CEUS which showed high enhancement in the early arterial phase with discrete wash-out in late venous phase. EUS-FNA of the pancreatic mass was performed and suggested a benign tumor. IHC studies revealed a neuroendocrine tumor with positive staining for synaptophysin, chromogranin A and insulin.

Results: The patient was directed for enucleation of the pancreatic tumor and pathologic examination confirmed the insulinoma diagnosis. Two weeks after surgery, the patient showed clinical signs of acute pancreatitis and a pancreatic amylase of 500 U/l. US highlighted a peripancreatic collection measuring 16/10 cm, with a mass effect on the stomach suggesting a pancreatic pseudocyst. EUS was again performed, this time with therapeutic purposes. Under EUS guidance, the pseudocyst was punctured with 19 gauge needle and a guidewire was inserted. A cystotome was inserted over the guidewire, punctured the pseudocyst wall and a 10 FR double pigtail stent was inserted with efficient drainage. Successive ultrasound examinations revealed a smaller collection in size, the stent was removed after 6 weeks and no recurrence was observed in the following months.

Conclusions: Our objective was to highlight the EUS potential for pancreatic lesions which may useful not only for diagnosis but also for managing pancreatic complications. Moreover, to avoid such situations, perhaps a biliary stent within the MPD might be more efficient for the surgeon to avoid possible complications.
Keywords: insulinoma, EUS, pseudocyst.

PCR 19

ULTRASONOGRAPHIC CLUES IN PAPPILARY NECROSIS

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Objectives: Papillary necrosis is a severe disease that has many causes, the most common ones being pyelonephritis and diabetes mellitus. Diagnosis is difficult especially in the chronic kidney disease population. We describe two cases with uncommon manifestations.
Materials: Two female patients, 25-year-old and a 67-year-old, presented at the Nephrology specialist for transient renal colic, pyelonephritis and in the latter also for transient hematuria. We compared the US features with CT scans and we established the final diagnosis by clinical means.
Results: On ultrasonography, sloughed papillae may appear as an echogenic material within the slightly dilated calices. If calcifications are present, identification can be improved using Doppler twinkling artifact. IVU is the main imaging modality but it comes with risks in CKD patients. The young female underwent first CT scan and after that US, while the second patient was examined only by US being overweight and with renal risk factors that limited the contrast agent administration. Both recovered well and without sequelle.
Conclusions: Correlation with clinical, laboratory and US findings help distinguish renal papillary necrosis from other renal abnormalities that have similar features. Areas of increased echogenicity in dilated calices are the main US feature and must be recognised.
Keywords: papilla, colic, echogenic, twinkling, ultrasound.

PCR 20

SUBCAPSULAR RENAL HEMATOMA

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Objectives: Introduction:the role of CEUS in the diagnosis of a renal tumor is important and sometimes essential in patients with chronic kidney disease.
Materials: We present the case of a 65 years old woman, with history of chronic kidney disease stage IV on a single surgical right kidney. She is presenting with signs and symptoms of infection and a giant tumor mass in the right flank.
Results: Following the corroboration of biological and imaging data, including CEUS, the diagnosis of a superinfected subcapsular renal hematoma was made .It was treated surgically and medicinally,with a favorable evolution.
Conclusions: The case was handled by a multidisciplinary team and the diagnosis was hampered by chronic kidney disease stage IV, that limited imaging investigation.
Keywords: renal hematoma,superinfected hematoma, CEUS.

PCR 21

THE ROLE OF CEUS IN THE DIAGNOSIS OF A RARE CASE OF HCC AND SPLEEN METASTASES

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Objectives: Hepatocellular carcinoma (HCC) is one of the most frequent types of primary liver cancer with high mortality which presents lungs, bone, and lymph node metastasis. In a few cases HCC determined spleen metastases, almost 0,8% of cases [1].
Materials: A male patient, 72 years old, with no significant pathological history, presented in our department, accusing loss of appetite, abdominal pain, and physical asthenia, for a few weeks. The physical examination showed hepatomegaly with firm consistency and splenomegaly. The biological panel in this case showed a compensation liver cirrhosis, AFP (Alpha-Fetoprotein)>1000IU/ml(N<5,8IU/ml). Serological markers for hepatitis were positive for HVC antibodies. Abdominal US showed an irregular liver contour and inhomogeneous structure, with evidence of a hyperechoic, lesion in segment V of hepatic right lobe, with hypoechoic halou measuring 6,5/5mm, and near by portal vein another lesion of 3/2cm. Spleen measuring 15 cm with a hypoechoic, homogeneous formation of superior pole of 4/2,3cm.
Result: In CEUS, both liver lesions present inhomogeneous and chaotic enhancement in arterial phase with wash-out slowly and uncompleted in portal phase, suggesting hepatocellular carcinoma, LIRADS V (LIRADS classification) [2]. Splenic lesion presents completely enhancement in arterial phase, inhomogeneous and completely wash out in portal phase, being sugestive for splenic secondary determinations. Computer tomography and AFP with high level, and clinical aspects in a patient with liver cirrhosis sustained our diagnosis. The administrated treatment was Sorafenib 800mg/day, from July 2015 until present, with partial response, conform RECIST criteria, with regression of viable tumor lesions [3]
Conclusions: CEUS represents a non invasive and accessible ultrasonography method with high sensibility and sensitivity for diagnosis and monitoring of patients with HCC and secondary determinations [4]
Keywords: CEUS, HCC, liver lesions, spleen metastases, high AFP.

References

1 Levent Filik, I. Biyikoglu, M. Akdogan, et al, Two Cases with Hepatocellular Carcinoma and Spleen Metastasis,
2 Schellhaas B, Wildner D, Pfeifer L et al, Ultraschall Med 2016 Dec, LI- RADS-CEUS
3 Modified RECIST Assessment for Hepatocellular carcinoma,2010
4 M. Claudon, C. F Dietrich et al, Guidelines and good clinical practice recommendations for CEUS in the liver

PCR 22

CONTRAST- ENHANCED ULTRASOUND IN THE DIAGNOSIS OF HEPATIC PARENCHYMAL PSEUDOLESIONS- A CASE SERIES

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Objectives: Parenchymal pseudolesions include focal fatty change, focal sparing, inflammatory pseudotumor, confluent fibrosis, pseudotumor hypertrophy and hepatic peliosis. Focal fatty changes are the most frequent of them. Approximately 30-40% of fatty liver infiltration cases occur focally, either as solitary areas, or as multiple areas with a more widespread distribution and lead to differential diagnosis with liver neoplasm.

Materials: We present several cases of hepatic parenchymal pseudolesions, exemplified by 2D and contrast enhanced ultrasound imaging

Results: We report the case of a 72-year-old Caucasian man, who presented with a three- day history of right upper quadrant abdominal pain. He also complained of anorexia and significant weight loss in one month. The ultrasound exam showed an imprecisely- defined heterogeneous mass situated in his right hepatic lobe measuring 68 mm × 46 mm. Diffuse homogeneous hyperenhancement in the arterial phase and washout during the delayed phase was observed at contrast-enhanced ultrasound (CEUS), therefore malignancy was suspected. Because the MRI scan showed suspicious appearance of malignant lesion, liver biopsy was performed. Microscopic examination revealed nonspecific benign characteristics The metastatic work- up was also negative. After 3 months, the patient was in good condition.

The case of a patient with neoplastic history and pseudotumoral fatty free infiltration and three other cases of atypical localisation of focal fatty infiltration or focal fatty sparing are also detailed.

Conclusions: Non- neoplastic abnormalities are clearly depicted with modern imaging techniques such as CEUS. CEUS has high accuracy in the diagnosis of liver focal fatty infiltration or sparing.

Keywords: contrast enhanced ultrasound, parenchymal pseudolesions, liver.

PCR 23

ATYPICAL LIVER METASTASES- A SPECTRUM OF ULTRASOUND FINDINGS- CASE SERIES

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Objectives: Conventional ultrasound (US) and contrast-enhanced ultrasound (CEUS) are used in oncology clinical practice, with an accuracy similar to computed tomography and magnetic resonance imaging to detect and characterize liver metastases. The ultrasound appearance is often of a well-defined, hypoechoic lesion, surrounded in 40% of cases by a halo. After contrast administration, liver metastases can display either hypo or less often hyperenhancement in the arterial phase, followed by an early washout. However, the ultrasound appearance of liver metastases can be extremely heterogeneous and pose a significant challenge to diagnosis.

Materials: Using case examples, in this paper, we illustrate five particular types of liver metastases, focusing on B-mode ultrasound features and patterns of contrast enhancement in CEUS.

Results: The first case demonstrates hypervascular liver metastases in a patient with neuroendocrine carcinoma of the pancreatic uncinate process. Well-delimitated, hyperechoic lesions, up to 6 cm, with arterial hyperenhancement and early and marked washout were demonstrated on US and CEUS. Ultrasound aspect of pseudocystic liver metastases can be seen in neuroendocrine tumors- case 2 and pancreatic cancer- case 3. Mucinous liver metastasis from mucinous adenocarcinoma of the colon may present as a giant, solitary, hyperechoic and inhomogeneous tumor, with peripheral and septal enhancement in the arterial phase of CEUS and early washout (case 4). In the last case, we described the ultrasound findings of hepatic metastases from ocular melanoma that occurred years after curative surgery.

Conclusions: Awareness of the spectrum of ultrasound aspects of liver metastases facilitates the distinction of liver metastases from other primary liver tumors.

Keywords: metastases, ultrasound, contrast-enhanced ultrasound.

PCR. 24

DIFFERENTIAL DIAGNOSIS OF ATYPICALLY LOCATED APPENDICITIS

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Objectives: Appendicitis remains one of the most common causes of acute abdomen in children [1]. The atypical location of the appendicular process often complicates timely diagnosis and leads to various complications, which leads to a high percentage of diagnostic errors.

Materials: In order to show the difficulties of differential diagnosis of atypically located appendicitis, present the following clinical observation.

Results: 13-year-old boy with non-localized abdominal pain was sick for 7 days. Ultrasound: the delimited fluid in the left iliac region with a diameter of 7 cm could be traced up the left lateral canal, reach the left dome of the diaphragm and spread along the front surface of the pancreas. The pancreas was not changed. In addition, a leak in the retroperitoneal space with a diameter of 1.5 cm was observed in the left iliac region, and a hyperechoic structure with an acoustic shadow, which was considered as coprolite, was observed in the caudal part of the cluster. Given the visualization of coprolite, an ultrasound suggested that the appendix was perforated with abscesses in the abdomen and leakage into the retroperitoneal space.

CT scan of the abdominal cavity with contrast enhancement confirmed all changes in the abdominal cavity, however, the leak into the retroperitoneal space described by ultrasound was represented by an altered vermiform appendix, which was traced from the dome of the cecum, passed anterior to the aorta and ended in the left ileal region in the fluid accumulation.

It was decided to conduct treatment in the amount of laparotomy, debridement and drainage of the abdominal cavity.The total volume of evacuated pus 1000ml.

Conclusions: Ultrasound (US) can detect complications of acute appendicitis in children. Computed tomography (CT) should be used if ultrasonography is insufficient. US and CT have high diagnostic accuracies of clinically suspected acute appendicitis in children overall with no significant difference [2].

Keywords: appendicitis children, atypically located appendicitis.

References

1 P. Teoule, J. Laffolie, Ch. Reissfelder. Acute Appendicitis in Childhood and Adulthood. Dtsch Arztebl Int. 2020 Nov 6;117(45):764-774. doi: 10.3238/arztebl.2020.0764.

2 H. Zhang, M.Liao, J.Chen Ultrasound, computed tomography or magnetic resonance imaging - which is preferred for acute appendicitis in children? A Meta-analysis Pediatr Radiol. 2017 Feb;47 (2):186-196. doi: 10.1007/s00247-016-3727-3. Epub 2016 Nov 4.

PCR 25

ENDOGENOUS ENDOPHTHALMITIS SECONDARY TO LIVER ABSCESS: A CASE REPORT

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Objectives: Endogenous endophthalmitis represents the inflammation of the eye as a result of infection spread on hematogenous pathway. Klebsiella pneumoniae belongs to gram-negative pathogens and is a potential cause for serious infections, including pyogenic liver abscesses.

Materials: A 66-year-old woman with a past medical history of type 2 diabetes mellitus and cholecystectomy presented in the Emergency Unit complaining of left eye pain, blurred vision, and sensitivity to light, being admitted to the Ophthalmology Department. An inflammatory syndrome with high levels of C-reactive protein, leucocytosis, and unbalanced diabetes with a glycemic value of 372 mg/dl was present. The physical examination revealed also right upper quadrant pain. Standard transabdominal ultrasonography was performed, visualizing in the right hepatic lobe a 6,3/7,3 cm inhomogenous image. The patient was transferred in the Gastroenterology Department for further investigations where contrast-enhanced abdominal ultrasonography described a honeycomb-like image, with wall enhancement during the arterial phase and progressive washout during the portal one, highly suggestive for pyogenic abscess in the fourth segment. The cranial and chest-abdomen-pelvis CT scan showed no extension of the local ocular inflammation, and an IV,V segments localized hypodense lesion suspicious for liver abscess. Further on, the patient was transferred for open surgical drainage and the microbiological exam from the resulting pus diagnosed a Klebsiella pneumoniae infection.

Results: Standard ultrasonography performed on admission allowed early diagnosis of the liver abscess and conducted the later management. The overall patient evolution improved considerably after abscess drainage, but the visual function was deeply deteriorated and needed enucleation of the infected eye.

Conclusions: Patients presenting with painful red-eye and abdominal complaints should be considered an emergency and attentively searched through. A standard or contrast-enhanced abdominal ultrasound scan carried out early may dictate the evolution in patients with liver abscess complicated with ocular symptoms.

Keywords: liver abscess, endophthalmitis, Klebsiella pneumoniae, contrast-enhanced ultrasonography.

PCR 26

FOLLOW-UP A CAVERNOUS PORTAL VEIN TRANSFORMATION IN A YOUNG PATIENT - ULTRASONOGRAPHY CHALLENGE

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Objectives: To highlight the importance of abdominal Doppler ultrasonography in monitoring a cavernous portal vein transformation with portal hypertension and a Warren shunt.

Materials: Our research team presents the case of a 2 year old male patient known who had cavernous transformation of the portal vein at 2 years old. Later on, he developed portal hypertension, thrombocytopenia and hypersplenism at the age of 3. Our patient was admitted to the hospital in numerous occasions for life threatening hematemesis and melena due to variceal bleeding and underwent several times variceal ligation. In the case of our patient, the factor causing the portal vein was idiopathic. Studies show that many cases were caused by embryological malformation.

Results: At 13year old, our patient underwent surgery and Warren Shunt- (anastomosis of the splenic vein and the left renal vein) was performed in order to lower the PHT. After the surgery, he did not present gastrointestinal bleeding and no other complications due to PHT and his general state was stable. The patient has to monitor his liver disease, every three- six months, all his life. In this research paper, we want to lay emphasis on the importance of colour and /or pulsed Doppler sonography in order to evaluate the blood flow in the cavernous portal vein transformation, in its segmental branches, in the hepatic vein and examine the spleno-renal shunt.

Conclusions: Doppler sonography is a trustworthy procedure to accomplish the challenge of monitoring a cavernous portal vein transformation in a young patient, due to its non-invasive, generally painless, as well as the fact that it does not use radiation.

Keywords: cavernous portal vein transformation, ultrasonography, portal hypertension.

PCR 27

ASCARIS LUMBRICODES IN THE GALLBLADER

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Objectives: Ascariasis is a common disease caused by Ascaris lumbricoides. Due to the narrow and tortuous structure of the biliary tract, it is rare for the helminth to invade into the gallbladder, constituting

2.1% of hepatobiliary ascariasis. Ultrasound is the investigation of choice for the diagnosis of gall bladder ascariasis.

Materials: We report a case of a 36-year-old women who presented with complaints of back pain on-and-off for 1 month. She is recommended by neurologist to do ultrasound of kidney. A hyperechoic structure in the gallbladder (GB) was accidentally visualized. Detailed on real time B-mode ultrasonography of the gallbladder showed a dilated gallbladder with multiple fixed linear echogenic, tubular, parallel lines with anechoic central line, some of this part was calcified with acoustic shadow (1/3 size of GB), common bile duct and intrahepatic biliary wasn't extended. From the anamnesis the patient reported that about 6 months ago there was an attack severe pain in the right hypochondrium and had to call an ambulance help. The attack was reliefed and she did not go to the hospital. After US investigation ascariasis confirmed in the laboratory, women was successfully treated with an anthelminthic drug, then underwented cholecystectomy. A dead calcified worm inside the gallbladder was defined.

Results: Ascaris worms generally live in the jejunum and can migrate to the biliary system through the papillary orifice and causing biliary obstruction and a variety of complications. It usually presents as acute acalkulous cholecystitis. The source of infection is a person with ascariasis. Infection occurs only when swallowing mature eggs, and the transmission factors are mainly vegetables and berries, on the surface of which there are particles soil, as well as water and contaminated hands. Clinically in the early phase of ascariasis characterized by the development of allergic manifestations, in the late stage - a violation functions of the digestive system.

Conclusions: Ultrasound method is a noninvasive first-line technique for diagnose gallbladder ascariasis. Ultrasonography plays a significant and practical role in the diagnosis, differential diagnosis of upper abdominal pain and follow-up of suspected cases of biliary ascariasis.

Keywords: Ascaris lumbricoldes, gallblader, ultrasound.

PCR 28

PERITONEAL LOOSE BODIES: ACCIDENTAL FINDINGS

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Objectives: Peritoneal loose bodies (PLB) – asymptomatic incidentally findings of calcified necrotic fat in abdomen and pelvic that are not associated with organs. There aren't so much information about it in the literature but J. Mayfield and others consider that PLBs are often a diagnostic dilemma without surgical intervention.

Materials: 59-year-old women was admitted to hospital with upper abdominal pain and nausea. By B-mode ultrasound (US) investigation gallstones in gallbladder (GB) were found without dilatation and obstruction of the choledochus. Accidentally several hyperechoic round structure with acoustic shadow visualized in pelvis diameter 0,5-1,0-2,5 sm. During laparoscopic cholecystectomy GB was removed with hyperechoic structures. Histology shows us lipogranulomas with necrotic-inflammatory changes.

Results: Peritoneal loose bodies (Peritoneal Mice) within the peritoneal cavity have an specific US imaging appearance: round noncompressible well-circumscribed hyperechoic mass without internal vascularity with peripheral fibrotic or calcified regions and acoustic shadow, surrounded by a thin hypoechoic rim. A small number of articles in the internet suggest that PLB can be formed mainly as a result of torsed and infarcted late epiploic appendigitis, rarely mesenteric panniculitis or omental infarction.

Conclusions: Peritoneal loose bodies have no clinical significance and require no specific treatment. Ultrasound can help better identify unknown abdominal and pelvic calcified fatty masses and to avoid surgical excision for diagnostic purposes.

Keywords: Peritoneal loose bodies, ultrasound, necrotic fat masses.

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EFSUMB-WFUMB STUDENTS' ULTRASOUND CONGRESS – STUC

STUC01

AUGMENTED REALITY APPLICATION FOR ULTRASOUND EQUIPMENT KNOBOLOGY - ARGUS

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Objectives: An application of Augmented Reality is presented to get familiar with the knobology of ultrasound equipment (ARgUS) that are available in our skills-labs. Students can prepare individually their first practical session with a real representation of the used equipment instead of reading the manual or spending valuable teaching time during a skills-lab session on this. The app expands the moduls of our blended learning concept for teaching technical basics in ultrasound [1].
Materials: The prototype application has been developed with Android Studio 3.3.1 which simplifies different modul implementation and prototype testing on various smartphones or tablets. But nevertheless several different steps need to be handled before a camera of a smartphone can be used for an augmented reality representation: First the real ultrasound equipment has been modeled in 3D by photographic scanning (3Dflow Zephyr V4.353) and rebuild as a CAD model (Blender V2.79b) because no original CAD files were available for our ultrasound equipment. Subsequent for the recognition of the CAD model and the orientation in 2D/3D by a camera an external toolbox has been used (Vuforia 8.0.10), which output could be used to develop the special smartphone app (Unity 2018.3.11f1) and implement buttons, texts or interfaces for our special ultrasound needs. The software has been finalised for Android Version 4.4 and above.
Results: The ARgUS app is able to recognise 5 modern ultrasound equipment in real (3D) or from a photo/monitor (2D) and displays the model name of the scanner on top and the meaning of the detected knobs, that are in view of the camera. They are highlighted within a meaningful box to understand the abbreviation or symbol and to give additionally more information about the special functionality. On the main window of the app a help function can be selected to get familiar with the AR software or to get a list of the implemented ultrasound equipment types before first use.
Conclusions: The app and the equipment photos are downloadable now for all our students as e-resource [3] to prepare the practical handling at their first skills-lab session.
Keywords: teaching, ultrasound, augmented reality, skills-lab.

References

1 Kollmann, C: Teaching Technical Basics in Ultrasound for Medical Students - Outline of the Viennese 'Teach Us Sound' Concept; Praxis 2018; 107 (23):1273-1278 (DOI: 10.1024/16618157/a003104)
2 Kollmann, Santner: A prototype of a handheld augmented reality application to get familiar with ultrasound equipment knobology; Med Ultrason 2021; 23(4),438-442 (DOI: 10.11152/mu-3139)
3 ARgUS lite. Augmented Reality app for Android. E-Resource from Center for Medical Physics & Biomed. Eng., Medical University Vienna 2019 (CC BY-NC-SA) https://cloudius.meduniwien.ac.at/index.php/s/cCdikZ5qLfVSuzp

STUC 02

EXPERIMENTS SUPPORTING TEACHING THERMAL ASPECTS INVOLVED WITH DIAGNOSTIC ULTRASOUND OUTPUT

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Objectives: Knowledge of basic ultrasound technology and tissue interactions is necessary for medical students to understand possible bio-effects that are combined sometimes with the application of different diagnostic imaging. Theoretical teaching of these interactions with tissue and practical demonstrations of the real implications completes the comprehensive insights into bio-effects. In this project some simple experiments have been developed for use in workshops involving medical students. The main purpose is to demonstrate possible thermal effects of scanned tissue or self-heating of the probe due to the user-selected settings and modes of a diagnostic ultrasound equipment.
Materials: Three different materials have been used to demonstrate thermal effects visually: thermochromic foils, a smartphone-based infrared camera, and a thermochromic spayable ink with different temperature ranges have been placed on the probe itself or on absorbing tissue-mimicking objects placed in a water bath (with 25˚C and 35˚C). Different imaging modalities (B,M,Doppler & combinations) of a curved and linear probe, three output intensities (100%/75%/51%) with standard application presets have been tested to study the thermal outcome and representation.
Results: With maximum intensity output the attached thermochromic foil active around room temperature shows a colour change for all different modalities. In these experiments the effects of different window sizes in colour Doppler or sample gate positions in pulsed-wave Doppler can be easily demonstrated. The infrared camera is suitable to show self-heating of the probe and number of involved piezo-elements while selecting different modalities.

Even at body core temperature a slight heating effect of a modality could be detected with thermochromic foils.
Conclusions: The used materials and developed methods are less expensive, and fast to use in practical workshops. A visual feedback of the thermal effect that can be provoked with specific user-selected settings will lead to a better personal understanding of ultrasound tissue interaction.
Keywords: teaching, thermal effects, ultrasound, output.

STUC 03

STUDENTS' PERSPECTIVES ON CURRICULAR ULTRASOUND EDUCATION AT GERMAN MEDICAL SCHOOLS

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Objectives: Despite ultrasound being an inherent part of medical education, only a few German medical schools have established a comprehensive ultrasound curriculum. This study aimed to explore medical students' perspectives on ultrasound in medical education (USMed).
Materials: Questionnaire and Distribution. An anonymous, voluntary online survey was developed to collect information regarding student opinions on USMed. The survey consisted of 17 questions, structured into three sections. In total, 1040 questionnaires from 31 medical schools (of total 37) were completed.
Results: Between January 1st, 2019 und June 30th, 2019, an online survey was conducted among German medical students via the students' associations and their respective teaching facilities. The survey consisted of 17 items regarding USMed. Statements were rated on a 4-point Likert scale for agreement. In total, 1040 students from 31 German medical faculties participated. The majority (1021, 98.2%) reported a very high to high interest in curricular USMed. Students agreed (n = 945, 90.9%) that USMed would be helpful along their entire course of medical studies. Considering the best starting time for USMed, the opinions of German medical students diverged: students studying in a model curriculum preferred to start in the second year (40.7%) while 49%of the students studying in a traditional curriculum preferred to start in the third year ($p \leq 0.001$). An insufficient allotment of time for USMed in the planned curriculum (675, 65%) and a lack of courses run by medical faculty (305, 29.4%) were listed as perceived significant barriers to the participation in USMed. Peer teaching was regarded as an effective method in realizing USMed by 731 (70.3%) students.
Conclusions: German medical students are very interested and willing to participate in USMed. There appears to be a high demand for US courses offered by medical schools.
Keywords: ultrasound, ultrasound education, medical education, curriculum development, peer-teaching, medical Student.

STUC 04

INFRARED CAMERA AS A UTILITY FOR QUALITY ASSURANCE OF ULTRASOUND PROBES

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Objectives: Diagnostic ultrasound probes are one of the most stressed components of ultrasound system. A faulty probe can lead to misdiagnosis. Therefore, quality assurance (QA) of ultrasound probes is becoming a major concern. The disadvantages of complex QA methods are high cost of the equipment required for probe analysis and time-consuming nature of the process.
Materials: We used an ultrasound system that allows the required elements to be switched off. We set the acoustic power to the highest available value in order to maximize heating of the elements. Other imaging parameters corresponded to usual B-mode settings. The evaluation method is based on the examination of a linear probe operating in air and free of gel. Heating of the probe was captured by an infrared (IR) camera with a resolution of 640 x 480 pixels. The IR camera is equipped with uncooled microbolometer detectors. The acquisition time was 10 seconds (2 seconds with an inactive probe to capture noise and an additional 8 seconds with the active probe to investigate heating).
Results: Using this method, we can detect single element dropouts across the probe apart from 5 elements at the edge. The moving aperture causes that the elements at the edges are heated to lower temperature than the elements in the middle. The parts of the probe with non-uniform heating require a more detailed analysis. The method has been validated on convex and phased array probes with equal success.
Conclusions: This method seems to be useful for quality assurance of ultrasound probes. The main advantages of method are time saving (10-second measurement + fast analysis), no need for special equipment (a commercially available IR camera can be used for various types of probes) and reliability. The only limitation is the spatial resolution of the camera. Future research will focus on the applicability of this method to other types of ultrasound probe failures
Keywords: Infrared camera, Diagnostic ultrasound, Quality assurance.

STUC 05

THE USEFULNESS OF THE ULTRASOUND EXAMINATION IN DIAGNOSTICS OF INFERIOR VENA CAVA (IVC) PATHOLOGIES

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Objectives: Ultrasound (US) assessment is a useful modality for initial evaluation when a pathologic condition of the inferior vena cava (IVC) is suspected. This pictorial essay aimed to assess the diagnostics efficacy of US examination of IVC pathologies.
Materials: A group of 21 adult patients (8 females) was referred to an US evaluation of the IVC. Patients presented symptoms such as leg swelling, and abdominal pain. All patients fasted prior to the study. If the IVC was obscured, the examination was repeated 1-2 days after adequate preparation. Each US examination was performed using the Logiq 7 GE Medical System with a convex probe at 3,5 MHz using B-presentation, Doppler, and B-flow options. The tests were performed with the patient supine.
Results: In the 66,7% of patients the first examination allowed for unequivocal assessment of IVC. Three patients were diagnosed with unilateral renal vein tumor thrombus extending to the IVC. In six other patients, non-neoplastic thrombi were found. In four of them, the thrombus involved iliac veins. In two patients the thrombus involved both the iliac veins and the IVC. In one patient intravenous leiomyomatosis was reported in the IVC. The rest of the patients did not have any pathology visible on US. Three of the patients diagnosed with thrombosis were qualified for IVC filter placement. Two patients were qualified due to iliocaval thrombus and one due to progression of thrombus during anticoagulation.

Conclusions: US examination enables the evaluation the entire course of IVC and the diagnosis of IVC pathology, including neoplasms, thrombosis, and leiomyomatosis. Additionally, it allows for assessment of blood flow with color Doppler, and differentiation of the thrombus character - neoplastic vs non-neoplastic with the use of contrast-enhanced ultrasonography. Moreover, the IVC US evaluation allows for the identification of indications for the implantation of the IVC filter.

Keywords: IVC filter, thrombosis, leiomyomatosis.

STUC 06

A NATIONAL REGISTER FOR INTERVENTIONAL ULTRASOUND (INVUS) IN GERMANY: OUTLINE AND PRELIMINARY RESULTS OF A PILOT STUDY

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Objectives: Interventional Ultrasound (INVUS) has become an essential part of daily clinical practice for a variety of indications (1-6). The advantages are obvious: fast and mobile availability, absence of radiation, high resolution, and real-time imaging (7). The current state of research on risk factors and adverse events is mostly based on monocentric or retrospective studies, which are focused on specific interventions and are often limited to the analysis of bleeding risks, pain and associated predictive factors (8).

Materials: In preparation for a nationwide INVUS register, a one-year pilot study focusing on abdominal INVUS was initiated in October 2021 at 9 study centres in Berlin and Brandenburg. Beginning at the end of 2022, the national INVUS Register will collect prospective data on diagnostic and therapeutic percutaneous and endosonographic INVUS procedures in various body regions and indications for a 5-year period. Paracentesis and thoracocentesis without long-term drainage placement, procedures on the prostate and breast, and prenatal interventions will be excluded. Patient-specific data, technical variables, risk factors, outcome quality and adverse events are recorded. The data are digitally recorded by the study centres in a web-based documentation system and scientifically analysed after pseudonymization and encryption. Use for benchmarking purposes is planned.

Results: The experience gained from the pilot study will be used for the technical and organizational development of the register structure. In addition, the pilot study will provide prospectively collected data on the spectrum and outcomes of abdominal INVUS procedures. Here we present the results of the interim analysis for the first 6 months.

Conclusions: The aim of the INVUS Register is to provide a comparative assessment of outcome quality and adverse events, as well as their predictors, based on extensive prospectively collected data on INVUS interventions from different medical specialties. Data from the pilot study will be useful to optimize the structure of the registry in terms of data security, user-friendliness, efficiency and statistical analysis. Results are expected to improve the evidence base of guideline recommendations on hygienic requirements (9), coagulation status, needle choice, procedural techniques (3, 4, 7) and selection between percutaneous and endosonographic INVUS procedures (5, 10, 11).

Keywords: ultrasound, ultrasound-guided intervention, register, outcome, adverse events.

References

1 Dietrich CF, Nuernberg D. Interventional Ultrasound. A Practical Guide and Atlas Stuttgart, New York, Delhi, Rio: Georg Thieme Verlag KG, 2015.
2 Dietrich CF, Braden B, Jenssen C. Interventional endoscopic ultrasound. Curr Opin Gastroenterol 2021;37:449-461.
3 Sidhu PS, Brabrand K, Cantisani V, Correas JM, Cui XW, D'Onofrio M, Essig M, et al. EFSUMB Guidelines on Interventional Ultrasound (INVUS), Part II. Diagnostic Ultrasound-Guided Interventional Procedures (Long Version). Ultraschall Med 2015;36:E15-35.
4 Dietrich CF, Lorentzen T, Appelbaum L, Buscarini E, Cantisani V, Correas JM, Cui XW, et al. EFSUMB Guidelines on Interventional Ultrasound (INVUS), Part III - Abdominal Treatment Procedures (Long Version). Ultraschall Med 2016;37:E1-E32.
5 Jenssen C, Hocke M, Fusaroli P, Gilja OH, Buscarini E, Havre RF, Ignee A, et al. EFSUMB Guidelines on Interventional Ultrasound (INVUS), Part IV - EUS-guided Interventions: General aspects and EUS-guided sampling (Long Version). Ultraschall Med 2016;37:E33-76.
6 Jenssen C, Brkljacic B, Hocke M, Ignee A, Piscaglia F, Radzina M, Sidhu PS, et al. EFSUMB Guidelines on Interventional Ultrasound (INVUS), Part VI - Ultrasound-Guided Vascular Interventions. Ultraschall Med 2016;37:473-476.
7 Lorentzen T, Nolsoe CP, Ewertsen C, Nielsen MB, Leen E, Havre RF, Gritzmann N, et al. EFSUMB Guidelines on Interventional Ultrasound (INVUS), Part I. General Aspects (long Version). Ultraschall Med 2015;36:E1-14.
8 Strobel D, Bernatik T, Blank W, Will U, Reichel A, Wustner M, Keim V, et al. Incidence of bleeding in 8172 percutaneous ultrasound-guided intraabdominal diagnostic and therapeutic interventions - results of the prospective multicenter DEGUM interventional ultrasound study (PIUS study). Ultraschall Med 2015;36:122-131.
9 Muller T, Martiny H, Merz E, Doffert J, Wustner M, Lessel W, Heynemann H, et al. DEGUM Recommendations on Infection Prevention in Ultrasound and Endoscopic Ultrasound. Ultraschall Med 2018;39:284-303.
10 Polkowski M, Jenssen C, Kaye P, Carrara S, Deprez P, Gines A, Fernandez-Esparrach G, et al. Technical aspects of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Technical Guideline - March 2017. Endoscopy 2017;49:989-1006.
11 Fusaroli P, Jenssen C, Hocke M, Burmester E, Buscarini E, Havre RF, Ignee A, et al. EFSUMB Guidelines on Interventional Ultrasound (INVUS), Part V. Ultraschall Med 2016;37:77-99.

STUC07

HHUS (HANDHELD ULTRASOUND) AND AI (ARTIFICIAL INTELLIGENCE) – DATA COLLECTION PROJECT TO IMPROVE VSCAN AIR CL IN ABDOMINAL EXAMINATION

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Objectives: HHUS devices have undergone tremendous development in recent years and are enjoying increasing popularity, especially in emergency medicine and outdoor settings. The increased use in general

practice during home visits and also in palliative care is providing a "democratization" of ultrasound. However, the wider dissemination should not lead to a reduction in quality. The use of AI seems suitable to counteract this.

Materials: A total of 113 individuals underwent pre-defined standard scans in the form of 10-second video loops, including collection of raw data files resulting in 10 separate scans per examination. The examinations were performed with the Vscan Air CL system by GE Healthcare GmbH. The examinations were anonymized. Only age, gender and body data (weight + height) were collected.

The following 10 scans were recorded:

1. Gall bladder: longitudinal (left à right); transversal (top à bottom)
2. Kidney (right): longitudinal; transversal
3. Liver: Panning at the level of the hepatocaval confluence
4. Spleen: Panning at the level of the splenic hilum
5. Kidney (left): longitudinal; transversal
6. Urinary bladder: longitudinal; transversal

Results: All scans were collected completely from a total of 113 individuals in the period 09.2021 - 02.2022.

Of these, 44 were male, 69 female, and 15 individuals offered specific pathologies. Among the pathologies were missing gallbladder in condition after cholecystectomy, hydronephrosis (grade 1 – 2), renal cysts, gallbladder polyps and gallbladder stones.

Conclusions: The collected data will be merged with data pools from 2 other international centres. Based on the specific data obtained from Vscan Air, system customisation and integration of existing databases of pathologies will be performed. The integrated AI system should not only allow easier handling (cross-sectional image correction), but also allow the detection of normal structures and common pathologies. A first evaluation is planned for the near future.

*SPONSORED BY GE HEALTHCARE GMBH

Keywords: HHUS, AI, scan volumes, loop, ultrasound.

STUC 08

MOBILE OUTPATIENT ULTRASOUND DIAGNOSTICS (HHUS) IN SPECIALIZED OUTPATIENT PALLIATIVE CARE (SAPV) PERFORMED BY QUALIFIED NURSES

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Objectives: The federal State Brandenburg faces great challenges in medical care in the future. Area-wide medical care is threatened by demographic change. (1)

It has been shown abroad that non-physician users (e.g., nurses) have the ability to significantly improve patient care in medically under-served regions through the use of HHUS (handheld ultrasound). (2,3, 4)

As demonstrated in a pilot study (POCUS 1.0), it is possible to bring modern imaging - through the use of HHUS - to the field. It has been shown in the pilot study that nurses can also be enabled to use ultrasound during the home visit to the patient and thereby avoid, if necessary, a change in therapy by the general practitioner or unnecessary journeys for the patient. (5)

The aim of the POCUS 2.0 study is to design an effective ultrasound curriculum for nurses as a basis for standardised ultrasound training for nurses, especially in outpatient settings. (6, 7)

Furthermore, we want to investigate whether and what impact the use of non-physician outpatient ultrasound (HHUS) has on patient management.

Materials: Nurses receive 3 days of structured and advanced training in ultrasound. The teaching material is designed to meet the needs of the nurses. The aim of the course is to teach in easy investigations like detection of fluid collections in abdomen (FAST) and thorax, hydronephrosis, right position of urinary bladder catheter and others relevant questions.

The nurses are accompanied and trained in their work by a tutor (supervision). After each examination, the nurses fill out a survey form developed by experts, on diagnosed deviations. A standardised image and video documentation is made (anonymity) via a cloud (e.g. Vscan Extend Tricefy Uplink App / GE Healthcare). The results of the examination (questionnaire and image material) are supervised (validated) by experts within 24 to 48h. - The use of tele-teaching (tele-sonography) in the teaching of ultrasound knowledge and in the monitoring of results will be reviewed.(8)

Results: 16 palliative nurses of 4 ambulant services and 2 hospices take part in the course and in the study program. 8 HHUS devices (Vscan Air and Vscan extend) are used. 4 supervisors are involved in the teaching and review program. The user (nurses) take part in a test after the course and after 4 weeks for documentation of quality. In supervision period supervisors give information about relevant results to responsible GP.

Conclusions: The study should show that also in Germany it́s useful and efficient that non physicians are instructed in ultrasound and involved esp. in US diagnostics of outdoor palliative care patient.

Keywords: HHUS, palliative care, patient management, us in hospice.

References

1 Ministerium für Umwelt GuV. Künftige Sicherstellung der gesundheitlichen Versorgung in Brandenburg Grundlagen, Handlungsfelder und Manahmen/ Version 2012.
2 Wagner M, Shen-Wagner J, Zhang KX, Flynn T, Bergman K. Point-of-Care Ultrasound Applications in the Outpatient Clinic. South Med J. 2018;111(7):404-10.
3 Adler D, Mgalula K, Price D, Taylor O. Introduction of a portable ultrasound unit into the health services of the Lugufu refugee camp, Kigoma District, Tanzania. International Journal of Emergency Medicine. 2008;1(4):261-6.
4 Brannam L, Blaivas M, Lyon M, Flake M. Emergency nurses' utilization of ultrasound guidance for placement of peripheral intravenous lines in difficult-access patients. Acad Emerg Med. 2004;11 (12):1361-3.
5 Lo H, Frauendorf V, Wischke S, Schimmath-Deutrich C, Kersten M, Nuernberg M, et al. Ambulatory Use of Handheld Point-of-Care Ultrasound (HH-POCUS) in Rural Brandenburg - A Pilot Study. Ultraschall Med. 2021.
6 Carter T, Conrad C, Wilson JL, Dogbey G. Ultrasound Guided Intravenous Access by Nursing versus Resident Staff in a Community Based Teaching Hospital: A "Noninferiority" Trial. Emergency Medicine International. 2015;2015:1-4.
7 Swamy V, Brainin P, Biering-Sorensen T, Platz E. Ability of non-physicians to perform and interpret lung ultrasound: A systematic review. Eur J Cardiovasc Nurs. 2019;18(6):474-83.
8 Kovacevic P, Dragic S, Kovacevic T, Momcicevic D, Festic E, Kashyap R, et al. Impact of weekly case-based tele-education on quality of care in a limited resource medical intensive care unit. Critical Care. 2019;23(1).

STUC09 (PP97)

INDISPENSABLE ROLE OF HANDHELD ULTRASOUND IN RURAL PALLIATIVE CARE

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Objectives: Due to disease severity, palliative care patients often present with complex clinical pictures and complaints such as pain, dyspnea, nausea, loss of appetite, and fatigue. Limited diagnostic capabilities in the home setting often lead to uncertainty in treatment decisions. To establish diagnostic clarity, palliative patients are often hospitalized. In the last stage of life, "trifles" such as avoidable transports take on greater significance. The development of handheld ultrasound (HHUS) has opened a good opportunity especially for palliative care, as US can be performed not only in palliative care units, but also in hospices and at home. This study investigated the diagnostic and therapeutic applications that palliative physicians can obtain by using HHUS during home visits in rural regions such as Brandenburg.

Materials: 6 US-trained palliative care physicians used an HHUS system (GE's Vscan Extend) in their outpatient palliative care (SAPV) practice. Leading symptoms, examination findings, and resulting treatment changes were documented in a standardized data collection form.

Results: 123 HHUS- Examinations were performed in 79 palliative outpatients. Pathological findings were found in 83% (54/65) for the main symptom dyspnea. Ascites (n=28), pleural effusion (n=11), and a combination of pleural effusion and ascites (n=9) were diagnosed most frequently. Based on the US result, medication change was performed in 9 patients and bedside paracentesis in 29 patients. In addition, symptoms such as pain and dyspnea (n=28), pain (n=10), and nausea (n=6) could be relieved by HHUS-assisted paracentesis.

Conclusions: The use of HHUS during home visits allows early identification and relief of distressing symptoms of palliative patients and has good patient acceptance. The use of HHUS often results in a decisive influence on the patient's further treatment.

Keywords: handheld Ultrasound (HHUS), palliative care, palliative interventions.

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STUC 10. LEARNING CURVE IN POINT-OF-CARE ULTRASOUND

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Introduction: Point-of-Care Ultrasound (POCUS) is a widely used non-invasive medical procedure that allows the clinician to assess internal organs and tissues using high frequency sound waves. This imaging method is becoming more routinely used in the clinical setting, thus emphasizing the need to efficiently train the new generations of medical students into using it. The purpose of this study was to compare the retention rate of new information in the context of different teaching approaches.
Material and method: We compared the performance of two groups of students, one group of 26 students attending an optional, 14 week course, organized by the Faculty of Medicine, while the other group of 67 students attended two 4 day workshops, held by the Department of Gastroenterology and Hepatology of the Timiș County Emergency Clinical Hospital. At the end of each type of training session, the participants were evaluated both in a theoretical and practical manner.
Results: The metric used to evaluate the performance of each group was the average success rate of sonographic structures recognition. The group which attended the optional course had a higher success rate (85.33%) compared to the group that attended the 4 day workshops (75.27%), thus yielding a net difference of 10.06% between the two. Moreover, it has been shown a slightly higher success rate among female participants in comparison to male participants in both study groups, namely 85.62% vs. 85.15% after attending the optional course and 75.35% vs. 75% after attending the workshop session. Nevertheless, when taken into account the duration of each type of training, it can be stated based on the aforementioned results that both types of teaching approaches greatly increase the level of competency in the usage and interpretation of ultrasound.
Conclusions: POCUS is becoming a critical skill that the majority of clinicians will need to be familiarized with. The growing interest of medical students in learning this type of procedure also creates opportunities to learn and it has been shown that irrespective of the teaching approach, competency can be successfully attained.

STUC 11. A RARE CASE OF TERTIARY HYPERPARATHYROIDISM IN A STAGE 5 CHRONIC KIDNEY DISEASE PATIENT- ROLE OF ULTRASOUND EXAMINATION

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Introduction: Tertiary hyperparathyroidism (HPT) occurs when an excess of parathyroid hormone (PTH) is secreted by parathyroid glands, usually after longstanding secondary HPT in chronic kidney disease (CKD) patients. Ussualy this occurs after decades of renal replacement therapy in rare cases, after long-standing secondary HPT.
Material and method: A 43 year old female with CKD for 13 years was admitted to the Nephrology Departament for elevate urea and creatinine, with the indication of renal replacement therapy. She had extensive bone pain, small tumors in the tibial and clavicular area and severe phospho-calcic imbalance: PTH 4488 pg/ml, calcium 12.3 mg/dl, phosphorus 9.1 mg/dl. Ultrasound of the cervical region, CT scan and multiple bone X-rays were done.
Results: **M**ultiple area of bone condensation and osteolysis were found. Ultrasound examination of the cervical area revealed a hypoechoic, un-homogeneous focal lesion 2,5 cm in diameter, located posterior to the left thyroid lobe, corresponding to the location of the left inferior parathyroid gland. In Doppler examination there was a peripheric hypervascularization but no micro-calcification wihtin the lesion. This was also confirmed by micro-V signal. Thyroid was homogenous, with normal volume and no focal lesions. Enhanced CT scan was performed after initiation of dialysis and the focal lesions described by US appeared hypoenhanced. A Tc99m sestamibi parathyroid scan confirmed the parathyroid lesion.
Conclusions: Ultrasound examination was very usefull in the rapid identification of a parathyroid lesion in advanced CKD patient with tertiary HPT.

STUC 12. ROLE OF ULTRASOUND IN DIAGNOSIS AND FOLLOW-UP OF AN ABSCESSED PYELONEPHRITIS WITH PERINEPHRIC COLLECTIONS

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Introduction: Acute pyelonephritis (PN) is a potentially organ- and/or life-threatening infection that characteristically causes scarring of the kidney. Prevalence is as low as 1-10 cases in 10000 PN. We describe the case of a young woman with acute PN complicated with multiple intrarenal abscesses.
Material and method: a 33 year old female patient with a history of factor V Leiden mutation, was admitted to the nephrology departament with septic shock and acute right PN. Abdominal ultrasonography and enhanced CT scan were performed and a diagnosis of abscessed PN with sub-capsular effusion was established. Patient was followed daily for 10 days and monthly for 6 months.
Results: At US examination the right kidney was enlarged,128/56 cm with multiple hypoechoic focal lesions, located in the corticomedullary area. Two areas of transonic subcapsular effusions 5 mm thick each, located on the anterior hepato-renal surface and posterior towards the ilio-psoas were described. Asociated to this, effusions in right pleural space and Douglas pouch were found. CT scan confirmed multiple hypodense areas with no contrast enhancement. A combined iv antibiotic regimen was administered for 14 days. After hospital discharge patient received oral wide-spectrum fluoroquinolones for 4 weeks. One month later, CEUS examination revealed a delayed enhancement in the focal parenchimal areas with normal enhancement in the late phase, identical to adjacent parenchima. This finding coresponds to favorable evolution to recovery.
Conclusions: The rare complication of the acute PN in our patient in the absence of other risk factors was possible due to the coagulation

disorder. US native, Doppler and contrast-enhanced was decisive in the diagnosis and follow-up.

STUC 13. AN UNCOMMON ULTRASOUND ASSOCIATION: HORSESHOE KIDNEY AND CARCINOMA

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Introduction: Horseshoe kidney (HSK) is one of the most common congenital renal fusion anomalies and the association with renal cell carcinoma is uncommon. We describe a case with stage 5 chronic kidney disease (CKD) and renal tumor in a patient with HSK.
Material and method: A 69 year old diabetic male was admitted to the nephrology department for complete evaluation of CKD stage G5A3. Abdominal ultrasonography (US) was performed and a renal tumor was discovered. Because of elevated creatinine, a native CT scan revealed HSK.
Results: At ultrasonography inferior poles of both kidneys were not well delineated and the parenchyma was diffuse echogenic and narrowed. At superior right pole a hypoechogenic focal lesion, 5,7 cm in diameter was described. Lesion had an inhomogeneous parenchymal-like appearance, with intense Doppler signal. Resistivity within the lesion was high, RI 0.76. The rest of the kidneys had a weak Doppler signal due to advanced kidney disease. In microV technique the lesion had a very intense signal. A native CT scan was performed and HSK was described, with the isthmus formed by the reunion of the inferior poles. Because of the advanced kidney disease patient was prepared for renal replacement therapy and after that the surgical management was planned.
Conclusions: US was a reliable method for the incidental finding of a renal tumor, but because of the advanced morphological changes due to CKD the isthmus was not detected. Association with renal tumor in HSK is rare and in this case the management was complicated because of the advanced stage CKD.

STUC 14. KEY IMAGING FEATURES IN MULTIPLE VON MAYENBURG COMPLEXES – A CASE REPORT

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Introduction: Multiple biliary hamartomas, also known as von Mayenburg complexes (VMC), are rare, benign malformations of the intrahepatic bile ducts. VMC are frequently incidental imaging findings and may mimic multifocal liver lesions, including metastases.

The present case report is aimed to illustrate the distictive imaging and histopatological features of VMC.
Case Presentation: A 44-year-old male patient with no significant past medical history was admitted to our tertiary referral hospital for unintentional weight loss and fatigability. Laboratory workup evidenced no significant abnormalities and preserved liver function. Autoimmune and viral ethiologies of liver damage were excluded. Abdominal ultrasound revealed multiple hyperechoic liver lesions up to 5 mm each, scattered throughout the prenchyma with no signs of portal hypertension. Liver stiffness measured by 2D-share wave elastography was 5.2 kPa. Contrast-enhanced ultrasonography showed homogenous hepatic enhancement with no wash-out. Magnetic resonance cholangiopancreatography revealed disseminated subcentimetric cystic liver lesions without communication to the normal biliary tree. Percutaneous liver biopsy was performed and histological findings revealed irregular and disorganized dilated bile ducts with single layer cubic epithelium without cytological atypia, sorrounded by collagenous stroma, highly suggestive for the diagnosis of VMC.
Conclusion: Here we reported the case of a patient with rare biliary hamartomas, highlighting the role of key imaging aspects combined with histological findings in establishing the diagnosis.
Keywords: biliary hamartoma, von Meyenburg complexes, percutaneous liver biopsy.

* equally contributed

ULTRASOUND IN MEDICINE AND BIOLOGY

The Official Journal of the World Federation
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