KU-S01

The Application of Shear-Wave Elastography in the Evaluation of Renal Function and Diagnosis of Renal Diseases

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Ultrasound has been a long-standing tool for evaluating kidney diseases. In recent decades, various ultrasound-based modalities, such as elastography, have emerged. Shear wave elastography (SWE) estimates tissue stiffness by applying a pulse wave with the probe to the region of interest and measuring the corresponding shear wave velocity. Kidney fibrosis is the cardinal histological feature of chronic kidney disease (CKD) and end-stage kidney disease is kidney fibrosis, linked to increased tissue stiffness. SWE is applied to predict CKD stages and assess the chronicity of kidney disease. However, the correlation between kidney function and SWE findings varies across different studies. Therefore, we conducted this cross-sectional study to evaluate the correlation between SWE findings and the chronicity of kidney disease in patients undergoing native kidney biopsy.

After obtaining informed consent, we performed SWE on patients before kidney biopsy. Clinical parameters including demographic data and laboratory tests evaluating kidney function were recorded. Univariate and multivariate correlation analyses were employed to assess the correlation between shear wave velocity or Young's modulus and the histologic features of kidney biopsy specimens, including the percentage of inflammation, tubular atrophy, and interstitial fibrosis involved. Since kidney biopsy is an invasive procedure, this result might assist clinicians in deciding if kidney biopsy is necessary, especially for patients with advanced CKD. Furthermore, incorporating SWE into a predictive model for kidney outcomes in a prospective cohort holds significant value.

KU-S02

Parameters on Renal Shear Wave Elastography Rather Than B-mode Sonography Are Associated with Chronic Kidney Disease Stages and the Disease Progression

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Chronic Kidney Disease (CKD) is a substantial and escalating global health concern, necessitating the development of proficient methods for early detection and consistent monitoring of disease progression. Shear wave elastography (SWE), a novel sonographic technique, facilitates quantitative assessments of tissue stiffness in differentiating among the various stages of CKD and tracking its progression over time. Studies indicated that parameters derived from SWE (e.g., shear wave velocity, Young's modulus), crucial measures of tissue stiffness, significantly correlated with the varying stages of CKD. Distinct disparities in renal stiffness were observed between healthy individuals and patients with CKD, as well as between those in the early and advanced stages of CKD. Interestingly, a study revealed a clear correlation between disease progression in CKD and increased renal stiffness, showing that patients with less renal stiffness appeared to be less susceptible to the progression of CKD. In contrast, studies discovered that traditional B-mode ultrasound parameters did not correlate substantially with CKD stages or their progression. Despite potential factors that may affect renal stiffness measurements, such as renal blood flow and the placement of the region of interest (ROI), studies strongly underline the potential applicability of SWE as a quantitative tool for evaluating renal diseases and monitoring CKD progression.

Renal elastography may be a low-cost way to provide additional diagnostic information on CKD. We recommend further validation studies to solidify these promising findings and explore this novel technique's potential in depth. Integrating this

technique into the current clinical practice may help in the early non-invasive detection of CKD and potentially alter the management of CKD.

KU-S03

Association between Liver Stiffness Measurement by Transient Elastography and Chronic Kidney Disease.

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Introduction: Transient elastography or elastometry (TE) is widely used for clinically cirrhosis and liver steatosis examination. Liver fibrosis and fatty liver had been known to share some co-morbidities that may result in chronic impairment in renal function. We conducted a study to analyze the association between scores of 2 TE parameters, liver stiffness measurement (LSM) and controlled attenuation parameter (CAP), with chronic kidney disease among health checkup population.

Method: This was a retrospective, cross-sectional study. Our study explored the data of the health checkup population between January 2009 and the end of June 2018 in a regional hospital. All patients were aged more than 18 year-old. Data from a total of 1940 persons were examined in the present study. The estimated glomerular filtration rate (eGFR) was calculated by the modification of diet in renal disease (MDRD-simplify-GFR) equation. Chronic kidney disease (CKD) was defined as eGFR<60mL/min/1.73 m2.

Results: The median of CAP and LSM score was 242, 265.5, and 4.3, 4.95 in non-CKD (eGFR>60) and CKD (eGFR<60) group, respectively. In stepwise regression model, we adjust for LSM, CAP, inflammatory markers, serum biochemistry markers of liver function, and metabolic risks factors. The P value of LSM score, ALT, AST, respectively is .005, <.001, and <.001 in this model.

Conclusion: The LSM score is an independent factor that could be used to predict renal function impairment according to its correlation with eGFR. This result can further infer that hepatic fibrosis may be a risk factor for CKD.

KU-S04

MRI/TRUS Fusion Biopsy for Early Detection of Clinical Significant Prostate Cancer: Current Status and Future Prospective

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Prostate cancer is a prevalent urologic cancer worldwide. In Taiwan, prostate cancer is the 5th most common malignancy in men. Early detection of prostate cancer is essential for better treatment outcomes. However, overtreatment of insignificant prostate cancer is another issue to discuss. The conventional diagnostic approach of prostate cancer involves ultrasound guided systemic prostate biopsy, through rectal or perineal approach, which can result in the risk of the underdiagnosis of clinically significant cancer. It is due to the low sensitivity of

identifying prostate cancer lesions by sonography. In recent years, the advent of magnetic resonance imaging (MRI) and its fusion with transrectal ultrasound (TRUS) has revolutionized the landscape of prostate cancer diagnosis. This technique integrates high-resolution MRI images with real-time ultrasound guidance, enabling precisely targeted sampling of suspicious lesions.

PIRADS (Prostate Imaging Reporting and Data System) is a structured reporting system for multiparametric MRI in the evaluation of suspicious prostate cancer in treatment naive prostate glands. MRI before prostate biopsy can help to find the significant prostate cancer lesions and avoids the unnecessary prostate biopsy. However, MRI-guided in-bore biopsies are costly and time consuming and the requirement of nonferromagnetic biopsy instruments during the MRI setting is another limitation. MRI/TRUS fusion biopsy have several advantages including the implementation outside the MRI setting, real time sonography with good spatial correlation and are not costly.

In conclusion, MRI/TRUS fusion biopsy represents a significant advancement in the early detection of clinically significant prostate cancer. This innovative approach can enhance the precision and efficacy of prostate cancer diagnosis and help to the following treatment decision making.

KU-S05

Comparisons of Percutaneous versus Retroperitoneoscopic Cryoablation for Renal Masses

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Purpose: Preserving renal function and controlling oncological outcomes are pertinent while managing renal tumours. We compared outcomes of percutaneous cryoablation (PCA) and retroperitoneoscopic cryoablation (RCA) in patients with renal neoplasms.

Methods: We identified 108 patients with renal tumours at two medical centres, where 63 patients received PCA and 45patients underwent RCA from August 2009 to July 2015, and they were followed up until February 2017. We compared preoperative and postoperative parameters, namely gender, systemic diseases, age, American Society of Anesthesiologists score, body mass index (BMI), haemoglobin, the estimated glomerular filtration rate, tumour size, operative time, tumour type, Clavien–Dindo classification of surgical complications, and tumour recurrence, by using an independent sample t test, Pearson's Chi-square test, Fisher's exact test, a Mann–Whitney test, and a generalised linear model.

Results: Based on baseline characteristics, we found that the patients in the PCA group were older and had higher BMI than those in the RCA group, whereas the patients in the RCA group had more comorbidities than those in the PCA group.

Retroperitoneoscopic and percutaneous methods had similar operative times, blood transfusion rates, postoperative fever episodes, and complication rates for either minor or major complications. However, the percutaneous method was associated with a shorter length of stay. No patient experienced deterioration in renal function until 2 years after both procedures. Impaired renal function was found in both groups in the 3-year follow-up. In both groups, tumour recurrence was significant for tumours> 4 cm.

Conclusions: Our results confirm that both cryoablation methods (PCA and RCA) are safe and effective for renal cell carcinoma. Favourable oncological control was achieved in both groups if the renal tumour size was ≤ 4 cm.

KU-S06

Microwave Ablation for Treatment of Renal Tumor Experiences Sharing and Current Update

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Microwave ablation is a minimally invasive technique that uses heat generated by microwave energy to destroy tumors. It is one of the ablative techniques that can be used for renal cell carcinoma (RCC), especially for small and localized tumors. Microwave ablation has advantages of faster heating, larger ablation zones, and less dependence on tissue impedance over other ablative techniques comparison.

Patients with cT1a RCC (≤ 4 cm) who are not suitable for surgery or who prefer a nephron-sparing approach could receive microwave ablation and also considered for selected patients with cT1b RCC (4-7 cm) who have high surgical risk or contraindications to surgery.

However microwave ablation should be performed by experienced operators using ultrasound or computed tomography guidance, with adequate anesthesia and monitoring. We should aim to achieve complete tumor ablation with a safety margin of at least 5 mm and followed contrast-enhanced imaging to assess the technical effectiveness and detect any complications as well as outpatient regular follow-up imaging to monitor for local tumor progression, metastasis, or recurrence. The outcomes of microwave ablation for RCC depend on various factors, a multicenter study of 323 patients with 371 cT1 RCC tumors treated with ultrasound-guided microwave ablation showed that the 10-year local neoplastic processes, cancer-specific survival, disease-free survival, and overall survival rates were 11.3%, 91.4%, 69.1%, and 89.2% for cT1b patients. A single-center study of 102 patients with 112 malignant renal tumors treated with microwave ablation showed that the technical success rate was 100%, the major complication rate was 3.6%, the local tumor progression rate was 3.6%, and the cancer-specific survival rate was 97.9% at a median follow-up of 36 months.

Microwave ablation is a promising technique for renal tumor, but it also has some limitations and challenges, such as risk of thermal injury to adjacent organs or structures, such as the bowel, ureter, or nerves. The difficulty of treating tumors in locations that are inaccessible or obscured by gas or bone. More long-term data and comparative studies with other modalities to establish the efficacy and safety of microwave ablation is needed.

KU-P01

The Role of Sonography in Different Practice Guidelines for Acute Colic by Urolithiasis among the Asian Regions

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Background: To assess the role of sonography in different clinical practice guidelines (CPGs) for acute colic events in urolithiasis.

Materials and Methods: The printed and online materials in CPGs for acute renal colic related to ureteral stones by European Association of Urology (EAU), Japanese Urological Association (JUA), Taiwan Urological Association (TUA) and Urological Association of Asia (UAA) were reviewed.

Results: The on-line versions of CPGs for acute colic of EAU, JUA, TUA and UAA were available in 2023, 2013, 2022, and 2019 respectively. Of note, the version of TUA CPG is mostly adapted from EAU CPG. In TUA, strong recommendation for sonography for renal colic in general population, pregnant women and children are noted, but in confirming and locating the stones, non-contrast CT is significantly more accurate than sonography. In UAA, sonography is the recommended choice of diagnosis for most renal stones and ureteric stones, particularly in children with level of evidence of 4, and grading B; CT provides the best sensitivity and specificity. In JUA, sonography recommendation is B, but CT is A. In EAU, the highest recommendation

of diagnostic imaging study was non-contrast CT, followed by excretory urography and sonography. Strong recommendation for sonography for renal colic in pregnant women and children is noted. CT was less suggested for follow-up after treatment of radiopaque stones.

Conclusions: In this limited review, differences exist in different guidelines. Sonography is a noninvasive tool and usefulness based on recommendation from different CPGs. The study may do some help in revising of the official guideline for evaluation of acute colic by urolithiasis in Taiwan.

Key words: acute colic, clinical practice guidelines, sonography

KU-P02

Coincidence of Horseshoe Kidney with Adenocarcinoma of Splenic Flexure and Descending Colon in a Young Man

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Background: Horseshoe kidney is known to coincident with many anomalies, diseases and cancers. Coincidence of horseshoe kidney with adenocarcinoma of colon is very race.

Materials and Methods: Using B-scan ultrasound, the isthmus of horseshoe kidney was demonstrated in this young patient.

Results: This 33 years old young patient visited our gastrointestinal outpatient department (OPD) with the chief complain of left lower quadrant crampy abdominal pain, progressive fullness and flatus and loose blood tinged stool passage on June 5, 2023.Colonoscope was arranged and the result revealed 1. one polyp, r/o adenomatous, at transverse colon, s/p cold snare polypectomy, size 5mm, from AV 60cm (Block A) 2. Invasive colon tumor with central depression, easy bleeding and partial lumen narrowing, over splenic flexure to descending colon, from AV 40cm, biopsy x6 (Block B) was done.3. Internal hemorrhoid. The colonoscopic biopsy report of poly is tubular adenoma. The pathological report of invasive colon tumor is moderately differentiated adenocarcinoma. He visited nephrology OPD due to urinary tract infection. Renal sonography revealed abnormal direction of right kidney with long axis 9.7 cm and indistinct and not clearly demarcated lower pole, abnormal direction of left kidney with long axis 10.7 cm, mild central sinus separation, and indistinct and not clearly demarcated lower pole, and a mass (isthmus) anterior to the aorta connecting the right and left kidneys on scan of central plane of abdomen at lower pole level. CT scans of abdomen without and with i.v. contrast medium showed horseshoe kidney with fusion of lower poles of bilateral kidneys, colon carcinoma with colon wall thickening at splenic flexure. He received end to end anastomosis Robot operation at Taipei Medical University Hospital on July 4.2023. The post –op stage was classified as colon carcinoma stage III with LN involvement. Post op chemotherapy will be arranged 8 times thereafter.

Conclusion: The development of horseshoe kidney is derived from fusion of two meta-nephrogenic blastemal with cloaca in embryonic stage. The location of fusion is mostly at the lower poles of kidneys. The histology of isthmus

of the horseshoe kidney may be fibrous connective tissue or thin solid renal tissue or thick solid renal tissue. The locations of adenocarcinoma of colon with coincidence of horseshoe kidney are variable in ascending, transverse and descending colon.

Key words: horseshoe kidney, adenocarcinoma of colon, ultrasound