

GEN-I01

Multiparametric Breast Ultrasound

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Breast ultrasound is the established and complementary imaging modality to mammography and MRI, and initial imaging method in young women, with considerable improvement of accuracy in mammographically dense breasts. Biopsies of all US visible lesions are easily performed under ultrasound guidance, as well as lesion marcation and some minimally invasive treatment procedures like ablations. The position of ultrasound in the multimodal diagnostic algorithm along mammography and MRI will be discussed.

Gray scale ultrasound is the main stay of the diagnosis, but important is the utilization of color Doppler, strain and shear-wave sonoelastography. The option of the automated breast ultrasound is also widely used, as well as of the 3D breast ultrasound, and fusion applications. Contrast-enhanced ultrasound of the breast is performed mostly in research and to assess the response to neoadjuvant therapy of cancer. The role of ultrasound in supplemental screening of breast cancer in dense breasts is considerable, and has advantages compared to the digital tomosynthesis. The particular emphasis in the lecture will be on the appropriate technique of obtaining sonoelastographic images and challenges in image acquisition, standardization of the color display across different ultrasound systems, assessing the correlation between the tissue stiffness and prognostic factors of breast cancer, decreasing intraobserver variability and increasing reliability of SE to follow-up probably benign lesions. Updates in ultrasound in the new BIRADS lexicon edition will be presented as well.

GEN-I02

The Application of Contrast-enhanced

Ultrasound (CEUS) in Uroradiology

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Contrast-enhanced ultrasound (CEUS) has emerged as a pivotal imaging modality in the field of uroradiology, offering several advantages over traditional ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI). This talk explores the growing application of CEUS in the diagnosis and management of urological diseases, with a particular focus on renal and scrotal pathologies. The presentation discusses the integration of CEUS into clinical guidelines and its advantages for real-time imaging, portability, and non-reliance on ionizing radiation, making it a safer and repeatable option for patients.

CEUS addresses the limitations of conventional ultrasound, particularly in its ability to enhance both macrovascular and microvascular visualization. This improvement allows clinicians to better differentiate between benign and malignant lesions, which is a challenge with non-enhanced ultrasound. In renal imaging, CEUS has demonstrated utility in the accurate differentiation of renal cell carcinomas from pseudotumors, such as the column of Bertin or fetal lobulations. Moreover, its use has been explored in characterizing complex cystic lesions, with the adapted Bosniak classification system showing promise for CEUS application. By improving diagnostic clarity, CEUS can reduce the need for more invasive imaging techniques like CT and MRI, thereby limiting patient exposure to radiation and reducing healthcare costs.

In the realm of scrotal imaging, CEUS excels in distinguishing between vascular and non-vascular testicular lesions, providing valuable information for differentiating benign conditions, such as epidermoid cysts, from malignant tumours. This enhanced capability is crucial in trauma cases and for evaluating conditions like segmental testicular infarction, where CEUS can clearly depict areas of ischemia. In paediatric patients, CEUS

offers early detection of abscesses or infarctions, allowing timely clinical intervention and improving patient outcomes.

CEUS is also increasingly used for guiding interventions, including biopsies and drainage procedures. The presentation highlights the role of CEUS in improving biopsy success by targeting viable tissue and avoiding necrotic areas. It also demonstrates its utility in nephrostograms and other procedures, offering a precise alternative to traditional fluoroscopy and CT guidance, especially in cases where radiation exposure should be minimized.

CEUS has established itself as a versatile and indispensable tool in urological imaging, providing superior diagnostic accuracy and intervention guidance compared to traditional modalities. Its ability to visualize fine vascular details, avoid radiation, and enhance patient safety makes it an essential component of modern urological imaging. As CEUS continues to evolve, its expanded use in clinical practice is expected to further enhance the diagnostic and therapeutic capabilities in uroradiology, reducing patient risks and improving outcomes.

GEN-01

CEUS of Breast Tumors and Non-mass Breast Lesions

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In this presentation, we will explore contrast-enhanced breast ultrasound (CEUS) and its impactful applications in clinical practice. CEUS employs microbubble contrast agents to enhance the visualization of breast lesions, leading to sharper diagnosis and improved lesion characterization.

We will discuss how CEUS aids in precise surgical planning by clearly delineating tumor

margins, enabling surgeons to plan more precise and effective interventions. Additionally, CEUS improves the accuracy of biopsies for lesions that are visible on MRI or CEDM but poorly seen on conventional B-mode ultrasound. By enhancing the visibility of these lesions, CEUS-guided biopsies achieve better targeting and diagnostic concordance.

The use of CEUS is demonstrated through several clinical cases, showcasing its efficacy in distinguishing between benign and malignant lesions, as well as its role in the management of complex cases. Through these applications, CEUS proves to be a valuable tool in enhancing the accuracy and effectiveness of breast cancer diagnosis and treatment, ultimately improving patient outcomes.

GEN-02

GEN-03

CEUS for Monitoring of Thyroid Ablation

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Contrast-enhanced ultrasound (CEUS) is a pivotal tool for monitoring thyroid ablation, particularly in the treatment of benign and malignant thyroid nodules. CEUS provides real-time, dynamic visualization of blood flow within ablated tissue, allowing clinicians to accurately assess the extent of ablation and detect any residual viable tissue. Its non-invasive nature, absence of ionizing radiation, and suitability for repeated use make it ideal for follow-up evaluations. CEUS also aids in guiding clinical decisions and improving patient outcomes. As a result, CEUS is increasingly integrated into thyroid ablation protocols, enhancing the safety and efficacy of these treatments.

GEN-04

CEUS Assessment of Treatment Response of Hepatic Tumor

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Aim: To evaluate inter-reader agreement between novice and expert radiologists in assessing contrast-enhanced ultrasonography (CEUS) and magnetic resonance imaging (MRI) images for detecting viable tumours with different sizes after conventional transarterial chemoembolisation (cTACE).

Materials and methods: This prospective study included patients who had less than five hepatomas and who underwent cTACE. Hepatomas with one or two feeding arteries were selected as target lesions. CEUS and MRI were performed within 1 week after cTACE to evaluate viable tumours.

Results: The expert group had higher kappa values in evaluating all tumour sizes via CEUS compared with MRI. The novice group had similar kappa values. In patients with tumours measuring ≤ 3 cm, the expert group had higher kappa values in reading CEUS compared with MRI images; however, in the novice group, the kappa value was lower in evaluating CEUS compared with MRI images. In patients with tumours measuring > 3 cm, the expert and novice groups had good to excellent kappa values. The confidence level of the two groups in reading MRI images was high; however, the novice group had a lower confidence level.

Conclusion: CEUS is a convenient,

cost-effective, and easy to apply imaging tool that can help interventionists perform early detection of viable hepatocellular carcinoma post-TACE. It has a higher inter-rater agreement in interpreting CEUS images compared with MRI images among expert radiologists even when they are extremely familiar with post-cTACE MRI images. In novice radiologists, there may be a learning curve to achieve good consistency in CEUS interpretation.

GEN-P01

Usage of Point-of-Care Ultrasonography for Diagnosing Hollow Organ Perforation

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Introduction: Early diagnosis of hollow organ perforation in the emergency department is crucial for patient safety. Hollow organ perforations account for a significant proportion of acute abdomens requiring emergent surgery. It is a serious and common abdominal emergency that can lead to severe complications if not promptly identified and treated. Pneumoperitoneum, often associated with hollow organ perforation, requires immediate medical attention. Delayed diagnosis can result in sepsis, a life-threatening condition that requires rapid intervention. Here we present a case report of hollow organ perforation that point-of-care ultrasonography (POCUS) provides direct evidence of free air with dirty ascites.

Case: A 50-year-old male with cirrhosis presented to the emergency department (ED) with an 8-hour history of progressive diffuse abdominal sharp pain. Cold sweating, fever, and nausea accompanied. His abdomen was soft, distended, tympanic on percussion, with rebound tenderness. Point-of-care ultrasound (POCUS) showed dirty air shadow with mixed heterogeneous echogenic fluid over the liver surface. (Fig. 1). Scissors maneuver was also identified for intraperitoneal free air (Fig.

2). Abdominal computer tomography confirmed the diagnosis of pneumoperitoneum (Fig. 3). He was admitted for explorative laparotomy for ruptured duodenal ulcer repair and discharged without complications and remained stable during follow-up.

Discussion: Ultrasound, particularly point-of-care ultrasound (POCUS), offers several advantages in the emergency department setting, including rapid assessment, non-invasive, and real-time imaging. Recent studies have shown promising results in the use of abdominal ultrasound for detecting free air in the peritoneal cavity. POCUS demonstrates high sensitivity and specificity in diagnosing various abdominal conditions, including acute appendicitis, intestinal obstruction, and hollow organ perforation. It enables rapid diagnosis and guiding immediate treatment decisions.

GEN-P02

Usage of Point-of-Care Ultrasonography for Diagnosing Appendicitis.

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Introduction: Appendicitis is the most common abdominal surgical emergency worldwide, with timely diagnosis being critical to prevent complications such as perforation, abscess formation, and peritonitis [1]. Early recognition in the emergency room is essential because the progression of appendicitis can lead to life-threatening conditions if not promptly treated. Studies show that delays in diagnosis significantly increase the risk of complications, which in turn can lead to longer hospital stays, more complex surgeries, and higher mortality rates. Here we present a case report of appendicitis that point-of-care ultrasonography (POCUS) provides direct evidence of a non-compressible appendix with

focal fluid accumulation.

Case: A 31-year-old female presented to the emergency department (ED) with a 6-hour history of epigastric pain. The pain was persisted without remission on lying or posture change. Nausea with pain migration to the right lower quadrant in recent hours accompanied. Neither gross hematuria, shoulder radiation pain nor trauma episodes have happened. Her abdomen was soft, flat, and tympanic on percussion. Tenderness over McBurney point was found. Point-of-care ultrasound (POCUS) showed a non-compressible appendix with focal fluid accumulation (Fig. 1). Abdominal computer tomography confirmed the diagnosis of appendicitis (Fig. 2). She was admitted for appendectomy and discharged without complications and remained stable during follow-up.

Discussion: Appendicitis is an inflammation of the appendix, a small, tubular organ in the right lower abdomen that is attached to the large intestine. The clinical symptoms may be initially nonspecific symptoms of general malaise, indigestion, or bowel irregularity. Periumbilical or central abdominal pain generally develops after nonspecific symptoms. Nausea, vomiting, and fever are also frequently complained. Typical pathological findings in appendicitis are a thickened, non-compressible appendix greater than 6 mm in diameter, hyperemia, and accumulation of focal fluid around the inflamed appendix which can be easily detected by POCUS. A recent systematic review of the use of ultrasonography in diagnosing appendicitis identified an overall sensitivity of 86%, specificity of 94%, positive predictive value (PPV) of 100%, and negative predictive value (NPV) of 92%; while in the CT studies, the calculated pooled values of sensitivity, specificity, PPV, and NPV were 95%, 94%, 95%, and 99%, respectively. While CT remains the gold diagnostic tool for precisely demonstrating acute appendicitis POCUS is a timely, efficient, effective, patient-centered alternative in the ED setting and can be used as first-line diagnostic tool in both adults and children.

GEN-P03

Usage of Point-of-Care Ultrasonography for Diagnosing Pneumoretroperitoneum.

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Introduction: Pneumoretroperitoneum, the presence of free air in the retroperitoneal space, is a critical condition that demands accurate and early diagnosis for optimal patient outcomes. The importance of prompt detection cannot be overstated, as it often indicates serious underlying pathologies such as gastrointestinal perforation or complications from medical procedures. Early diagnosis of pneumoretroperitoneum is crucial for several reasons. Timely detection allows for faster intervention, potentially reducing morbidity and mortality rates. Accurate diagnosis helps clinicians determine whether surgical intervention is necessary or if conservative management is sufficient. Early detection can prevent the progression of the condition and associated complications. Here we present a case report of pneumoretroperitoneum that point-of-care ultrasonography (POCUS) provides direct evidence of partial “curtain” of gas around the left kidney and collection of gas dorsal of the left kidney.

Case: A 75-year-old male with end-stage renal disease under regular hemodialysis presented to the emergency department (ED) with black stool with anorexia and abdomen dull pain for one week. Progressive weakness, fever, and hematuria accompanied. His abdomen was soft, distended, and tympanic on percussion. Point-of-care ultrasound (POCUS) showed partial “curtain” of gas around the right kidney. (Fig. 1). Collection of gas dorsal of the left kidney was also detected (Fig. 2). Abdominal computer tomography confirmed the diagnosis of pneumoretroperitoneum (Fig. 3). He was admitted for conservative treatment and discharged without complications and remained stable during follow-up.

Discussion: Ultrasound, particularly point-of-care ultrasound (POCUS), offers several

advantages in the emergency department setting, including rapid assessment, non-invasive, and real-time imaging. Recent studies have shown promising results in the use of abdominal ultrasound for detecting free air in the peritoneal cavity, which can be extrapolated to retroperitoneum. However, it's important to note that the accuracy of ultrasound in diagnosing pneumoretroperitoneum specifically may require further research and validation.

GEN-P04

Usage of Point-of-Care Ultrasonography for Diagnosing Pneumoretroperitoneum.

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Introduction: Pneumoretroperitoneum, the presence of free air in the retroperitoneal space, is a critical condition that demands accurate and early diagnosis for optimal patient outcomes. The importance of prompt detection cannot be overstated, as it often indicates serious underlying pathologies such as gastrointestinal perforation or complications from medical procedures. Early diagnosis of pneumoretroperitoneum is crucial for several reasons. Timely detection allows for faster intervention, potentially reducing morbidity and mortality rates. Accurate diagnosis helps clinicians determine whether surgical intervention is necessary or if conservative management is sufficient. Early detection can prevent the progression of the condition and associated complications. Here we present a case report of pneumoretroperitoneum that point-of-care ultrasonography (POCUS) provides direct evidence of partial “curtain” of gas around the left kidney and collection of gas dorsal of the left kidney.

Case: A 75-year-old male with end-stage renal disease under regular hemodialysis presented to the emergency department (ED) with black stool with

anorexia and abdomen dull pain for one week. Progressive weakness, fever, and hematuria accompanied. His abdomen was soft, distended, and tympanic on percussion. Point-of-care ultrasound (POCUS) showed partial “curtain” of gas around the right kidney. (Fig. 1). Collection of gas dorsal of the left kidney was also detected (Fig. 2). Abdominal computer tomography confirmed the diagnosis of pneumoretroperitoneum (Fig. 3). He was admitted for conservative treatment and discharged without complications and remained stable during follow-up.

Discussion: Ultrasound, particularly point-of-care ultrasound (POCUS), offers several advantages in the emergency department setting, including rapid assessment, non-invasive, and real-time imaging. Recent studies have shown promising results in the use of abdominal ultrasound for detecting free air in the peritoneal cavity, which can be extrapolated to retroperitoneum. However, it's important to note that the accuracy of ultrasound in diagnosing pneumoretroperitoneum specifically may require further research and validation.

GEN-P05

Usage of Point-of-Care Ultrasonography for Diagnosing Renal Abscess.

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Introduction: Early diagnosis of renal abscess in the emergency department (ED) is crucial for optimal patient outcomes and efficient healthcare delivery. Renal abscesses, while relatively uncommon, can lead to severe complications if not promptly identified and treated. The challenge lies in the often non-specific initial presentation, which can mimic other conditions and potentially lead to misdiagnosis or delayed treatment. For emergency

physicians, recognizing the clinical characteristics that suggest a renal abscess is paramount. Early diagnosis allows for timely initiation of appropriate antibiotic therapy and, when necessary, surgical intervention. This can significantly reduce morbidity, prevent the spread of infection, and decrease the likelihood of long-term renal damage. Here we present a case report of right renal abscess that point-of-care ultrasonography (POCUS) provides direct evidence of hypoechoic focal lesion with echogenic foci within the renal parenchyma.

Case: A 77-year-old female with past history of renal stones presented to the emergency department (ED) with a one-week history of acute left flank pain. The pain was persisted without remission on lying or posture change. Fever with vomiting, and dysuria accompanied. Neither gross hematuria, shoulder radiation pain nor trauma episodes have happened. Her abdomen was soft, flat, and tympanic on percussion. Point-of-care ultrasound (POCUS) showed mixed hypoechoic and anechoic focal lesions within the renal parenchyma along with echogenic internal debris (Fig. 1). Right hydronephrosis was also detected (Fig. 2). Abdominal computer tomography confirmed the diagnosis of emphysematous pyelonephritis with abscess formation and obstructive uropathy (Fig. 3). She was admitted for abscess drainage and removal of stone impaction and discharged without complications and remained stable during follow-up.

Discussion: Ultrasonographic findings of renal abscess typically include hypoechoic or anechoic focal lesion within the renal parenchyma, irregular margins of the lesion, internal debris or echogenic material, posterior acoustic enhancement, increased vascularity in the surrounding renal tissue, potential extension into the perirenal space, thickening of the renal capsule, and possible gas within the lesion, appearing as echogenic foci with shadowing. It's important to note that ultrasonographic findings may vary depending on the stage of the abscess and its size. Serial ultrasound examinations can be useful in monitoring the progression of the abscess. While ultrasound is a valuable tool, CT imaging may provide more detailed information in complex