主 題：超音波的新進展
New Frontiers in Ultrasound

時間 Time	演講題目 Topic	演講者 Speaker
Moderator:	黃碧桃 Betau Hwang 童綜合醫院	
13:30-13:40	Opening Remark	黃碧桃 Betau Hwang 童綜合醫院
13:40-14:10 PED-S01	GI Endoscopic Ultrasound	孫盟舜 Meng-Shun Sun 高雄阮綜合醫院肝膽腸胃科
14:10-14:40 PED-S02	Pediatric Musculoskeletal Sonography – What to Know before Starting an Exam	蔡季霖 Chi-Lin Tsai 中國醫藥大學復健醫學部
Moderator:	謝凱生 Kai-Sheng Hsieh 中國醫藥大學兒童醫院	
14:40-15:10 PED-S03 (Video)	Superficial High Frequency Ultrasound	黃執中 Chih-Chung Huang 成功大學電機工程所
15:10-15:40	Coffee Break	
Moderator:	謝凱生 Kai-Sheng Hsieh 中國醫藥大學兒童醫院	
15:40-16:10 PED-S04	Endobronchial Ultrasound (EBUS) and Transbronchial Needle Aspiration (TBNA): The Evolution of Pulmonary Diagnostics	余秉宗 Ping-Tsung Yu 臺北馬偕醫院胸腔內科
Moderator:	楊生湳 San Nan Yang 義大醫院	
16:10-16:40 PED-S05	Fetal Ultrasound and Role of Pediatricians in the Field of Prenatal Diagnosis-Starting from Cardiac Anomaly	池宛玲 Wan-Ling Chih 台兒診所
16:40-16:50	Panel Discussion	
16:50-17:00	Closing Remark	楊生湳 San-Nan Yang 義大醫院

PED-S01
GI Endoscopic Ultrasound

Deputy Chair, Department of Internal Medicine
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Endoscopic ultrasound (EUS) is gaining significant recognition in pediatric gastroenterology, offering increasingly safe and effective diagnostic and therapeutic solutions, despite initial limitations related to equipment size and the need for specialized expertise.

EUS is predominantly utilized for pancreato-biliary diseases, including acute recurrent and chronic pancreatitis, choledocholithiasis, pancreatic fluid collections (PFCs), and pancreatic masses. Key diagnostic advancements include EUS-guided fine-needle aspiration/biopsy (FNA/FNB), which is a safe and effective method for obtaining tissue from solid and cystic pancreatic lesions, lymphadenopathy, and subepithelial lesions, demonstrating high diagnostic yields with newly development of needles. The development of miniprobes has extended EUS applicability to very young patients with gastrointestinal symptoms for assessing luminal structures and wall thickness. Emerging imaging techniques like contrast-enhanced EUS (CE-EUS) and elastography are enhancing tissue characterization.

In the therapeutic realm, EUS has transformed the management of PFCs, with lumen-apposing metal stents (LAMS) now established as the preferred drainage method, often preventing more invasive surgical interventions. Other evolving interventional applications include EUS-guided gastrojejunostomy (EUS-GE) for gastric outlet obstruction, EUS-guided biliary drainage (EUS-BD), celiac plexus block for chronic pain management, and EUS-guided liver biopsy.

Despite these rapid advancements, challenges persist, notably the need for adapting adult-sized equipment for smaller pediatric anatomy, a scarcity of pediatric-trained endosonographers, the routine requirement for general anesthesia, and the absence of pediatric-specific diagnostic criteria for certain conditions. Future directions include further equipment miniaturization, broader integration of advanced imaging and artificial intelligence (AI) for enhanced diagnostics, and increased specialized training and collaborative research initiatives, all aimed at delivering increasingly precise and minimally invasive care for pediatric gastro-intestinal diseases.

PED-S02
Pediatric Musculoskeletal Sonography – What to Know before Starting an Exam

Chi-Lin Tsai
China Medical University Hospital

For a long time, the diagnosis and treatment of pediatric musculoskeletal (MSK) conditions have relied heavily on imaging modalities such as X-rays, CT scans, and MRI. While these technologies are indispensable, their use in a pediatric population presents unique challenges, particularly the use of ionizing radiation and the frequent requirement for sedation to ensure patient stillness.

Sonography is a quickly emerging imaging modality in the evaluation of pediatric musculoskeletal conditions due to its safety, lack of ionizing radiation, portability, and ability to provide real-time dynamic assessment. The dynamic capability of ultrasound is particularly advantageous for diagnosing conditions with functional or positional symptoms, such as snapping syndromes and joint instability in young athletes.

Of note, anatomically, the pediatric skeleton is characterized by a predominance of cartilage, open growth plates, and variable ossification, which alters sonographic appearance and requires familiarity with age-specific normal findings to avoid misinterpretation as pathology. The vascularity and echogenicity of synovium, enthesis, and bone surfaces also differ by age, and normal physiologic vascularization may be mistaken for inflammation if adult criteria are applied.

This speech aims to provide a concise introduction to pediatric MSK sonography. It will review common indications for pediatric musculo-

skeletal ultrasound, highlight the critical anatomical differences that distinguish pediatric from adult examinations, and the spectrum of pathologic findings that may be diagnosed in the pediatric population. By understanding these core concepts, a clinician who is already familiar with scanning adult population can hopefully begin a pediatric exam with relative ease.

PED-S03
Superficial High Frequency Ultrasound

Chih-Chung Huang
Department of Biomedical Engineering, Nation Chung Kung University

Neovascularization of injured tendon increases the healing in proliferative phase but also improper healing and painful if it prolonged presence. Currently, ultrasound Doppler imaging has been used for measuring the neovascularization of injured tendon, such as Achilles tendon. However, the resolution of the state-of-the-art clinical ultrasound machine is insufficient for visualizing the neovascularization in finger tendon. Therefore, a high frequency micro-Doppler imaging (HFμDI) based on a 40 MHz ultrafast ultrasound imaging was proposed for visualization of neovascularization in injured finger tendons during different rehabilitation phases in this study. The visibility of vessels was enhanced based on block-wise singular value decomposition (BWSVD) filter through several curvilinear structure enhancement strategies, including the bowler-hat (BH) transform and Hessian-based vessel enhancement filtering (VEF). The HFμDI was verified via small animal kidney and spleen imaging since the vessel structure patterns are well known in the mouse. A total of five patients with finger tenon injuries were involved for HFμDI examination at different rehabilitation phases after surgery (from 11-56 weeks), and the finger function evaluations were also carried out for comparisons. Small animal experimental results showed that the proposed HFμDI provides the excellent ability for microvasculature imaging, which the contrast-to-noise ratio (CNR) of HFμDI is higher about 15 dB than it from traditional SVD filter, and the minimum detectable vessel size is 35 μm in mice kidney without injecting any contrast agent. In human study, neovascularization was observed obviously in injured finger tendons in the early phase of healing from 11-21 weeks, but it regresses after 52-56 weeks. The rehabilitation of finger seems to help reducing the neovascularization: neovascular density decreases about 1.8% to 8.0% in subjects after rehabilitation for 4 weeks. All the experimental results showed the ability of HFμDI for microvasculature imaging, which exhibits a high potential for injured finger tendon evaluation.

PED-S04
Endobronchial Ultrasound (EBUS) and Transbronchial Needle Aspiration (TBNA): The Evolution of Pulmonary Diagnostics

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Lung cancer and mediastinal diseases remain major health challenges, requiring accurate diagnosis and staging for effective management. Conventional bronchoscopy and imaging have limitations in tissue sampling and precision, while mediastinoscopy is invasive. The development of endobronchial ultrasound (EBUS) with transbronchial needle aspiration (TBNA) has redefined pulmonary diagnostics by enabling real-time, minimally invasive sampling of mediastinal and hilar lymph nodes.

EBUS-TBNA demonstrates high sensitivity and specificity in lung cancer staging, particularly for N2/N3 lymph node assessment, and is equally valuable in diagnosing benign conditions such as sarcoidosis, tuberculosis, and lymphoma. Its advantages include safety, cost-effectiveness, and outpatient feasibility, though limitations remain in

operator dependency, nodal access, and sample adequacy.

Recent advances—such as elastography, Doppler imaging, rapid on-site cytology (ROSE), and artificial intelligence—are enhancing diagnostic yield and expanding clinical applications. EBUS-TBNA has become the gold standard for mediastinal sampling and will continue to play a central role in precision medicine and personalized respiratory care.

PED-S05

Fetal Ultrasound and Role of Pediatricians in the Field of Prenatal Diagnosis-Starting from Cardiac Anomaly

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Advances in fetal ultrasound resulted in an increasing number of fetus with structural anomaly being diagnosed prenatally. Among these, congenital heart diseases (CHDs) are the most common structural malformation and are the leading birth defects causing neonatal mortality among birth defects. Despite the many benefits of performing a prenatal diagnosis in CHD, early diagnosis can also cause a great deal of psychological stress for expecting families. Consultation with pediatric cardiac team provide parents with sufficient information and reduce their anxiety so that they can make an informed decision as to whether to continue the pregnancy. Herein we present experience of a perinatal cardiac team providing care for fetal cardiac anomalies.

On the basis of perinatal cardiac team, a perinatal craniofacial team also provide parents of affected fetus with detailed treatment planning and expectable outcome.

Fetal ultrasound is currently being used as a primary screening tool in prenatal care, while fetal magnetic resonance imaging (MRI) is an important diagnostic imaging adjunct to ultrasonography, particularly for the assessment of fetal brain development. It is used to complement an expert ultrasound examination either by confirmation of the ultrasound findings or through the acquisition of additional information. A multidisciplinary team composed of obstetrician, pediatric radiologist or neuroradiologist, pediatric neurologist, other pediatric subspecialist is necessary for prenatal diagnosis and counselling of fetal brain malformations.

Prenatal diagnosis of congenital malformations could shorten the time interval from birth to neonatal admission/ treatment, thus may help in achieving a better outcome. A multidisciplinary perinatal team plays an important role in diagnosis, counselling, delivery and treatment planning.