

PED-S01

Ultrasound-guided CVC Insertion

En-Pei Lee

*Division of Pediatric Critical Care Medicine,
Department of Pediatrics, Chang Gung Memorial
Hospital at Linko, Kweishan, Taoyuan, Taiwan*

The insertion of a central venous catheter (CVC) is a common procedure in critically ill children, but several complications (such as arterial puncture or cannulation, hematoma, hemothorax, or pneumothorax) may occur and the incidence isn't low. Implementing vascular access is crucial and is technically challenging occasionally.

Many studies reported that using ultrasound to guide catheter insertion would reduce the number of access attempts and complications. Several different vascular access can be performed via ultrasound guidance such as central venous and arterial catheter, peripheral venous and arterial catheters. All physicians are aroused to study ultrasound-guided techniques. Ultrasound-guided techniques is very helpful during vascular puncture, choosing the most appropriate vessel, monitoring the progression of the needle tip into the vessels, avoiding many complications. Several studies reported that ultrasound-guided techniques may reduce complications by decreasing the number of puncture attempts. Multiple access attempts are correlated with the higher risk of pneumothorax, arterial puncture and nerve injury. Besides, multiple puncture will increase the risk of hematoma and vasospasm, then increasing the difficulty of successful puncture and the risk of thrombus.

For clinical training, several systematic approach steps were suggested to lean the skill of ultrasound-guided CVC insertion, which included evaluating the mark vessel (anatomy and vessel localization, vessel patency), using real-time ultrasound-guided technique to puncture of the vessel, and checking the correct needle, wire, and catheter position in the vessel. To attain the best skill level for CVC placement the information from anatomic landmark techniques and the understanding from ultrasound-guided CVC insertion need to be combined and integrated.

PED-S02

Abdominal Ultrasonography in Diagnosis of Pediatric Acute Abdomen

Yu-Jyun Cheng

*Department of Pediatric gastroenterology,
Hepatology and nutrition, Changhua Christian
Children's Hospital, Changhua City, Taiwan.*

Acute abdominal pain is one of the most common complaints in the pediatric emergency settings. However, such nonspecific complaints may represent from relatively benign conditions like constipation, viral gastroenteritis to potentially life-threatening conditions: intussusception, volvulus, peritonitis...etc. Prompt evaluation by history taking, physical examination, laboratory studies and imaging help pediatricians to achieve diagnosis. Abdominal ultrasonography is the first-line imaging modality in pediatric populations, not only because it's low cost, easy-to-use and real time imaging, but also it doesn't require sedation and avoid radiation exposure. However, it is also highly operator-dependent and may lead to false positive or negative results and even misdiagnosis. This topic will discuss the application of abdominal ultrasonography in diagnosis of pediatric gastrointestinal disease.

PED-S03

The Role of Focused Echocardiography in Pediatric Critical Heart disease

En-Ting Wu

*Department of Pediatrics, National Taiwan
University Hospital, Taiwan*

Recently, the use of point-of-care ultrasonography (POCUS) by pediatricians especially in emergency and intensive care departments has become increasingly popular. Critical care echocardiography (CCE) quickly and accurately identifies cardiac

function, allowing intensivists to manage critically ill pediatric patients by manipulating vasoactive–inotrope–fluid treatment based on the echocardiographic results. Training courses for POCUS are increasingly available and more intensivists are learning how to use CCE. CCE helps to assess cardiac function, volume status, and effusions. Furthermore, it is beneficial in cardiopulmonary resuscitation in determining the reversible reasons for cardiac arrest. We aim to become more familiar with POCUS and CCE techniques which quickly respond to our acute problems in hemodynamically unstable patients and help pediatric intensive care specialists to become more effective in PICUs.

PED-S04

Point-of-Care Transcranial Ultrasound in Pediatric Intensive Care Unit

Jainn-Jim Lin

Division of Pediatric Critical Care Medicine and Pediatric Neurocritical Care Center, Chang Gung Children's Hospital, Taoyuan, Taiwan

The application of point-of-care transcranial ultrasound (TCD) is increasing in frequency in the clinical practice in the pediatric intensive care unit. In the acute brain injury with unconscious patient, some of the pertinent TCD applications for the pediatric intensivist could help to screen, rule-in or monitoring some specific intracranial pathologies, including presence of midline shift, hydrocephalus, non-invasive intracranial pressure estimation and evaluation of cerebral hemodynamics. Otherwise, optic nerve sheath diameters could also be measured to monitor intracranial pressure if an invasive ICP monitor cannot be placed. With the increasing availability of point-of-care ultrasound devices, coupled with the need for rapid diagnosis of deteriorating neurologic patients, pediatric intensivists should be trained to perform point-of-care transcranial ultrasound. In my talk, I will brief discuss the clinical application and show the experience of point-of-care transcranial

ultrasound in Chang Gung Children's Hospital.

PED-S05

The Role of Echocardiography in Neonatal Cardiovascular Intervention

Jieh-Neng Wang, M.D., Ph.D.

Department of Pediatrics, National Cheng Kung University Hospital, Tainan, Taiwan

The role of echocardiography in neonatal cardiovascular diseases is rapidly evolving. It became the most common method of choice for diagnostic evaluation, follow-up and analysis of treatment results in neonates. In addition, recent advances in interventional cardiovascular procedures applied during the neonatal period are alternative life-saving methods used both for the urgent correction of clinical conditions and initial palliative therapy prior to surgery. In this part, neonatal echocardiography now permits a more comprehensive assessment of cardiac performance that could not be previously achieved with conventional imaging. In this presentation, I will describe the state of the art imaging techniques, focusing on echocardiography during pre-procedure assessment, procedural guidance of the most common catheter-based interventions, and post-procedure follow up, providing tips and tricks for pediatric cardiologists.

PED-S06

Experience of Point of Care Ultrasound Milestone Teaching Program for Primary Clinical Practice Physicians

Cheng-Che Chow¹, Zhao-Qing Lin¹, Hung-Yen Cheng¹, Yung-Ting Kuo¹, Shih-Yen Chen¹, Kai-Sheng Hsieh²

¹Division of Pediatric, Taipei Medical University Shuang Ho Hospital, New Taipei City, Taiwan

²Division of Pediatric, Chinese Medical University Children's Hospital

Introduction: POCUS training program has been used in the adult emergency room but is rarely reported in pediatric primary clinical care training program. To enhance the capability of primary care physicians to perform POCUS. We establish routine monthly POCUS teaching for primary clinical care pediatric resident training and post-graduate training program doctor.

Methods: A level I POCUS teaching program was provided for post-graduate training program physicians and pediatric residents in the pediatric department, Shuang-Ho hospital, from January 2020 to January 2022. The tutor made the onsite small group evaluation and online anonymous survey study before and after the POCUS training program.

Results: A total of 140 medical physicians completed the anonymous online survey before and after each monthly POCUS training program for resident and post-graduate training programs. 80 (57%) have no POCUS lecture before, and 114 (81%) have no sonography experience within one month. 55 (46%) could perform ultrasound within 15 minutes with a bedside tutor. 117 (83%) physicians learned POCUS because they thought it might solve patient's problem, 79 (56.4%) interested in POCUS, and 52 (37.1%) interested to use POCUS for teaching. After POCUS training programs, 107 (77%) physicians were very satisfied with the lecture, and 107 (77%) were very satisfied with the hands-on class. 98 (71%) physicians consumed less than 15 minutes on the POCUS procedure. 92 (66%) thought the POCUS was not difficult. 108 (78%) thought the POCUS was helpful. 84 (64%) thought they could complete basic level I POCUS by themselves.

Conclusions: POCUS level I milestone teaching programs for pediatric residents and post-graduate training physicians are helpful for primary pediatric clinicians to improve the capability, interest, and their self-confidence to perform POCUS. We will develop a longer follow-up plan to evaluate its effectiveness.

PED-P01

A Preterm Male Infant with Dilated Common

Bile Duct, Elevated Alkaline Phosphatase and Gallstone Mimicking Choledochal Cyst

Shu-Wei Hu^{1,2}

¹Department of Pediatrics, Tungs' Taichung MetroHarbor Hospital

²Department of Pediatrics, Dongshih Farmers' Hospital

This was a 30-day-old preterm male infant with past histories of 1. Prematurity, gestational age 30 and 1/7 weeks, body weight 1116g; 2. Maternal preeclampsia; 3. Respiratory distress syndrome, grade II; 4. Neonatal hyperbilirubinemia. The parenteral nutrition was administered during 2-days to 25-days old, and he was fed with human milk. The vitamin D supplement was added since 15-days old. He had unconjugated hyperbilirubinemia with twice episodes, and both episodes were improved after phototherapy. We performed abdominal sonography at 5-days old because much residual milk with bile contain, and we found huge gallbladder with mild common bile duct dilatation (0.218cm) and gaseous intestine. The feeding condition with improved gradually after domperidone treatment. We checked laboratory data at 29-days old for healthy examination, and elevated alkaline phosphatase level (1497 IU/L) with normal bilirubin level (total/direct bilirubin: 8.6/0.9 mg/dL). The gamma-glutamyl transferase level was also elevated (309 IU/L). Because necrotizing enterocolitis stage 1A with sepsis was found at 30-days old, we followed abdominal sonography for screening hepatic venous gas. However, the abdominal sonography revealed 1.Huge gallbladder; 2.One gallstone (0.903*0.33cm); 3.Markedly common bile duct dilatation (0.396-0.535cm), suspect choledochal cyst type I. No acholic stool or anemia was found after birth. Because no obstruction signs were noted, we planned to keep observation about the choledochal cyst and gallstone until the body weight reached 2200g if no complication of gallstone was found. The magnetic resonance cholangiopancreatography would be arranged after the body weight reached 2200g.

PED-P02

Newborn Hip Screenings at 4 to 8 Weeks Are Optimal in Predicting Referral and Treatment Outcomes: A Retrospective Review*Eric Lussier¹, Wei-Te Lei^{2,3}, Yi-Ting Sun¹, Hui-Wen Chen^{4,5}, Tung-Yao Chang¹, Chia-Hsieh Chang⁶**¹Taiji Clinic, Taiwan**²Department of Pediatrics, Hsinchu MacKay Memorial Hospital, Taiwan**³Graduate Institute of Clinical Medical Sciences, College of Medicine, Chang Gung University, Taiwan**⁴Taipei Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, Taiwan**⁵Taiwan Adventist Hospital, Taiwan. ⁶Chang Gung Memorial Hospital, Taiwan.*

Optimal DDH screening timing and whether adding risk profiles could aid in detecting treatment outcome were investigated. Risk factors were employed to supplement ultrasound findings in flagging cases for follow-up. Initial screening results and harness treatment outcomes concordance were compared at different screening ages and screening protocols. Using clinical decision to supplement

ultrasound screening allowed to accurately flag all 12 DDH treated cases upon initial visit. Clinical decision correctly identified cases that would have otherwise been missed (n = 2). However, doing so increased the rate of false positive cases at all time points of initial screening. Initial screens were more accurate for predicting treatment outcomes when using ultrasound only if done after 28 days [≤ 28 days (88.1%) vs. 29 - 56 days (98.5%), OR = 7.16, $p < 0.001$] or ultrasound with clinical decision [≤ 28 days (86.4%) vs. 29 - 56 days (95.7%), OR = 3.00, $p < 0.001$]. In contrast, screening after 56 days failed to marginally improve accuracy compared to screens done between 29 - 56 days, regardless of the screening protocol employed. Two important trade-offs emerged. First, when choosing timing of initial screening, optimal accuracy and harness treatment schedule should both be considered. Second, when considering whether to use a more conservative risk profile to supplement ultrasound findings, treatment accuracy and the ability to efficiently detect cases requiring harness treatment should both be considered. We provide evidence for performing an initial DDH ultrasound screen between 4 and 8 weeks (29 - 56 days), while employing clinical decision to aid in determining cases that require further follow-up evaluation.