PED-S01

Ultrasound Guidance for Diagnosis, Treatment Direction, and Interventional Procedure in Pediatric Intra-abdominal Diseases

Hsun-Chin Chao, MD,
Division of Gastroenterology, Department of Pediatrics, Chang Gung Children's Medical Center, Chang Gung Memorial Hospital

Acute gastrointestinal (GI) diseases are common clinical problems among pediatric patients, there can be associated with a wide variety of surgical and non-surgical conditions. Abdominal ultrasound (US) provides valuable clinical information about the peritoneal cavity, great vessels, abdominal viscera, and lymph nodes, which is obtained in a noninvasive fashion and usually does not necessitate sedation or anesthesia.. Ultrasound allows to obtain real-time images to correlate with the patient's presenting signs and symptoms, it can be used by various specialties and may be broadly divided into diagnostic and procedural applications. Non-surgical procedure of abdominal intervention help to relieve the potentially life-threatening conditions, it may reduce the need of surgical intervention or emergency operation.

US help to evaluate hepatobiliary and intrahepatic vascular lesions such as hepatic failure, liver abscess,, hemorrhage, tumors, extravasation, Budd-Chiari syndrome, vascular thrombosis, portal vein obstruction, portal hypertension, and biliary tract diseases, GI diseases such as necrotizing enterocolitis, GI atresia, malrotation/volvulus, meconium peritonitis, meconium plug or ileus, intestinal atresia, inguinal hernia, intussusception, appendicitis, pancreatitis, abdominal mass, nephritis, renal abscess, hydronephrosis, GU tract diseases such as ovarian torsion, pelvic inflammatory disease, and pregnancy. US aid in the assessment of intestinal ileus, intestinal ischemia, organ tortion and vascular complication likes aortic dissection.

Common US techniques for guiding abdominal intervention include color Doppler US, reduction therapy for intussusceptions, gastric or bowel decompression, abdominal tapping/drainage, liver biopsy, endoscopic approach, contrast- enhanced US. US is a cost-effective, quick, painless, and non-invasive investigation with no radiation hazards or parental contrast reaction. However, it is not always available and the accuracy of diagnosis is dependent on an experienced sonographer. The main disadvantage of abdominal US is the inability of the sound waves to penetrate bone and gas, and has less role in patients with pneumoperitoneum while plain abdomen can detect free-air in patients with bowel perforation.

PED-S02

Ultrasound Guided Intussusception Reduction

Ting-Ywan Chou
Department of Medical Image, Cardinal Tien Hospital, Taipei, Taiwan

Intussusception is one of the most common pediatric abdominal emergencies. Sudent onset of intermittent abdominal pain, vomiting, current jelly stool and right upper abdominal mass are the main clinical findings. Hydrostatic reduction is the first choice of treating method by barium, air or warm normal saline. Operation is the one option after failure of the above methods for reduction. Barium and air reductions are performed in the fluoroscopic room by X-ray guided and the children will be exposed with increased radiation dose. Ultrasound guided reduction is the better method for the children by without radiation hazard.

Presence of target sign, crescent sign, absent liver edge sign and intestinal obstruction are the criteria for diagnosis of intussusception with abdominal radiography. However, KUB is obtained without those signs cannot be ruled out the possibility of intussusception.

Ultrasonography is now widely highly sensitive and specific to diagnose intussusception in children with target sign in transverse section and pseudokidney sign in longitudinal section. US also is the best guiding modality for reduction. The criteria for successful reduction is disappearance of the signs

of the intussusception and passage of fluid through the ileocecal valve and the intussusceptum.

The contraindication for reduction and recurrence will be discussed. Children have lymphoma, Meckel's diverticulum, polyps, duplication cysts and other leading point should be differentiated and will be operated on.

PED-S03

CDUS Evaluation and Management of Portal Vein Complications in LDLT

Tung-Liang Huang MD
The Diagnostic Department of Kaohsiung Chang Gung Memorial Hospital

The Major Portal Complications Detected by Intraoperative CDUS: PV Thrombosis (PVT), PV Insufficiency and Hyperperfusion

If no Doppler flow signals noted by intra-operative CDUS after PV reconstruction, PV thrombosis is highly suspected. Immediate thrombectomy is golden standard of treatment for PV thrombosis. Inadequate low PV inflow (mean velocity<12cm/sec) as PV insufficiency is usually detected in pediatric recipient due to persisted large portosystemic collaterals such as coronary vein, splenorenal shunt, gastrorenal shunt, sometime due to HV outflow obstruction or low cardiac output. The increase of PV inflow can be achieved by ligation of portosystemic collaterals, relief of HV outflow obstruction or re-do of PV anastomosis. On the contranary, PV hyperperfusion may occur with extremely high portal vein flow volume (PVFV) above 250 ml/min/100g in adult LDLT recipients. These cases will develop post-transplant hepatic dysfunction such as small-for-size syndrome (SFSS), it is often among the relative small-for-size graft (SFSG) (GRWR<0.8). To overcome this problem, several therapeutic options were also reported, such as surgical modulation of splenic arterial ligation or splenectomy for releasing the portal hyperperfusion and liver tissue congestion.

The Postoperative Portal Complications Detected with CDUS: PV Thrombosis (PVT) and PV Stenosis (PVS)

After postoperative days, PVT also may occur with slow or absent portal flow or direct visualization of thrombus by CDUS. Surgical thrombectomy or/and re-do of anastomosis or/and infusion of thrombolytic agent are used for the management. Postoperative PVS may develop with hepatic dysfunction, ascites or no clinical signs. CDUS shows peak high velocity detected in the narrowed anastomosis. Further management with percutaneous transhepatic portal angioplasty of balloon dilatation or intravascular stenting is suggested

PED-S04

Hypertrophic Pyloric Stenosis: Tips and Tricks for Ultrasound Diagnosis and Assistance for Surgery

Ching-Feng Huang
Department of Pediatrics, Taipei Veterans General Hospital, Taipei, Taiwan

Hypertrophic pyloric stenosis (HPS) is the most common surgical condition in young infants. It is characterised by thickening of the muscular layer and failure in relaxation of the pyloric canal which result gastric outlet obstruction. Elongation of the canal and thickened mucosa are also detected. Ultrasound is the preferred diagnostic choice as it is a non-invasive and non-radioactive technique, allowing direct evaluation of the pyloric canal morphology and motility. The major diagnostic criterion is a measurement of more than 3-4 mm in thickness of the muscular layer. Pathological elongation of the pyloric canal is characterised as longer than 15-19 mm in length. However, these criteria do not consider the variation in patient's weight and age. Pyloric ratio calculated from muscle thickness divided by pyloric diameter has been reported without correlation with infant's age and body weight. In addition, dynamic advantage of the ultrasound and visualization of materials passing through the pyloric channel usually influence

diagnosis. Portal venous gas and gastric wall pneumatosis are also been reported in HPS infants with distent stomach and prolong vomiting. Color Doppler flow imaging combined with color Doppler artifacts technique have been proved to be effective to observe the distribution and blood flow grade in each layer of pyloric canal in HPS patients. This method provides the evidence for judging the severity of pyloric stenosis, and gives the basis of surgical therapy.

HPS will be diagnosed under careful history taking and physical examination, often combination with imaging studies. Many sonographic techniques enhance the accuracy of diagnosis and provide evidences to arrange surgical intervention.

PED-S05

Clinical Utility of Transient Elastography in Cholestatic Infants and Children

Jia-Feng Wu, MD, MMSc, Ph.D.
Department of Pediatrics, National Taiwan University Hospital, Taipei, Taiwan

Cholestasis is the leading cause of pediatric liver transplantation in the world. Biliary atresia (BA) is a neonatal, inflammatory, progressive fibro-sclerosing cholangiopathy of infancy, resulting in obstruction of the biliary tract. To date, BA remains the major cause of chronic liver insufficiency, portal hypertension, and liver transplantation in children. The Kasai operation was first used for BA in 1959, and its results in treating this disease have been encouraging enough that it has become the first-line treatment of BA patients. Although ongoing cholestasis, which further aggravates liver cirrhosis and portal hypertension, exists in the majority of children with BA, a timely and successful Kasai operation may still delay or even decrease the need for liver transplantation. It is generally accepted that the Kasai operation is more successful in children with BA when performed before 60 days of age. However, early identification and timely Kasai operation in children with BA remain challenging.

In Taiwan, we have adopted the "stool color card" concept of Professor Akira Matsui. In 2002–2003, we conducted a pilot regional infant stool color card study to increase the efficiency of early detection of BA. A universal screening system for BA using the infant stool color card was launched by integrating the card into the child health booklet given to each neonate in Taiwan since 2004. The universal screening for BA using infant stool color cards leads to earlier detection of BA, more timely Kasai operations, and improved long-term prognoses of children with BA in Taiwan. Future efforts to enhance the early, timely, and proper use of infant stool color cards are still needed in Taiwan. Other than infant stool color card, the BA screening program with urine sulfated bile acid (USBA) and serum direct bilirubin after birth were also performed in Japan and USA.

After the screening program, the clinicians encounter more and more cholestatic infants than before. Timely identification of BA among large cholestatic infant pool become a new challenge in the universal BA screening era. The diagnostic accuracy of abdominal ultrasound, MRCP, and HIDA scan are not good enough to date. Our serial study demonstrated the beneficial role of transient elastography assessment of LSM in the non-invasive differentiation between BA and non-BA cholestatic infants and served as a biomarkers of cholestatic complications in infants and children.

Prompt and early detection of neonatal cholestasis is essential for early workup for the etiology of disease nature. We need the combination various kinds of modalities to assist a correct and prompt diagnosis of BA to ensure early operation.

PED-P01

Nine Interesting Pediatric Ultrasound Imaging.

Yamei Chang
MFM dianthus medical Group

Background: As part of the newborn health screening, which was launched 9 years ago, the

database had collected a large number of interesting cases. In this paper, 9 case's ultrasound findings those with longitudinally followed up are selected to presentation.

These 9 cases are listed as following

1) Congenital Langerhans cell histiocytosis with skin and thymic lesions
2) Giant baby with hyperbilirubinemia due to liver hemorrhage
3) The adrenal morphology of salt-wasting type congenital adrenal hypertrophy,
4) Congenital dacryocystocele
5) Sacral dimple: Dorsal dermal sinus, intraspinal lipoma and cord tethered (ultrasound and MRI image)
6) Retroperitoneal neuroblastoma (INSS stage III) in a newborn (ultrasound and MRI image)
7) A 2-month old female presenting with ovarian hernia
8) Cor triatriatum missing in 1st NB screen echocardiography
9) Dilated cardiomyopathy in 4-month-old infant, who has a normal echocardiography at newborn stage

PED-P02

More than Consolidation- physiological Evaluation of Ventilation in Lobar Pneumonia in Children with Chest Sonography

Kai-Sheng Hsieh[1], Chia-Wan Tang[2], Ken-Peng Weng[3]

[1]Department of Pediatrics, Shuangho Hospital Taipei Medical University, New Taipei City, Taiwan; [2]Department of Pediatrics, An-Tai Medical Care Cooperation Antai Tien Shen Memorial Hospital, Pingtung, Taiwan; [3]Department of Pediatrics, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan

Background: Lobar pneumonia with or without empyema is a serious infectious disease and causes severe mortality and morbidity in children. Conventionally, radiological imaging evaluation is the test of choice for diagnosing pneumonia and follow-up. Our objective was to determine the clinical and application of chest sonography pediatric patients with particular emphasis on real-time dynamic images to evaluate the ventilation pattern resulting from lobar pneumonia with or without empyema.

Method: The study was conducted comparing chest sonography in 35 children from birth to 18 years of age suspected of having lobar pneumonia in a tertiary teaching hospital. All ultrasound examinations were conducted using a 3-8 MHZ probe. Chest sonography was interpreted independently of the radiographic findings. We included 35 patients who had the final diagnosis of lobar pneumonia with or without empyema. All these patients had conventional clinical examination plus chest radiography and chest sonography.

Results: A total of 35 patients were included. Within a range of 4 months old to 18-year-old and a mean and standard deviation of 5.3 ± 3.1 years old. Respectively; 3 on the right upper, 7 on the right middle, 10 on right lower, 4 on the left upper, and 11 on the left lower lobe. Sonographic signs that indicate lobar pneumonia were consolidation with or without empyema ventilatory pattern and diaphragm motion in the individual lung lobes. All cases with lobar pneumonia and consolidation showed an absence of ventilation in the affected lobe.

Conclusion: Chest ultrasonography is a useful, safe, and accurate diagnostic tool for evaluating children with lobar pneumonia and could delineate expansion of lungs in the affected lobes. Our experience showed lobar pneumonia with consolidation results in non-ventilation of the affected lobes. It opens a new window for the physiological understanding of the consolidation and assessment of lobar ventilatory function in children with lobar pneumonia.

PED-P03

A New Look Pleural Effusion by Chest Sonography

Kai-Sheng Hsieh[1], Chia-Wan Tang[2], Ken-Peng

Weng[3]
[1]*Department of Pediatrics, Shuangho Hospital Taipei Medical University, New Taipei City, Taiwan;*
[2]*Department of Pediatrics, An-Tai Medical Care Cooperation Antai Tien Shen Memorial Hospital;*
[3]*Department of Pediatrics, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan*

Background: Pleural effusion is a common problem after heart or lung disease in pediatric patients. It may cause significant morbidity in children after cardiac and pulmonary diseases and increase stay in intensive and hospital stay. Conventionally, radiological imaging and radiography are the examination of choice for diagnose and follow-up of pleural effusion. Our objective was to determine the clinical application of chest sonography in pediatric patients with particular emphasis on new sonographic characteristics and patterns of pleural effusion resulting from heart failure and pneumonia.

Method: The study was conducted comparing chest sonography in 31 children from birth to 18 years of age suspected of having pleural effusion. All ultrasound examinations were conducted using a 3-8 MHZ probe. Lung ultrasonography was performed by 2 authors. Lung sonography was interpreted independently of the radiographic findings. We included 30 patients who had the final diagnosis of pleural effusion. All these patients had conventional clinical examination plus chest radiography and Lung sonography.

Results: A total of 30 patients were included. Within a range of 11 months old to 18-year-old with a mean and standard deviation of 8.5± 3.1 years old. Sonographic characteristics of the pleural effusions were included and classified as (according to their severity): 1- granule fibrin debris in the pleural effusion. 2- floating filamentous fibrin 3- septation within the effusive cavity 4- worm-like tissues and necrotic tissues in pleural effusion.

Conclusion: Chest sonography is a useful and safe diagnostic tool to evaluate children with heart failure and pneumonia with pleural effusion.