GI-S01

AFSUMB Guidelines for Contrast-enhanced Endoscopic Ultrasound

Ming Hui Lin[1,2]
[1]*Taiwan Contrast Enhanced Study Group T-CESG,*
[2]*Taiwan Adventist Hospital*

The Asian Federation of Societies for Ultrasound in Medicine and Biology aimed to provide information on techniques and indications for contrast-enhanced harmonic endoscopic ultrasound (CH-EUS), and to create statements including the level of recommendation. These statements are based on current scientific evidence reviewed by a Consensus Panel of 15 internationally renowned experts. The reliability of clinical questions was measured by agreement rates after voting. Six statements were made on techniques, including suitable contrast agents for CH-EUS, differences between contrast agents, setting of mechanical index, dual imaging and duration and phases for observation. Thirteen statements were made on indications, including pancreatic solid masses, pancreatic cancer staging, pancreatic cystic lesions and mural nodules, detection of subtle pancreatic lesions, gallbladder sludge and polyps, hepatic lesions, lymph nodes, subepithelial lesions, visceral vascular diseases, guidance of fine needle aspiration and evaluation for local therapy. These international expert consensus guidelines will assist endosonographers in conducting CH-EUS according to evidence-based information.

GI-S02

Chronicle of Interventional EUS in Taiwan

Hsiu-Po Wang
National Taiwan University Hospital

EUS first available	TSH	1983
Video EUS & miniprobe	NTUH	1995
IDUS	NTUH/TMH	1995
EUS-FNA (Olympus) Mirror	TNH/CGMH	1999
EUS-FNA (Pentax)	NCKUH/NTUH	2001
EUS-pseudocyst drainage	NTUH	2007
EUS-FNA (Olympus,C-2000)	NTUH (on-site cytology)	2003
EUS-celiac nerve block	NTHH	2007
EUS-biliary drainage (Plastic stent)	NTUH	2007
EUS Elastography	NTUH, Yunlin Branch	2008
Electronic EUS (Olympus)	NTUH	2009
EUS-RV-pancreatic stenting	NTUH	2011
EUS-ethanol injection	NTUH	2012
3D EUS	NTUH	2013
Contrast EUS (Levovist)	SCMH	2017
Luminal apposing metallic stent (LAMS) Proved at Taiwan		2018 Feb
EUS-LAMS	NTUH	2018 June
Contrast EUS (Sonazoid)	NTUH	2018
EUS-RFA	NTUH	2019
EUS-GBD	NTUH	2020
EUS-choledochoduodenostomy (metallic stent)	NTUH	2020
EUS-hepatogastrostomy	NTUH	2020
EUS-gastrojejunostomy	NTUH	2020

台灣第一台超音波內視鏡設備是由三軍總醫院 1984 購入

台灣第一位赴海外進修 EUS-FNA 的是台北慈濟的陳建華主任, 1999 至美國 University California Irvine Medical Center 的 Chao family comprehensive cancer Center, 受教於 Prof. Kenneth J. Chang

GI-S03

Update of EUS-guided Tissue Acquisition

Kuan-Chih Chen
Division of Gastroenterology and Hepatology, Department of Internal Medicine, Far Eastern Memorial Hospital, New Taipei City, Taiwan

Endoscopic ultrasound-guided tissue acquisition (EUS-TA) is a well-developed method for histological diagnosis of solid pancreatic neoplasm, and nowadays it was further applied to

other gastrointestinal and nongastrointestinal tumors. The fundamental goal for EUS-TA is to obtain an adequate sample for precise diagnosis. There are several aspects that have impact over it including: (1) technique regarding use of suction and stylet, fanning and capillary technique, number of passes; (2) needle type (EUS-FNA vs FNB, needle gauge); (3) endosonographer training; (4) cytopathologist and cytotechnologist training; and (5) center volume and its availability of rapid on-site cytopathology evaluation.

In addition to getting adequate tissue, the methods of specimen handling and processing are important as well. Moreover, personalized medicine of cancer can be offered by using genomic analyses through next-generation sequencing. Finally, multidisciplinary cooperation, including the endosonographer, the pathologist, and the pathology laboratory, is essential to provide more precise diagnosis of the targeted lesions obtained by EUS-TA.

GI-S04

Update of EUS Intervention of Pancreatic Pseudocyst WON

Szu-Chia Liao
Division of Gastroenterology, Department of Internal Medicine, Taichung Veterans General Hospital, Taiwan

The revised Atlanta classification includes new definitions that more accurately describe the various types of collections encountered: APFC, pseudocyst(PC), ANC, and WON. The important distinctions for classifying collections correctly are the time course (< 4 weeks or > 4 weeks from onset of pain) and the presence or absence of necrosis at imaging. 1,2 10%–20% of acute pancreatitis can be associated with necrosis of the pancreatic gland, peri-pancreatic tissue, or both. This subset of patients may face a complex, prolonged clinical course, with associated mortality of up to 20%–30% if infection develops in the necrotic collection. Over the past decade, there has been progress and improvement in understanding disease presentation and natural history. The management of PC or WON has evolved over time. Traditionally, the drainage of PFCs was accomplished by surgical or percutaneous methods. However, endoscopic drainage is now generally preferred over non-endoscopic drainage procedures. With the availability of EUS, the safety and efficacy of PFC drainage has improved further.3-8 A minimally invasive approach focusing on percutaneous drainage and/or endoscopic drainage or debridement is now favored. Endoscopic necrosectomy was introduced as a treatment option and is now preferred over surgical necrosectomy when the expertise is available. Successful management of these patients requires expert multidisciplinary care by gastroenterologists, surgeons, interventional radiologists, and specialists in critical care medicine, infectious disease, and nutrition.9

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GI-S05

Update of EUS Intervention of Pancreatic Duct Drainage

Ming-Lun Han
Division of Endoscopy,Department of Integrated Diagnostics & Therapeutics, National Taiwan University Hospital

Endoscopic ultrasound (EUS)-guided PD (EUS-PD) is now increasingly used as an alternative technique for drainage in symptomatic pancreatic duct obstruction or leakage, which includes EUS-guided rendezvous (EUS-RV) and EUS-guided transmural drainage (EUS-TMD). In cases with normal anatomy, EUS-RV should be the first approach, whereas EUS-TMD can be selected in cases with SAA or duodenal obstruction. In one literature review, technical success and adverse event rates were 78.7% and 21.8%, respectively. The technical success rate of EUS-RV appeared lower than EUS-TMD due to the difficulty in guidewire passage. Short-term adverse events included abdominal pain, acute pancreatitis, bleeding, and issues associated with pancreatic juice leakage such as perigastric or peripancreatic fluid collection. Development of dedicated devices and standardization of EUS-PD procedure are necessary in future.

GI-S06

Update of EUS Intervention for Biliary/Gallbladder Drainage

Jung-Chun Li
Tri-Service General Hospital, National Defense Medical Center

Endoscopic transpapillary biliary drainage is the most essential therapy for cholangitis and/or obstructive jaundice. Percutaneous transhepatic biliary drainage (PTCD) is traditionally performed as a useful alternative drainage procedure when endoscopic retrograde cholangiopancreatography (ERCP) is failed. However, PTCD may involve a permanent external drain, leading to compromise the quality of life. Recently, endoscopic ultrasound-guided biliary drainage (EUS-BD) has been developed and reported as a novel useful alternative internal drainage technique. Moreover, the advantage of EUS-BD over PTBD include the lack of ascites in the interventional field when present in the peritoneum.

Percutaneous transhepatic gallbladder drainage (PTGBD) is often performed for gallbladder decompression, but percutaneous drainage catheter requires routine maintenance and catheter exchange and is limited by inadvertent dislodgement and patient discomfort. EUS-guided transmural drainage as an alternative to PTGBD has been developed to allow internal drainage without the disadvantages of percutaneous drainage. Therefore, EUS-guided gallbladder drainage (EUS-GBD) is is quickly becoming the preferred modality of treatment of acute cholecystitis and symptomatic cholelithiasis in patients who are poor operative candidates.

GI-S07

Update of EUS Intervention for Liver

Jiann-Hwa Chen, M.D.
Department of Gastroenterology and Hepatology, Taipei Tzu Chi Hospital

Lesions such as hepatocellular carcinoma (HCC) or other entities at the caudate lobe were located at the deep site of liver, which was not visualized well by transabdominal ultrasound, and there were intervening veins that would have made it not only difficult but also hazardous to attempt percutaneous ablative treatment due to the long trajectory. Endoscopic ultrasonography (EUS) has emerged as a highly sophisticated interventional modality. EUS guided therapy provide the best solution to treat the caudate lobe lesion, i.e., in close proximity to the stomach, which made it easily accessible by EUS. EUS have been developed for the interventional purpose in addition to the pancreatic disease. EUS-guided liver biopsy or ethanol injection, owing to its less invasiveness, appears to be a new innovative option for lesions that is difficult to treat by local percutaneous treatment.

GI-S08
Update of EUS Intervention for Luminal Anastomoses

Yu-Ting Kuo
Division of Endoscopy, Department of Integrated Diagnostics & Therapeutics
National Taiwan University Hospital, Taipei, Taiwan

Recently, there have been significant advancements in endoscopic ultrasound-guided gastroenterostomy (EUS-GE) is now a reality. The described procedures have been made possible with novel devices that can reduce the difficulties of the procedures and potentially reducing the risk of adverse events. EUS-GE composes of a number of different procedures for different indications. EUS-GE can be performed for benign or unresectable malignant gastric outlet obstruction, EUS-guided afferent limb obstruction can be performed for malignant afferent limb obstruction, and EUS-guided gastro-gastrostomy can be performed for performance of ERCP after Roux-en Y gastric bypass (EDGE).

EUS-GE for benign or malignant gastric outlet obstructions has been described in several studies. When compared with duodenal stenting, the procedure was shown to be associated with less symptom recurrence and reinterventions. When compared with laparoscopic gastrojejunostomy, the technical and clinical success were similar but adverse events were significantly more in the laparoscopic gastrojejunostomy group. For afferent limb obstruction, EUS-guided drainage has been showed to be associated with 100% technical success and needed fewer reinterventions than endoluminal stenting. In EDGE, the procedure was shown to be successful in allowing performance of ERCP through the stent via the excluded stomach. When compared with enteroscopy-guided ERCP, the technical success rate was significantly higher, and the total procedure time was significantly shorter. The post-procedure median length of hospitalization was also shorter. Therefore, EUS-guided anastomosis between two gastrointestinal organs is a promising approach and a safe and effective therapeutic option to resolve several mentioned clinical conditions.

GI-S09
Update of EUS- guided Tumor Ablation

Wei-Chih Su
Department of Gastroenterology and Hepatology, Taipei Tzu Chi Hospital

In the last decades, several applications based on endoscopic ultrasound (EUS) and EUS-guided-fine-needle aspiration (EUS-FNA) have been developed, making these approaches from diagnostic purpose to expand to the interventional field. Due to the advent of advanced technology of EUS machine system and needle advice, we can position the scope accurately to the target of

pancreas or lesions surrounding the gastrointestinal tract under real time guidance to perform tumors ablation. The EUS-guided ablation procedure has the advantage of minimal invasiveness via shorter routes and real-time monitoring to avoid damaging the nearby structures around the tumor, like major vessels, to achieve an ablation effect. Currently, guidelines suggested surveillance or limited surgery to handle small (<2cm in diameter) pancreatic neuroendocrine tumors (P-NET). Given that surgery causes significant short-term and long-term adverse events, EUS-guided tumor ablation is a potential candidate of alternative treatment choice for those small-sized P-NETs.

EUS-guided alcohol ablation to symptomatic pancreatic insulinoma was first reported in 2006, and EUS-guided radiofrequency ablation (RFA) was introduced into the ablation of P-NET in 2015. The effectiveness of functional P-NET symptom control after alcohol ablation and RFA are 93.9% and 96%. The complete tumor ablation rate of non-functional P-NET by alcohol ablation and RFA are 62.1% and 82.4%, respectively. However, clinical application of EUS-guided P-NET ablation is limited, and until 2020, reported cases are less than 200. The possibility of pancreas parenchyma/ductal system injury and followed pancreatitis may be the major concerns. Until now, the largest cohort case series of EUS-guided alcohol ablation, including 39 lesions of a total of 32 patients, reported two mild pancreatitis and one pancreatic duct injury. There are 10 reported complications in a total of 79 RFA cases till 2020, including mild abdominal pain, pancreatitis, pancreatic duct stricture, and extra-pancreatic necrosis.

In conclusion, EUS-guided tumor ablation to functional P-NET with low malignant potential seems to have high effectiveness for those patients who are unsuitable for surgery. However, we need more outcome data for non-functional P-NET and safety reports for this procedure.

GI-S10

Important Concepts of Microwave Application In Liver Tumors Ablation

Chiang Ming Feng
Division of Gastroenterology and Hepatolgy, Lotung Poh-Ai Hospital, Yilan

Although many new treatment methods are available in recent years, local ablation still plays the most important role of BCLC-0/A HCCs treatment and even of metastatic liver tumors. New generation Microwave ablation emerges recent years and provides more flexible treatment methods in malignant liver tumors. The well-known advantage of MWA is a faster/powerful modality comparing to RFA and easily overcomes vessel-induced heat-sink effect. Head-to-head MWA/RFA comparison and the meta-analysis show no significant difference in complete ablation rate but all the studies are based on the old generation MWA. However, special characters of new-generation MWA allow it to play a different role in tumor ablation now. First, it can provide a precise and predictable ablation area very easily, so that a good pre-treatment planning is more important than ablation procedure itself. Second, because of high temperature in the core of MWA area (up to 150C), surrounding tissue/structure damage might be irreversible if happen and we should be cautious about the complication issues. Third, different brands of MWA will output different ablation style/area and which brand we select according to the tumor condition. In conclusion, RFA/MWA will be available concurrently and what we have to do is to organize a patient/tumor-oriented treatment planning in the future.

GI-S11

Advances in Liver Tumor interventional Ultrasound - Multi-electrodes RFA

Chen-Chun Lin, MD
Division of Hepatology, Liver Research Unit, Department of Gastroenterology and Hepatology, LinKuo Chang Gung Memorial Hospital; Chang Gung University

Radiofrequency ablation (RFA) is recommended as a curative treatment for hepatocellular carcinoma (HCC) in the early stage by the guidelines. The best long-term 5-year overall survival rates could have more than 50% in the patients with good liver reserve. However, the outcomes of RFA are limited by 3-cm tumor size. The complete necrosis rates will decrease, and the local tumor progress rates will increase for treating the tumor size larger than 3 cm. Multiple-electrode RFA could obtain a larger coagulation size up to 5 cm in diameter by simultaneously inserting up to 3 electrodes into or beside the tumors. Two electrode types are used in the multi-electrodes RFA, multi-bipolar mode (MB-RFA) and multi-monopolar mode (MM-RFA). MB-RFA inserts the electrodes outside of tumors by no-touch method to ensure a safety margin to achieve a better local tumor control than single monopolar RFA for the BCLC stage A patients. MM-RFA inserts the electrode 0.5cm inside tumor border also can obtain an adequate safety margin for ablation. Both modes have reasonable complete response rates for the medium-sized (3-5 cm) and large-sized (5-7 cm) HCCs. MM-RFA can decrease the global RFA failure risk in treating medium-sized HCC by creating an adequate safety margin in all dimensions than single-electrode RFA (S-RFA), leading to better overall survival. MM-RFA can decrease the risk of progressing to BCLC stage C by reducing local tumor progression risk and preventing subsegmental recurrences. Multi-electrode RFA can well treat the patients in BCLC stage B1 and part of B2. Within the 4-7 criteria (up to 7cm maximum size and less than or equal to 4 in number), MM-RFA could perform a curative intent to obtain more than 90% complete effectiveness rate and more than 50% of 5-year overall survival for the patients without signs of clinical-relevant portal hypertension. Multi-electrode RFA can overcome the heat-sink effect from major intrahepatic vessels to sustain local tumor control and better overall survival for patients with perivascular HCCs. In conclusion, Multiple-electrodes RFA can maximize the boundary of limitation of RFA up to the earlier stage of BCLC stage B and for the perivascular HCCs.

GI-S12

Radiofrequency Ablation for Hepatocellular Carcinoma in High-Risk Location

Chia-Chi Wang
Division of Gastroenterology and Hepatology, Taipe Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation

Hepatocellular carcinoma (HCC) is the fifth leading cause of cancer death worldwide. Curative treatments for early-stage HCC include local ablation, hepatic resection, and liver transplant. Radiofrequency ablation (RFA) is a minimally invasive treatment and can be used in patients who have an increased risk of hepatic resection, including a liver reserve of Child-Pugh B status and suboptimal general condition. However, HCC in high-risk locations can interfere with the performance of RFA and increase the possibility of complications due to thermal injury to adjacent organs such as hemothorax, colon perforation, bile duct injury or cardiac tamponate etc. High risk locations include tumors abutting the diaphragm or near vital organs such as the gastrointestinal tract especially colon, gallbladder, heart, or lung. Artificial ascites or artificial pleural effusion can provide a better sonic view and protect adjacent vital organs from thermal injury, it can widen the indication of RFA in the treatment of HCC. This talk will introduce RFA management and post-treatment monitoring for HCC in high-risk locations. The experience in our hospital will also be shared using case presentation.

GI-S14

Cryo-ablation for Liver Cancer

Pin-Nan Cheng
Department of Internal medicine, National Cheng

Kung University Hospital

In contrast to radiofrequency ablation therapy, cryo-ablation destroys tissue by alternating freezing and thawing. Following technical upgrade of application of argon-helium and computer-controlled temperature control, the curative effect of cryo-ablation has been significantly improved, while complications have been substantially decreased. Cryo-ablation can ablate precisely predictable zone of necrosis that comprises central coagulation necrosis and damaged regions in the peripheral tissues. In order to produce a larger ablation zone, multiple cryo-probes can be placed simultaneously.

Currently, cryo-ablation could be applied for hepatocellular carcinoma. metastatic liver tumor, breast cancer, prostate cancer, lung cancer, and renal cell carcinoma. Many studies reported the efficacy of cryo-ablation for HCC and supported the clinical benefits. Argon-helium cryoablation for HCC is a minimally invasive modality. A large study reported the overall rate of major complications was 6.3%, including cryo-shock syndrome, liver rupture-related bleeding, stress-induced gastric erosive bleeding, liver abscess, and liver failure.

With the introduce of percutaneous approach, cryotherapy has been used a safe and effective ablation therapy for liver tumor. Defining the parameters to determine treatment candidates, comparing the safety and efficacy with other ablation therapies, and exploring the combining role with other treatment modalities are important in the future.

GI-S14

RFA to Liver Metastasis: 4 Critical Steps

Chih-Horng Wu, Po-Chin Liang
Department of Medical Imaging and Radiology, National Taiwan University Hospital and College of Medicain

Liver metastases occur in up to 60% of patients with colorectal cancer. RFA (radiofrequency ablation) could achieve the same overall and disease-free survival rate as surgical resection for patients with colorectal cancer liver metastases. Besides, RFA is a less invasive therapeutic choice for liver metastasis with smaller wounds, less blood loss, and shorter hospitalization. Four steps are crucial for the success of RFA, including

1. Pre-RFA delicate images for tumor number and location
2. Real time fusion image-guidance during RFA
3. Post-RFFA images to assess ablative margin
4. Regular image follow-up for the detection for tumor recurrence

In this talk, we will share our experience of RFA to liver metastasis in these four steps in detail.

GI-S15

Contrast-Enhanced Ultrasound and Ablation:TLCA & AFSUMB Guidelines

Shen-Yung Wang
Mackay Memorial Hospital

Hepatocellular carcinoma (HCC) is the fourth most frequent cause of cancer death worldwide, and the 2nd highest among all cancers in Taiwan. HCC remains a critical challenge despite of improved surveillance and advancement in hepatitis and HCC treatment. Local ablation such as radio-frequency ablation is one of the first-line treatment for early-stage HCC, and ultrasound (US) guidance is easy and cost-effective to perform ablation for HCC. However, HCC can beinconspicuous on grayscale US and difficult to be ablated via US guidance.

Contrast-enhanced US (CEUS) has an important role in diagnosis and managing HCC. US contrast agents (UCA) are gas-filling microbubblescapable of enhancing the sonographic signals of blood flow to provide dynamic imaging features of focal liver lesions. CEUS is superior to grayscale US in diagnosis of focal liver lesions. Sonazoid, a newer generation of UCA, can provide Kupffer phase imaging which can facilitate the diagnosis and ablation of HCC.

Recently, the Taiwan Liver Cancer Association

(TLCA)has updated the management consensus guideline for HCC to include the updated data regarding newer generation of UCA. In addition, Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB) has proposed a consensus statement for Sonazoid CEUS. Sonazoid CEUS is useful for HCC ablation and assessing the treatment response.

GI-P01

The Second Look of Sonography for the Detection of Gallbladder Polyp in Patients with Fatty Liver Disease

Shu-Hsien Lin[1], Kun-Ta Wu[2], Yi-Chun Chiu[1], Chih-Chi Wang[2], King- Wah Chiu[1]
[1]Division of Hepato-Gastroenterology, Department of Internal Medicine,Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan;
[2]Division of General Surgery, Department of Surgery, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan

Background: Multiple studies have provided varied results on the relationship between gallbladder polyps (GBPs), fatty liver disease (FLD), and metabolic factors. The purpose of this study was to determine the possible risk factors related to GBP formation in Taiwanese population through the use of health examinations.

Materials and methods: In this retrospective study, 1311 subjects who underwent abdominal sonography for health evaluations from September 2019 to August 2020 were randomly enrolled. Baseline characteristics of the study subjects were recorded. Risk factors related to GBP formation were analyzed. All participants' series of abdominal sonography examinations in our hospital were also retrospectively reviewed to reveal the presence of GBPs through second-look sonography.

Results: Among 1311 participants, 946 participants (72.2%) had clinically evident FLD, as documented using abdominal sonography; GBPs were found in 233 (24.6%) subjects with FLD. The incidence of FLD was significantly associated with the presence of GBP ($p < 0.001$; OR: 4.16, 95% CI: 10.67-35.55). However, the severity of FLD was not found to be associated with GBP ($p = 0.052$). In a multi-variate analysis, GBP formation was found to be significantly correlated with the incidence of FLD ($p < 0.0001$, OR = 4.262, 95% CI: 2.17-8.34), younger group ($p = 0.002$; OR: 0.973, CI: 0.95-0.99), and alcohol consumption ($p = 0.009$; OR: 3.368, CI: 1.34-8.42). Among 1049 subjects in the non-GBP group, 56 (5.34%) persons were found to have had a GBP at least once in the other series of abdominal sonographies ($p < 0.0001$).

Conclusions: FLD, younger group, and alcohol consumption are major risk factors of GBP formation in Taiwanese population. The presence of GBPs might be revealed in second-look examinations of abdominal sonographies.

Keywords: fatty liver disease, gallbladder polyp, health examination, metabolic syndrome; second-look abdominal sonography