GI-S05

Endoscopic Ultrasound Guided Therapy of Gastric Varices

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Endoscopic ultrasound (EUS)-guided treatment of gastric varices (GV) offers several possible advantages over current therapies, including detailed assessment of the vascular anatomy, efficacy and safety similar to that of current therapies, and the ability to evaluate treatment effect through Doppler ultrasound. EUS-guided coil therapy has recently emerged as a promising endoscopic modality for the treatment of GV, particularly compared to traditional direct endoscopic glue injection. The technical success rate of EUS-guided combination therapy for the treatment of GV was 98.66% and the overall variceal obliteration rate was 96.79%. The rate of hemorrhage from treated gastric varices was 4.92% and the percentage of patients developing abdominal pain was 9.79%. EUS-guided therapy is a promising treatment for GV.

GI-S06

MAFLD, Fibrosis and Cirrhosis

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Metabolic-dysfunction associated fatty liver disease/non-alcoholic fatty liver disease (MAFLD/NAFLD) is an increasingly cause of chronic liver disease in Taiwan. Several long-term follow-up studies revealed that NAFLD patients with fibrosis had significantly higher incidence rate of cirrhosis, hepatocellular carcinoma and liver-related mortality than patients without fibrosis. In a meta-analysis, the liver-related mortality rate ratios increased from 1.0 to 1.41, 9.57, 16.69, 42.30 according to the increases stage 0 to 4 of hepatic fibrosis. A recent meta-analysis on 237 studies in Asia revealed that the annual incidence of HCC was 1.8 cases per 1000 person-years in patients with NAFLD. In our recent study, the clinical patterns and survival outcomes of23 NAFLD-related and 156 HBV-related HCC patients were compared. NAFLD-related HCC patients were significantly older (P=0.012) and had higher BMI(P=0.044) than those with HBV-related HCC. In particular, 34.8% (8 of 23) and 71.2% (111 of 156) of patients with NAFLD- and HBV-related HCC were cirrhotic, respectively (P=0.001). Subsequently, a multicenter study was conducted to evaluate the correlation between histologic feature and clinical manifestations of NAFLD. NAS-CRN scoring system was evaluated in 572 patients with NAFLD. Obese NAFLD patients had significantly higher grade of steatosis and hepatocyte ballooning than overweight and lean NAFLD patients. The prevalence of nonalcoholic steatohepatitis (NASH) were 22.5%, 25.93% and 36.19% in lean, overweight and obese NAFLD patients, respectively. Obesity was significantly associated with fibrosis severity (P=0.03). In both lean and obese patients with NAFLD, the fibrosis stage tends to increase in patients with definite NASH. Patients with NASH had a higher proportion of significant fibrosis (F2-F4) than non-NASH patients..

In summary, most of the patients with NAFLD-related HCC were noncirrhotic. The prevalence of NASH among patients with NAFLD in Taiwan was 34.2%. The severity of fibrosis in NASH patients was significantly higher than that in non-NASH patients.

GI-S07

AI and FIBROSCAN in MAFLD

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After successful global hepatitis B vaccination programs and direct anti-hepatitis C viral regimens, metabolic associated fatty liver disease (MAFLD) is becoming the leading cause of diffuse liver disease.

The gold standard for diagnosing liver steatosis remains liver histology studies. Magnetic resonance imaging proton density fat fraction (MRI-PDFF) is also accepted as a non-invasive gold standard alternative. However, MRI is quite expensive. Many quantitative ultrasound models are developed and are widely accepted as the first line diagnostic modality for liver diseases. Among them, Fibroscan that measures fibrosis as well as steatosis at the same time is the most popular modality currently in use. Another steatosis quantification is using deep learning algorithms that convert subjective diagnosis of 2D ultrasound into objective diagnosis. The advantage of this approach is that 2D ultrasound is the first line screening of liver disease. Many patients have received ultrasound studies in long term periodic surveys for liver cancer. We can do retrospective quantitative studies easily by applying deep learning algorithms. We had done deep learning from 2D ultrasound images using ResNet18 as backbone. Trained and validated with a big data of ultrasound images (totaling 3,310 patients and 228,075 images) with different scanners, then validated (N=147) and tested (N=112) in histology-proven cases. Internal validation of this algorithm was applied in a series of patients with body weight changes (N=74). The steatosis score correlated with body weight change (R2=0.62; 0.50-0.72 95% CIs, $p<0.001$). In addition, the AUROC was better in DL algorithm score than control attenuation of Fibroscan (0.92-0.97 vs. 0.8-0.88, $p<0.001$). We believe that AI will greatly help in converting subjective to objective diagnosis of 2D ultrasound. This approach will make retrospective quantitation of steatosis study possible.

GI-S08

HCC in MAFLD, Image Diagnosis

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We can categorize parenchymal liver disease into fatty liver, steatohepatitis, liver fibrosis, cirrhosis, nutmeg liver, hemochromatosis, iron overload, glycogen storage disease, amyloidosis, etc. The golden standard for diagnosing parenchymal liver diseases is a liver biopsy with possible complications. In contrast, non-invasive imaging tools include ultrasound and magnetic resonance imaging. Our previous study showed proton-density fat fraction (PDFF) and magnetic resonance spectroscopy (MRS) highly correlated with histologic steatosis percentage and intra-hepatocellular triglyceride content. PDFF also has higher diagnostic performance than in-and opp-phases images (AUC: 0.9783; Sensitivity: 92.9%; Specificity: 95.7%). Furthermore, intravoxel incoherent motion (IVIM) and magnetic resonance elastography are also non-invasive tools to access liver fibrosis. IVIM MRI parameters (Dfast) decreased significantly as the fibrosis score increased ($r = -0.528$, AUC=0.783). Therefore, multiparametric MRI is an excellent assessment of hepatic steatosis and fibrosis.

Hepatocellular carcinoma (HCC) can be noninvasively diagnosed through dynamic computed tomography (CT) and magnetic resonance imaging (MRI). We compared the diagnostic performance of CT and gadoxetic acid–enhanced MRI (EOB-MRI) in categorizing tumors by using the 2018 version of the Liver Imaging Reporting And Data System (LI-RADS v2018) and assessing liver tumors before resection. In patients with fatty liver, EOB-MRI had higher sensitivity than did CT in diagnosing HCC. Patients with EOB-MRI-categorized LI-RADS 5 lesions had more favorable outcomes than did those with LI-RADS 4 lesions after liver resection.

GI-S09

RFA in HCC: Single or Multi-electrodes

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Radiofrequency ablation (RFA) has been accepted as the most effective local ablation for small hepatocellular carcinoma (HCC ≤ 3.0 cm) by several HCC guidelines because the technique is minimally invasive, fewer sessions and easily repeatable. The complete response rates for HCCs ≤ 3.0 cm in size exceeds 90%. However, in prior studies, the complete response rate was reduced to 45%–70% for medium-sized HCCs (3.1–5.0 cm), and it was only 23%–45% for large HCCs (> 5.0 cm) by single RF electrode. The strategy to maximize outcomes of RFA is to increase ablation size and target tumor precisely (ex., real-time fusion imaging, contrast-enhanced ultrasonography, artificial ascites…). The methods of local ablation to get adequate safety margin for large HCCs (> 5.0 cm) include overlapping method, combined with ethanol, combined with chemoembolization, multiple-electrode mono-polar RF or bipolar RF with switch-controller, RITA RF generator with expandable electrodes and new generation microwave ablation. An increase in the number of sequential overlapping ablations usually results in an irregular shape of coagulation. Incomplete ablation may occur with irregular ablated zones and it is a common reason for treatment failure. A deployed RF electrode can provide a 5- to 7-cm-diameter ablation zone with a single electrode placement, but the shape of the ablation zone is not circular, and the device's multiple tines have the potential to puncture adjacent vital structures. Recently, application of a switching RF controller with the simultaneous placement of multiple mono-polar or bipolar RF electrodes has been reported to create a larger ablation zone. A few but promising preliminary results have been reported RFA with two or three mono-polar electrodes and a switching RF generator achieved a high rate (>90%) of complete ablation for medium-sized to larger HCCs.

GI-S10

MWA in HCC

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In this topic, I will be….

1. Focusing on CT-guided ablation of HCC, trans-lung approach
2. Focusing on single applicator microwave ablation

RFA and microwave ablation for the liver malignancy, esp. the HCC, is a safe and minimal invasion procedures for possible curative therapy for the hepatic tumors. Lipiodol-CT guidance of ablation is an alternative method that is superior to ultrasound guidance in the aspects of larger tumors or critical areas that ultrasound may be indistinct or not well delineated. In this speech, by case-based pictorial essay, I will show the preliminary experience of the single applicator microwave ablation in the treatment of the difficult, large or multiple HCCs in recent years.

GI-S11

Proton-bean Therapy in HCC

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Hepatocellular carcinoma (HCC) is one of the most common cancers in the world. Most HCC patients have impaired liver function because of hepatitis or liver cirrhosis, and only approximately 20-40% of patients are candidates for resection. Maximal preservation of normal liver volume and function is an important consideration in the choice of treatment.

Proton beam therapy (PBT) for HCC treatment has been applied for decades, and many clinical

results have shown excellent 3-year to 5-year local control (LC) rate ranging from 85-95% and nearly no major complications.

From 2015 to 2023, more than 6000 patients were treated with PBT at Chang-Gung Memorial Hospital. More than a quarter of patients have liver cancers. The PBT was considered in the patients that were not suitable for surgery or radiofrequency (RFA) and discussed in the multidisciplinary conference. The PBT dose were 72.6CGE/22fx and 66CGE/10fx, depending on tumor location. The largest tumor diameter was more than 5 cm, and more than 30% of tumors are larger than 10 cm in diameter. More than 40% were major tumor vascular invasion. The in-field control rate was was more than 90%.

According to previous clinical results and our experiences, PBT can be a good alternative treatment for patients unsuitable for surgery.