Gastroenterology

**# 1142 Long-term prognosis of patients who underwent endoscopic resection for esophageal squamous cell carcinoma reaching or invading beyond the muscularis mucosae**

**Authors:** T MIWATA [1]; S OKA [1]; S TANAKA [1]; Y YOSHIFUKU [2]; K KAGEMOTO [2]; Y SANOMURA [2]; Y URABE [2]; HIYAMA TORU [3]; K CHAYAMA [2]

**Affiliations:** [1]Department of Endoscopy and [2]Department of Gastroenterology and Metabolism, Hiroshima University Hospital, Hiroshima, Japan, [3]Health Service Center, Hiroshima University, Higashihiroshima, Japan

**Background and Aims:** There are few reports on long-term prognosis of patients after endoscopic resection (ER) for esophageal squamous cell carcinoma (SCC). The aim of the study was to evaluate long-term prognosis of patients who underwent ER for esophageal SCC reaching or invading beyond the muscularis mucosae.

**Results:** Out of 387 patients with superficial esophageal SCC who underwent ER at the Hiroshima University Hospital between August 1992 and November 2011, 100 patients with disease stage pT1a-M3 or beyond at the time of surgery were enrolled in the study. The patients were followed up for at least 5 years with annual endoscopy and computed tomography examinations. We investigated en bloc resection rate, local recurrence rate, lymph node (LN)/distant metastasis rates, and long-term prognosis. We diagnosed invasion depth in accord with the Japanese classification of esophageal cancer.

**Conclusions:** The patients enrolled in this study were as follows: pT1a-M3, 52 patients; pT1b-SM1, 18 patients; and pT1b-SM2, 30 patients. The overall en bloc resection rate was 41% (41/100). In cases of endoscopic submucosal dissection (ESD) and endoscopic mucosal resection (EMR), the en bloc resection rates were 93% (14/15) and 32% (27/85), respectively. The local recurrence rate was 6% (6/100). All six patients with recurrent disease had undergone EMR for M3 (two patients), SM1 (three patients), and SM2 (one patient) stage disease. LN metastasis rate among cases of pT1a-MM, pT1b-SM1, and pT1b-SM2 stage disease was 9% (5/52), 22% (4/18), and 20% (6/30), respectively. Among the 14 patients who were negative for LN metastasis after surgical operation with LN dissection, two patients died of other diseases, and 12 patients are alive without recurrence. Distant metastasis rate among pT1a-M3 and pT1b-SM2 cases was 2% (1/52) and 3% (1/29), respectively. The 5-year overall survival rate/disease-specific survival rate among all patients was 76%/95%. Among pT1a-M3, pT1b-SM1, and pT1b-SM2 patients, the overall survival rate/cause-specific survival rate was 85%/100%, 68%/95%, and 66%/86%, respectively; no significant differences were observed among the three groups.

**Conclusion:** The 5-year disease-specific survival rate in esophageal SCC patients with pT1a-M3 stage disease or beyond after ER was favorable, at 95%. Metastatic recurrence has never occurred after the initial ER in patients without LN metastasis confirmed by additional surgical operation.

---

**# 1419 Corpus-predominant gastritis index can be a marker earlier than intestinal metaplasia to screen out the Helicobacter pylori-infected non-ulcer dyspepsia patients at risks of gastric cancer**

**Authors:** HC CHENG [1,2]; YC TSAI [1,4]; HB YANG [3,5]; WL CHANG [1,2]; CC LU [3]; BS SHEU [1,2]

**Affiliations:** [1]Institute of Clinical Medicine, [2]Department of Internal Medicine, [3]Pathology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan, [4]Department of Internal Medicine, Tainan Hospital, Ministry of Health and Welfare, Executive Yuan, Tainan, Taiwan, [5]Department of Pathology, Tain-Yen General Hospital, Hsinchu, Taiwan

**Background and Aims:** Corpus-predominant gastritis index (CGI) identifies gastric cancer risks in *Helicobacter pylori* (*H. pylori*)-infected gastric cancer relatives. The study further validated the prevalence rate of CGI in *H. pylori*-infected non-ulcer dyspepsia (NUD) and determined whether non-invasive serum biomarkers correlate to CGI.

**Methods:** This study enrolled 560 *H. pylori*-infected subjects, including 336 NUD and 224 duodenal ulcer controls. Patients received esophagogastroduodenoscopy to provide topographic gastric specimens for updated Sydney’s system to define the presence of CGI, SPEM, and operative link on gastric intestinal metaplasia assessment (OLGIM) stages. Serum pepsinogen I and II and trefoil factor 2 (TFF2) and TFF3 levels were assessed by enzyme-linked immunosorbent assay.

**Results:** The NUD patients had a higher prevalence rate of CGI (47.9% vs 29.5%, *P* < 0.001) and OLGIM stage II-IV (30.1% vs 19.2%, *P* = 0.004) than the controls. The prevalence rates of CGI in NUD had an age-increment manner and achieved an upward plateau to more than 50% for patients with ages ≥40 years (*P* < 0.001), which was 10 years earlier than that of OLGIM. The NUD patients with CGI had a higher risk of SPEM (OR 2.72, 95% CI 1.59–4.64, *P* < 0.001), lower serum pepsinogen I/II ratio (*P* < 0.001), but not higher TFF2 and 3 levels than those without CGI. The pepsinogen I/II ratio <9 can predict CGI in *H. pylori*-infected NUD (AUROC 0.68, 95% CI: 0.62–0.74).

**Conclusions:** *Helicobacter pylori*-infected NUD patients with age ≥40 years are prone to have CGI, which serves as a marker earlier than OLGIM to select risk groups for *H. pylori* eradication to prevent gastric cancer.

---

**# 1438 A clinical study of recurrence in stage 0 and IA pancreatic cancer (PC)**

**Authors:** K KANEMITSU [1]; K HANADA [1]; N HIRANO [1]; T MINAMI [1]; A OKAZAKI [1]; Y IZUMI [1]; J IKEMOTO [1]; S YONEHARA [2]

**Affiliations:** [1]Department of Gastroenterology, [2]Pathology, Onomichi General Hospital, Onomichi, Japan

**Background and Aim:** The recurrence of PC resected at early stage remains to be delineated. The appropriate follow-up method of postoperative patients is still not clear. We evaluated recurrent
cases that surgical operation underwent at early stage PC and the follow-up methods for resected PC cases at early stage. Methods: From January 2003 to July 2015, 32 cases were diagnosed with 16 stage 0 or 16 stage IA (UICC) pancreatic cancer (PC). Out of these 32 cases, 14 stage 0 and 14 stage IA cases were followed-up for at least 1 year after pancreatectomy prospectively. In these 28 cases, we performed blood tests every 3 months and enhanced CT every 6 months. We examined patients’ characteristics, histopathological findings, and reviewed recurrent cases. Results: The follow-up period ranged from 391 to 3542 (mean: 1614) days. The age of first operation ranged from 39 to 84 (mean: 67.1) years. There were 10 with PC cases in the head, 13 cases in the body, and 5 cases in the tail. No significant difference between recurrent and non-recurrent cases was found in patients’ characteristics, observation periods, and histopathologic factors. Totally, 7 out of 28 cases demonstrated cancer recurrences in the remnant pancreas (2 out of 14 cases in stage 0 and 5 out of 14 cases in stage IA). Two out of 14 cases in stage IA had metastasis to lymph nodes. There was no recurrent case with distant metastasis. Conclusions: In the early stage of PC, some cases could have recurrences in the remnant pancreas, although these patients were taken periodic follow-up examinations. At its most extreme, it can be potentially explained that cases with early stage PC might be given total pancreatectomy. Additionally, it is necessary to reconsider the appropriate follow-up method for resected PC cases at early stage.

# 1442 Helicobacter pylori infection related long noncoding RNA (lncRNA) downregulated autophagy, DNA damage repair deficiency via attenuating autophagy
Authors: XIAOYING ZHOU; GUOXIN ZHANG
Affiliation: First Affiliated Hospital of Nanjing Medical University

Long non-coding RNAs (lncRNAs) were shown to play critical roles in cancer biology. We investigated whether H. pylori infection could promote gastric cancer by regulating lncRNAs expression. Differentially expressed lncRNAs between H. pylori positive and negative tissues were identified by microarray and validated by qRT-PCR. Our results indicated that H. pylori positive tissues have a specific profile of lncRNAs. Cytological assays with siRNA-mediated knockdown or lentivirus vector-mediated over-expression were performed to probe the functional relevance of the lncRNAs. We identified an lncRNA, AF147447 (termed as Dreg), downregulated expression by H. pylori infection, which can inhibit GC proliferation and invasion in vitro and in vivo, act as a tumor suppressor in the development of H. pylori induced GC. LncRNA-Dreg could repress MUC2 expression by direct binding or increasing miR-34c expression. We also found that transcription factor E2F1 could be recruited to lncRNA-Dreg promoter by RNA immunoprecipitation and RNA pull down assays. These findings support a role of Dreg in tumor suppression. This discovery contributes to a better understanding of the importance of the deregulated lncRNAs by H. pylori infection and provides a rationale for the potential development of lncRNA-based targeted approaches for the treatment of H. pylori-related gastric cancer.
Keywords: gastric cancer, Helicobacter pylori infection, lncRNA, MUC2

# 1445 Helicobacter pylori infection induces DNA damage repair deficiency via attenuating autophagy
Authors: C XIE; LY XU; Z YANG; C HE; Y HUANG; JH WANG; C PENG; NH LU
Affiliation: Department of Gastroenterology, the First Affiliated Hospital of Nanchang University, Nanchang, Jiangxi, China

Background and Aim: Our previous study showed that H. pylori infection could induce DNA double strand breaks (DSBs) in gastric epithelial cells. Meanwhile, DNA damage response pathway plays an important role in maintaining genomic stability, which is related to autophagy. However, the role of H. pylori in DNA damage repair and autophagy is unclear. This study intends to explore the effect of H. pylori in DNA damage response pathways and autophagy. Methods: (1) A total of 302 gastric biopsies, including chronic gastritis, intestinal metaplasia, dysplasia, and gastric cancer. The DNA damage response (DDR) pathway and autophagy related protein were detected by immunohistochemistry. (2)GES-1 was cultured with H. pylori at different time points. DSBs, cell cycle, autophagy, and activation of DDR pathway were evaluated by immunofluorescence, flow cytometry, or western blot. (3)GES-1 was pretreated with inhibitor or agonist and transfected with wt-Rad51 or si-Rad51, then cultured with H. pylori and repeat the above test. Results: DDR pathway was activated, and autophagy deficiency was found in the process of gastric carcinogenesis. Helicobacter pylori infection could induce DSBs both in vivo and in vitro. Meanwhile, H. pylori persistent infection could reduce the level of autophagy and downregulate the expression of Rad51. Restoring the level of autophagy by agonist could upregulate the expression of Rad51, resulting in DSBs reduction. We studied DNA damage repair and autophagy in gastric epithelial cells infected by H. pylori for the first time, which may contribute to reveal new pathogenesis of H. pylori. The pathogenic mechanism should be explored in vivo in the future. Conclusion: Helicobacter pylori infection induced DNA damage repair deficiency by attenuating autophagy, which may contribute to genomic instability and carcinogenesis of gastric mucosa.
Keywords: autophagy, DNA damage repair, Helicobacter pylori

# 1496 The efficacy of on-demand proton pump inhibitor therapy in symptom control for patients with Barrett's esophagus: A pilot cohort study
Authors: SUNG-SHUO KAO [1,2,8]; FENG-WOEI TSAY [1]; KWOK-HUNG LAI [1,2]; JIN-SHIUNG CHENG [1,3]; DENG-CHIANG WU [4,6,8]; CHAO-HUNG KUO [5,6,8]; SENG-KEE CHUAH [7,8]; PING-I HSU [1,2,8]
Affiliations: [1] Division of Gastroenterology, Department of Internal Medicine, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, [2] National Yang-Ming University, Taipei, Taiwan, [3] Deputy superintendent, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, [4] Vice-Superintendent, Kaohsiung Municipal Hsiao-Kang Hospital, Kaohsiung, Taiwan, [5] Superintendent, Kaohsiung Municipal Chung-Ho Memorial Hospital, Kaohsiung, Taiwan, [6] Division of Gastroenterology, Department of Internal Medicine, Kaohsiung Medical University Chung-Ho Memorial Hospital, Kaohsiung, Taiwan, [7] Division of Gastroenterology and Hepatology, Department of Internal Medicine

Recent evidence shows that on-demand proton pump inhibitor therapy can improve symptom control in patients with Barrett’s esophagus. Aim: To evaluate the feasibility and effectiveness of on-demand proton pump inhibitor therapy in symptom control for patients with Barrett’s esophagus. Methods: Patients were randomized in a 1:1 ratio to receive either omeprazole 20 mg on-demand or placebo every 3 months. Results: Of 67 patients enrolled, 34 patients were randomized to the omeprazole group and 33 to the placebo group. The mean number of omeprazole tablets consumed was 12.5 ± 10 per patient. The mean duration of treatment was 12 months. The primary endpoint was symptom improvement. Conclusion: On-demand proton pump inhibitor therapy is feasible and effective in symptom control for patients with Barrett’s esophagus. Further randomized controlled trials are needed to confirm these findings.
Keywords: on-demand proton pump inhibitor therapy, Barrett’s esophagus, symptom control
Background and Aim: Proton pump inhibitor (PPI) therapy is the most potent drug for control of reflux symptoms in patients with Barrett’s esophagus. However, the efficacy of PPI therapy for symptom control of Barrett’s esophagus in Asian population and natural history of asymptomatic Barrett’s esophagus is unclear. The aim of this study is to assess the efficacy of PPI therapy for reflux symptom control in Asian patients with symptomatic Barrett’s esophagus and to investigate the incidence of symptom development in patients with asymptomatic Barrett’s esophagus.

Methods: In this prospective cohort study, consecutive patients with Barrett’s esophagus documented by endoscopy with biopsy were recruited. The eligible patients were initially treated by 8-week esomeprazole and then received on-demand therapy with esomeprazole 40mg daily for 40 weeks. The primary outcome measures were the complete symptom resolution rate in initial treatment phase and failure rate of on-demand therapy in on-demand phase. In patients with asymptomatic Barrett’s esophagus, the outcome measures were the incidence of symptom development. Results: Fifty patients with symptomatic Barrett’s esophagus and five patients with asymptomatic Barrett’s esophagus were recruited. Complete symptom resolution was achieved in 19 of 50 (38%) patients with symptomatic Barrett’s esophagus receiving 8-week esomeprazole therapy. Among the 19 patients with complete symptom resolution, the failure rate of on-demand therapy in the on-demand phase was 31.6% (6/19). All the patients (100%) with on-demand therapy failure were switched to maintenance therapy within 2 months of on-demand therapy. In the five patients with asymptomatic Barrett’s esophagus, the incidence of symptom development was 0%. Conclusions: Thirty eight percent of the patients with symptomatic Barrett’s esophagus achieve complete symptom resolution by 8-week of regular-dose esomeprazole therapy. In those patients with complete symptom resolution, one-third of patients have poor symptom control by on-demand therapy. In contrast, most of the patients with asymptomatic Barrett’s esophagus have no reflux symptom development after long-term follow-up.

# 1538 Comparison between Chicago II and Chicago III classification in diagnosing esophageal motility disorder

Authors: AHMED ALSAEGH; AML ONG; EILEEN NGAI; VIKNESWARAN NAMASIVAYAM; YU TIEN WANG

Affiliation: Department of Gastroenterology and Hepatology, Singapore General Hospital, Singapore

Background and Aim: The Chicago Classification for esophageal motility disorders was recently updated. The clinical implication of this revision is unknown. The purpose of this study was to assess the potential clinical impact of changes in High resolution manometry (HRM) diagnoses based on this new classification. Methods: High resolution manometry (HRM) results of all patients performed at Singapore General Hospital between January 2012 and December 2014 were reviewed using both Chicago II and Chicago III diagnostic criteria. The results were compared with patients’ symptom and clinical outcomes. Results: One hundred forty eight HRM were performed, and all were analyzed. The overall detection of esophageal dysfunction with Chicago III was 54% (80/148), and 62.1% (92/148) with Chicago II (Ps = 0.15). 31 (20.9%) patients had reclassified diagnoses. Compared with Chicago II, Chicago III detected three additional achalasia (18.2% vs 20.3%, Ps = 0.65), four fewer EGI outflow obstruction (19.6% vs 16.9%, Ps = 0.54), five fewer major motility disorder (8.8% vs 5.4%, Ps = 0.25), and six fewer minor motility disorder (23% vs 11.5%, Ps = 0.30). All of the three newly diagnosed achalasias were symptomatic and had previous esophageal dilation, and all four patients diagnosed with outflow obstructions by Chicago II that were reclassified as normal in Chicago III had no symptoms, endoscopic or radiological evidence of distal esophageal dysfunction. Conclusions: There is a good concordance between Chicago II and Chicago III criteria in diagnosing esophageal motility disorder. However, Chicago III may increase sensitivity to detect symptomatic achalasia while reducing “false positive” diagnosis of functional EGI obstruction in asymptomatic patients with no evidence of dysfunction.

# 1540 The influence of efflux pump on the antibiotic resistance of Helicobacter pylori to clarithromycin and moxifloxacin

Authors: SUN MIN LEE [1]; NAYOUNG KIM [1,2]; YONG HWAN KWON [1]; RYOUNG HEE NAM [1]; JI HYUNG SUH [1]; MIN HEE HAM [1]; SUJIN KIM [1]; JONG-CHAN LEE [1]; JONG YOUN PARK [1,3]; DONG HO LEE [1,2]

Affiliations: [1]Department of Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Gyeonggi-do, South Korea, [2]Department of Internal Medicine and Liver Research institute, Seoul National University College of Medicine, Seoul, South Korea, [3]School of Pharmacy, MCPHS University, Boston, USA

Background and Aim: Antibiotic resistance of Helicobacter pylori has been explained with point mutations. However, many evidences have suggested the possibilities of other mechanisms. Particularly, efflux pump (EP) system, which would be a cause of clarithromycin and moxifloxacin resistance, is known to be associated with multi-drug resistance. This study was performed to investigate the role of EP system on antibiotic resistance and to evaluate the possibility of clinical implication of efflux pump inhibitor (EPI). Methods: Helicobacter pylori strains were isolated from gastric mucosal biopsy specimens of 101 Koreans; 48 strains were moxifloxacin resistant, 34 were clarithromycin resistant, and 19 were resistant on both. Changes of the minimal inhibitory concentrations (MICs) were examined by agar dilution test, with or without EPI (phenylalanine-arginine betanaphthylamide, 10, 20, 40, 60, and 120 mg/L). Results: Among all moxifloxacin-resistant isolates, 55.2% (37/67) showed MIC reduction. Moxifloxacin MIC values were reduced by EPI treatment (P = 0.002). Based on gyrA mutation analyses, 55.6% (5/9) of non-mutants, 48.0% (12/25) of Asn87 mutants, 59.38% (19/32) of Asp91 mutants, and one Ala88 mutant showed MIC reductions. Next, clarithromycin MIC was reduced in 62.3% (33/53) of total clarithromycin-resistant isolates. Clarithromycin MIC values were significantly decreased with EPI treatment (P = 0.006). Additionally, 23S rRNA mutation analyses confirmed EPI effects on 80% (8/10) of non-A2143G mutants and 58.1% (25/43) of A2143G mutants (Figure). Conclusions: EP system was involved in the development
of fluoroquinolone and clarithromycin resistance, suggesting that EPI could be used to overcome multidrug resistance. In addition, the EPI effect was the biggest in non-mutants, which imply that EP system may explain the resistance in non-mutants.

**Keywords:** antibiotic resistance, efflux system, *Helicobacter pylori*

---

**# 1630 Cancer cell selective photodynamic therapy using glucose-conjugated and oligosaccharide-conjugated chlorins**

**Authors:** H KATAOKA [1]; N HAYASHI [1]; M TANAKA [1]; E KUBOTA [1]; S YANO [2]; T JOH [1]

**Affiliations:** [1]Departments of Gastroenterology and Metabolism, Nagoya City University Graduate School of Medical Sciences, Nagoya, Japan, [2]Graduate School of Materials Science, Nara Institute of Science and Technology, Nara, Japan

**Background and Aims:** Photodynamic therapy (PDT) involves the administration of a photosensitizer (PS) followed by illumination with visible light, leading to generation of reactive oxygen species. Cancer cells take up much glucose, a phenomenon known as Warburg’s effect. We synthesized a PS, glucose-conjugated chlorin (G-chlorin), which is selectively taken up by cancer cells (Mol. Cancer Ther. 2014). We investigated the ability of PDT with G-chlorin to induce antitumor immunity through induction of calreticulin (CRT) and high mobility group box 1 (HMGB1).

Additionally, we developed oligosaccharide-conjugated chlorin (O-chlorin) to overcome the hydrophobicity of G-chlorin and investigated its effects.

**Methods:** (1) Anticancer effects against gastric and colon cancer cells were examined using PDT with talaporfin, G-chlorin, and O-chlorin, both in vitro and in vivo. (2) Induced expression and intracellular localization of CRT and HMGB1 by PDT were investigated. (3) An allograft model was used to examine vaccination effects by subcutaneous injection of cancer cells pre-treated with PDT.

**Results:** (1) G-chlorin and O-chlorin PDT showed significantly higher anticancer effects than talaporfin, both in vitro and in vivo ($P < 0.01$). (2) Pretreatment with G-chlorin PDT increased CRT and HMGB1 expression, and they were translocated from the nucleus to the cytoplasm. (3) Vaccination effects were confirmed, and silencing of CRT and HMGB1 with si-RNA canceled these effects.

**Conclusions:** Direct induction of apoptosis and induction of antitumor immunity through CRT and HMGB1 may play crucial roles in antitumor effects shown by G-chlorin PDT. Water-soluble O-chlorin is a candidate next generation PS.

---

**# 1721 Risk factors influencing the outcome of peptic ulcer bleeding in chronic kidney disease after initial endoscopic hemostasis: Nationwide cohort study**

**Authors:** CHIH-MING LIANG [1]; SENG-KEE CHUAH [1,2]; CHIEN-NING HSU [3]; SHIH-CHENG YANG [1]; CHENG-KUN WU [1]; WEI-CHEN TAI [1,2]; CHIH-WEI SHEN [4]; MING-KUN Ku [5]; MING-JENG KUO [6]; JIUNN-WEI WANG [7]; WEI-CHIH SUN [8]; TSUNG-HSING HUNG [9]; PING-I HSU [8]; DENG-CHIANG WU [7]; ON BEHALF OF TAIWAN ACID-RELATED DISEASE (TARD) STUDY GROUP

**Affiliations:** [1]Division of Hepato-gastroenterology; Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital, Taiwan, [2]Chang Gung University, College of Medicine, Kaohsiung, Taiwan, [3]Department of Pharmacy, Kaohsiung Chang Gung Memorial Hospital, Taiwan, [4]Division of Hepato-gastroenterology; Department of Internal Medicine, Chia-Yi Chang Gung Memorial Hospital, Taiwan, [5]Division of Gastroenterology; Fu-Ying University Hospital, Pin-Tung, Taiwan, [6]Divisions of Gastroenterology, Taian Municipal Hospital, Tainan, Taiwan, [7]Division of Gastroenterology, Department of Internal Medicine, Kaohsiung Medical University Hospital and Kaohsiung Medical University, Kaohsiung, Taiwan, [8]Division of Gastroenterology, Department of Internal Medicine, Kaohsiung Veterans General Hospital, National Yang-Ming University, Kaohsiung, Taiwan, [9]Division of Hepato-gastroenterology; Department of Internal Medicine, Buddhist Tzu Chi General Hospital, Dalin Branch, Taiwan

**Background and Aim:** Patients suffering from peptic ulcer bleeding (PUB) who have chronic kidney disease (CKD) may result in more adverse outcomes. This study aimed to identify the risk factors that may influence the outcomes of chronic kidney disease patients with PUB after initial endoscopic hemostasis.

**Methods:** Data of 1997–2008 were extracted from the National Health Insurance Research Database in Taiwan. In this population-based cohort study, PUB ($n = 18646$) were screened. We recruited patients admitted because of PUB after endoscopic hemostasis ($n = 1267$). We divided the patients into non-CKD group ($n = 1083$) and CKD group ($n = 184$). We then analyzed the risks influencing the outcome of these patients.

**Results:** The Charlson scores were significantly different between two groups ($2.76 ± 2.53$ in CKD group vs $1.31 ± 1.62$ in non-CKD group, $P < 0.0001$). The rate of prior ulcer history and hospital infections was higher in CKD group than non-CKD group ($10.87%$ vs $4.16%$, $P < 0.0001$ and $26.63%$ vs $17.54%$, $P < 0.0001$, respectively). The rebleeding and needing to repeat endoscopic therapy in CKD group was higher than in non-CKD group ($11.96%$ vs $6.37%$, $P = 0.0067$) and also the death rate ($8.7%$ vs $2.49%$, $P < 0.0001$). The hospitalization cost and length of stay were higher in CKD group ($P < 0.0001$). The death
rate in CKD group was higher than in non-CKD group (22.02% vs 14.39%, $P=0.0011$). The risk factors of rebleeding during hospitalization were patients with congestive heart failure ($P=0.0368$) and with shock status ($P<0.0001$), while factors for death were NSAIDs drug use ($P=0.0464$) and patients with shock ($P=0.0092$) and endotracheal intubation ($P<0.0001$). Conclusions: CKD patients with peptic ulcer bleeding after endoscopic therapy encountered higher rebleeding rate, infection rate, and mortality rate. Congestive heart failure and shock status were the risk factors for rebleeding. Patients with shock status and endotracheal intubation, renal disease, and aspirin use were the risk factors for death.

**Table 1**

|                  | ORP ($n=156$) | IVP ($n=167$) | $P$-value |
|------------------|---------------|---------------|-----------|
| Rebleeding (%)   |               |               |           |
| Within 72 h      | 3.8           | 2.4           | 0.42      |
| Within 7 days    | 4.4           | 4.2           | 0.89      |
| Within 30 days   | 5.1           | 5.9           | 0.74      |
| Hospital stay    | 6.7           | 6.9           | 0.64      |
| Surgery or TAE (%) | 0             | 0             |           |
| Death within 30 days (%) | 0.6 | 1.1 | 0.60 |

# 1731 Oral versus intravenous proton pump inhibitors in preventing peptic ulcer rebleeding after endoscopic hemostasis

**Authors:** CHIEH-CHANG CHEN [1,2]; YU-JEN FANG [2]; JI-YUH LEE [2]; CHEN-SHUAN CHUNG [3]; CHU-KUANG CHOU [4]; YAO-CHUN HSU [5]; JHY-MING LIOU [1]; CHI-YANG CHANG [5]; CHI-YI CHEN [4]; HSII-PO WANG CHOU [4]; YAO-CHUN HSU [5]; JYH-MING LIOU [1]; JI-YUH LEE [2]; CHEN-SHUAN CHUNG [3]; CHU-KUANG CHIEH-CHANG CHEN [1,2]; YU-JEN FANG [2]; JI-YUH LEE [2]; CHEN-SHUAN CHUNG [3]; CHU-KUANG CHOU [4]; YAO-CHUN HSU [5]; JHY-MING LIOU [1]; CHI-YANG CHANG [5]; CHI-YI CHEN [4]; HSII-PO WANG CHOU [4]; YAO-CHUN HSU [5]; JYH-MING LIOU [1]; JI-YUH LEE [2]; CHEN-SHUAN CHUNG [3]; CHU-KUANG

**Background and Aim:** Some studies indicated that oral proton pump inhibitors (PPIs) can prevent peptic ulcer rebleeding after endoscopic hemostasis, but the efficacy of oral PPIs remains uncertain. This study is designed to compare the efficacy of high-dose oral PPI to intravenous PPI in preventing recurrent bleeding after endoscopic hemostasis. Methods: This is a multi-center randomized-controlled open-labeled trial. Patients with Forrest IA/IB or IIa bleeding ulcers were treated with dual or triple endoscopic hemostasis and were randomized to receive oral PPI treatment (ORP group), Takepron OD (lansoprazole) 60 mg stat, followed by 30 mg every 12 h for 72 h, or IV PPI treatment (IVP group), pantoprazole 80 mg bolus, followed by 3.375 mg/h for 72 h. All patients received oral lansoprazole 389.6 ± 22.7, or triple endoscopic hemostasis and were randomized to receive

**Results:** A total of 156 patients were randomized to the ORP group and 167 to the IVP group during July 2010 and December 2013. Recurrent bleeding in 30 days was reported in 5.1% of patients in the ORP group and 5.9% of patients in the IVP group ($P=0.73$). There was no difference in hospital stay, need for surgery, or interventional radiology and mortality rate between two groups. The results are illustrated in Table 1. Conclusion: High-dose oral PPIs treatment with takepron 30 mg OD is as effective as IV PPIs treatment in reducing the risk of recurrent bleeding after combined endoscopic hemostasis.

# 1787 Upregulations of gastric TRPV receptors and decreased serum concentration of BDNF in patients with functional dyspepsia (FD)

**Authors:** CYNTHIA KY CHEUNG; LIN LIN LAN; YAWEN CHAN; JUSTIN CY WU

**Affiliation:** Institute of Digestive Disease, The Chinese University of Hong Kong, Hong Kong

**Background and Aim:** The role of immune activation in FD patients without infection remains unclear. The aim of this study is to compare the gastric mucosal and serum expression of BDNF, TGF, and TRPV families between FD patients and healthy controls. Methods: Consecutive adult FD patients (Rome III) with no recent history of gastroenteritis and age-matched and sex-matched asymptomatic healthy controls were recruited. Subjects with GERD and IBS as predominant symptoms, diabetes mellitus, current, or previous $H. pylori$ infection, psychiatric illness, and recent use of NSAID or PPI were excluded. Serum and gastric biopsies were analyzed by immunohassay and RT-PCR. The gastric mucosal inflammation, mast cell, and eosinophil counts were evaluated. Results: Forty five (M:F = 8:37, mean age: 35.9 ± 9.1 years) FD patients were matched with 23 healthy controls (M:F = 8:15, mean age: 36.6 ± 10.2 years). FD patients had PDS as predominant subtype (PDS: 43, EPS: 2). There was no significant difference in the median inflammation score (FD: 0 (0–1), Control: 0 (0–1), $P=0.54$), mast cells (FD: 0.15 ± 0.07, Control: 0.01 ± 0.02, $P=0.27$) and eosinophils (FD: 0.09 ± 0.05, Control: 0.04 ± 0.04, $P=0.90$). However, FD patients had significantly higher mRNA expression of gastric TRPV1 (FD: 0.008 ± 0.002, Control: 0.003 ± 0.001, $P=0.03$), TRPV2 (FD: 0.006 ± 0.001, Control: 0.002 ± 0.001, $P=0.01$), Serum BDNF (FD: 240.7 ± 11.0, Control: 389.6 ± 22.7, $P<0.001$) were significantly lower in FD patients. Serum TGFβ1 and TGFβ2 were significantly correlated with symptoms of belching ($R=0.441, P=0.01$) and vomiting ($R=0.378, R=0.04$) in FD patients. Conclusion: Upregulations of gastric mucosal TRPV1, TRPV2, and TGFβ1 and downregulation of serum BDNF were observed in FD patients and associated with dyspeptic symptoms. Mucosal immune activation may contribute to the development of FD in those without history of infection, which is independent from mast cell or eosinophil activation.

# 1831 Paradigm shift for the treatment of refractory benign biliary stricture (BBS) with magnet compression anastomosis (MCA): Mid-term follow-up after recanalization of the completely obstructed strictures

**Authors:** SUNG ILL JANG [1]; KWANG-HUN LEE [2]; HONG JIN YOON [3]; HEE WOOK KIM [3]; DONG KI LEE [3]
Background and Aim: The usefulness and follow-up results of magnetic compression anastomosis (MCA) are evaluated in terms of the successful treatment of benign biliary strictures (BBS). Methods: MCA was performed in patients with BBS that was not resolved with conventional endoscopic or percutaneous treatments. The route of magnet delivery for MCA varies. After magnet approximation and recanalization, an internal drainage catheter was placed for 6 months and removed. Results: Thirty eight patients who developed postoperative or traumatic strictures underwent MCA, and recanalization was successfully achieved in 31 patients (Table 1). There was an acceptable procedure-related complication (mild cholangitis) in one patient and no procedure-related mortality. The average amount of time that elapsed from magnet approximation to removal was 61.6 days (range, 13–182 days), and the mean follow-up period after recanalization was 41.9 months (range, 7.1–73.4 months). Restenosis after MCA recurred in one patient and partial restenosis in one patient, but recanalizations were successful using a guidewire via percutaneous and endoscopic tract. Conclusion: Magnetic compression anastomosis (MCA) represents an alternative nonsurgical method of recanalization of BBS that cannot be treated with conventional methods. By creating a new fistula tract instead of dilating a previous stricture, rate of stricture recurrence after MCA was lower than with the conventional method.

Table 1 Outcomes of magnetic compression anastomosis

| Procedure                                | Patients No. (N = 38) |
|------------------------------------------|-----------------------|
| Magnet approximation                      | 89.5% (34/38)         |
| Recanalization                           | 91.2% (31/34)         |
| Catheter removal                         | 87.1% (27/31)         |
| Duration of each process in MCA          |                       |
| Days for recanalization                  | 61.6 (range: 13 – 182)|
| Duration of internal catheter (days)     | 156.3 (range: 48 – 381)|
| Follow-up after removing internal catheter (month) | 41.9 (range: 7.1 – 73.4) |
| Complications                            |                       |
| Early                                    |                       |
| Cholangitis                              | 1                     |
| Pancreatitis                             | 1                     |
| Mortality                                | 0                     |
| Late                                     |                       |
| Recurrence of anastomosis site stricture | 1                     |
| Partial re-stenosis                      | 1                     |

MCA, magnetic compression anastomosis
resistance were 60%, 17.6%, and 36.9%, respectively. The eradication rates of MS and LT were 84.3% (253/300) and 75.3% (226/300), respectively, in the ITT analysis (P = 0.006) and were 86.3% (253/293) and 78.8% (223/283), respectively, in the PP analysis (P = 0.021). The efficacy of MS and LT were both affected by levofloxacin resistance. The secondary resistance of levofloxacin was 66.7% and 73.9% after MS and LT, respectively. The efficacy of LT, but not MS, was affected by the CYP2C19 polymorphism. Conclusion: Modified sequential therapy containing levofloxacin was more effective than levofloxacin triple therapy and is recommended in the second-line treatment for H. pylori. ClinicalTrials.gov number: NCT01537055.

Keywords: clarithromycin, CYP2C19, prediction, rescue, resistance

Disclosures: All of the authors disclosed no conflicts. The funding source had no role in study design, data collection, analysis or interpretation, report writing, or the decision to submit this paper for publication.

ClinicalTrials.gov.ID:NCT01537055

# 1854 Refractory gastro-esophageal reflux disease in an Asian population: roles of advanced imaging and functional testing in diagnosis and management

Authors: LI WEIQUAN JAMES; FOCK KWONGMING; ANG TIINGLEONG; POH CHOHOEAN; LAW NGAI MOH; ANG DAPHNE

Affiliation: Changi General Hospital, Singapore

Background and Aim: Refractory gastro-esophageal reflux disease (GERD) is difficult to treat. This study aims to evaluate the roles of advanced imaging and functional testing in refractory GERD in a real-world setting. Methods: Prospective study of outpatients with refractory GERD in a tertiary center. Refractory GERD defined as persistent and troublesome GERD symptoms after more than 8 weeks of standard-dose proton pump inhibitor (PPI) therapy. All patients underwent esophagogastroduodenoscopy (OGD). High resolution manometry (HRM), pH, and impedance studies were also offered to investigate persistent symptoms. Results: Ninety-nine patients (men = 47; Chinese = 72; mean age 50±13.4 years) were recruited between February 2013 and October 2014. OGD showed esophagitis in 25/99 (25.3%; grade A = 19, grade B = 6). PPI was doubled in these patients if not already carried out or switched to a more potent agent. Esophagitis was found in 32 more patients (32.3%) using narrow band imaging (NBI). Dilated intrapapillary capillary loops (IPCL) were the commonest finding on NBI, followed by island of mucosa and microerosions, respectively. Large hiatus hernia (≥3 cm) detected in 14/99 (14.1%). One of 99 had Barrett’s esophagus. Eight of 99 underwent HRM; 71/99 had pH and impedance studies. Non-erosive reflux disease (NERD) was found in 12 patients (mean DeMeester score 19.5). Fifty four of 99 (54.5%) had non-GERD causes: one gastric cancer, one eosinophilic esophagitis, five achalasia, nine ineffective esophageal motility, one nutcracker esophagus, and 37 functional heartburn. Twenty two patients had hypersensitive esophagus. Patients with achalasia (four surgery and one dilatation) and nutcracker esophagus (catheter channel blocker) improved with therapy. Conclusion: Non-GERD causes and reflux sensitivity account for a significant proportion of refractory GERD patients. Functional testing allows accurate diagnosis and appropriate management despite similar presenting symptoms. NBI may identify more patients with insufficient acid suppression by detecting more GERD-related lesions.

# 1867 Cat dander sensitization: The link between irritable bowel syndrome and asthma

Authors: KEWIN TIEN HO SIAH [1, 2]; AMELIA SANTOSA [2, 3]; HUNG CHEW WONG [2]; REUBEN K WONG [1, 2]; BEATRICE NICKEL [4]; PAUL LORENZ BIGLIARDI [3, 5]

Affiliations: [1]Division of Gastroenterology & Hepatology, University Medicine Cluster, National University Health System, Singapore, [2] Yong Loo Lin School of Medicine, National University of Singapore, Singapore, [3] Division of Rheumatology, University Medicine Cluster, National University Health System, Singapore, [4] Swiss Tropical and Public Health Institute, Basel, Switzerland; University of Basel, Basel, Switzerland, [5] IMB (Institute of Medical Biology), ASTAR (Agency for Science, Technology and Research), Singapore, Singapore

Background and Aim: Large epidemiological studies have shown that asthma and IBS frequently co-exist. Our aim was to elucidate the role of aeroallergen and atopy in IBS through the review of (1) allergic conditions; (2) food and aeroallergen sensitization; and (3) possible occult parasitic infections. Methods: Symptomatic patients referred to the allergy clinic were invited to participate in the study. Consenting subjects completed questionnaires, skin prick tests (SPT), and venipuncture for immuno-solid-phase allergen chip (ISAC) testing for 112 components from 51 allergen sources, total serum IgE (Phadia® 100), and parasite IgG. Standard definitions were used for IBS, asthma, and allergic rhinitis. The local institutional review board approved the study. Results: Eighty-seven (48 F:39 M) subjects with clinically relevant atopic disease were recruited. Of the patients, 26.4% had asthma, 74.7% had allergic rhinitis, and 42.5% had atopic eczema. Three subjects were non-atopic. Thirty-six (41.4%) patients fulfilled ROME III IBS criteria (5 IBS-C, 11 IBS-D, 15 IBS-M, and 5 IBS-U). IBS was significantly associated with cat sensitization by two separate tests: positive SPT to cat dander and specific IgE cat protein Fel d 1 (OR [95% CI] = 5.86 [1.87–18.32]; P = 0.002 and 10.45 [1.20–90.82]; P = 0.033). The odds of having IBS were also significantly higher for asthmatic patients, pet owners, and positive SPT to dog allergens. Allergic rhinitis, eczema, and food allergy were not associated with IBS. One non-IBS subject (out of 60 performed) tested positive for Toxocara antigen. Multivariate analyses revealed that asthma and cat sensitization (SPT) were independently associated with IBS (OR [95% CI] = 9.4 [2.1–42.1], P = 0.003 and 7.7 [1.2–49.8], P = 0.032). Conclusion: There is a high cat dander sensitization in IBS patients, possibly explaining the high asthma prevalence in IBS subjects. It is important to explore the underlying pathophysiologic mechanisms and potential therapeutic options.

# 1872 Optimizing first-line Helicobacter pylori eradication therapy: Prolonging treatment or add-on therapy, which is better?

Authors: ALEX HWONG-RUEY LEOW [1]; AHMAD NAJIB AZMI [2]; MUN-FAI LOKE [3]; JAMUNA VADIVELU [3]; KHEAN LEE GOH [1]
Background and Aims: The treatment efficacy of *H. pylori* infection has decreased steadily because of increasing resistance to clarithromycin. Our aim of this study is to re-examine the efficacy and tolerability of several combination of first-line eradication therapy. Methods: Consecutive treatment naïve participants with a positive RUT during outpatient upper endoscopy were included. All participants were randomly assigned to groups given rabeprazole (pariet) 20 mg b.i.d., amoxicillin (ospamox) 1 g b.i.d., and clarithromycin (klacid) 500 mg b.i.d. for 7 days (Group A), 14 days (Group B), and bismuth subcitrate(De-Noltab) 240 mg b.i.d, rabeprazole (pariet) 20 mg b.i.d., amoxicillin (ospamox) 1 g b.i.d., and clarithromycin(klacid) 500 mg b.i.d for 7 days (Group C). Successful eradication was defined by negative C13-UBT at least 4 weeks after the completion of therapy. Results: As an interim analysis, a total of 304 patients were recruited. In the intention-to-treat analysis, *H. pylori* was eradicated in 75.5% of patients in group A, (77/102) (95% CI: 65.32–82.81), 87.6% (85/97) (95% CI: 79.61–92.78) in group B, and 85.7% (90/105) (95% CI: 77.76–91.15) in group C. Per protocol analysis showed that the infection was successfully eradicated in 79.4% of patients in group A (77/97) (95% CI: 70.29–86.24), 91.4% (85/93) (95% CI: 83.94–95.58) in group B, and 86.5% (90/104) (95% CI: 78.67–91.81) in group C. Comparison ITT analysis: P-values: Group B versus A—0.028; Group C versus A—0.063; Group C versus B—0.690. Comparison PP analysis: P-values: Group B vs A—0.019; Group C vs A—0.176; Group C vs B—0.280. There were no significant differences in adverse events or patient adherence. Clarithromycin resistance rate was 6.8%, whereas resistance to amoxicillin was zero. The results are illustrated in Table 1.

| Table 1 Results of various treatment regimens: intention-to-treat and per protocol analyses |
|---------------------------------|---------------------------------|---------------------------------|
| Group A 7-day clari therapy     | Group B 14-day clari therapy    | Group C 7-day bismuth quadruple |
| 77/102 (75.5%)                  | 85/97 (87.6%)                   | 90/105 (85.7%)                  |
| 95% CI 65.32–82.81              | 79.61–92.78                     | 77.76–91.15                     |
| PP analysis Eradication rate    |                                 |                                 |
| 77/97 (79.4%)                   | 85/93 (91.4%)                   | 90/104 (86.5%)                  |
| 95% CI 70.29–86.24              | 83.94–95.58                     | 78.67–91.81                     |

Conclusions: Fourteen-day clarithromycin-based triple therapy is significantly superior compared with both 7-day bismuth-based quadruple therapy and 7-day clarithromycin-based triple therapy. Although 7-day bismuth-based quadruple therapy seems to be more effective than standard therapy, the difference was not statistically significant. Low clarithromycin resistance rate and absence of resistance towards amoxicillin at our population is reassuring and thus substantiating the use of treatment strategies reported here.

Acknowledgement: This study was supported by UM-MoEHIR grant UM.C/625/1/HIR/MoE/CHAN/13/2(HIR Account No: H-50001-A000032).

References:
1 Xinsheng Teh, Yalda Khoosravi, WoonChing Lee, Alex Hwang, Ruey Leow, et al. Functional and molecular surveillance of Helicobacter pylori antibiotic resistance in Kuala Lumpur. PLoS One. 2014 Jul 8;9(7):e101481.
2 Goh KL, Navaratnam P. High Helicobacter pylori resistance to metronidazole but zero or low resistance to clarithromycin, levofloxacin, and other antibiotics in Malaysia. Helicobacter 2011; 16: 241–245.

# 1889 Indication-criteria discrepancies after endoscopic submucosal dissections for early gastric cancer: Is it negligible?

Authors: HW PARK; SW JEON

Affiliation: Department of Gastroenterology, Kyungpook National University School of Medicine, Daegu, Republic Of Korea

Background and Aims: Selecting proper candidates for endoscopic submucosal dissection (ESD) of early gastric cancer (EGC) is important in that it may lead to an additional gastrectomy after an ESD or possibly lead to an unnecessary surgery for patients who could instead be treated with an ESD. The aim of this study was to evaluate the criteria-indication discrepancy rates after endoscopic submucosal dissections (ESD) for EGC and to examine the factors that predict the discrepancies prior to ESD.

Methods: A total of 611 lesions that were diagnosed with EGC, based on forceps biopsies, were treated with ESD. Of the 611 EGCs, 598 EGCs that met the absolute/expanded indications were divided into two groups according to their criteria-indication discrepancies after ESD. Results: The incidence of overall discrepancies, size discrepancies, and pathological discrepancies were 41%, 55.9%, and 7.4%, respectively. Complete resection rates (P < 0.001) and curable resection rates (P < 0.001) were significantly lower in the discrepancy group. Endoscopic size ≥20 mm (OR 2.493, CI: 1.546–4.022, P < 0.001), the presence of ulcers (OR 1.712, CI: 1.070–2.738, P = 0.025), and the patient’s age <60 years (OR 1.689, CI 1.044–2.733, P = 0.033) as well as undifferentiated EGC on forceps biopsies (OR 5.397, CI: 2.027–14.369, P = 0.001) were independent factors that could predict the discrepancies prior to ESD.

Conclusion: Criteria-indication discrepancies are substantial, and these significantly affect the curability of EGCs after ESD. That a patient’s age, differentiation, tumor sizes, and the presence of ulcers are all associated with the discrepancies.

Keywords: discrepancy, early gastric cancer, endoscopic submucosal dissection

# 1898 New FGID symptom clusters identified by factor analysis in an Asian multi-center study

Authors: KEWIN TIEN HO SIAH [1,2]; XIAORONG GONG [3]; XI JESSIE YANG [4]; WILLIAM E WHITEHEAD [5]; MINHU CHEN [6]; XIAOHUA HOU [7]; NITESH PRATAP [8]; UDAY C GHOSHAL [9]; ARI F SYAM [10]; MURDANI
ABDULLAH [11]; MYUNG-GYU CHO [12]; YOUNG-TAE BAK [13]; CHING-LIANG LU [14]; SUTEP GONLACHANVIT [15]; FAN FANG [16]; PUIKUAN CHEONG [16]; JUSTIN CY WU [16]; KOK-ANN GWEE [2]

Affiliations: [1]Division of Gastroenterology & Hepatology, University Medicine Cluster, National University Hospital, Singapore, [2]Department of Internal Medicine, Yong Loo Lin School of Medicine, National University of Singapore, [3]The First Affiliated Hospital, Guangzhou Medical University, China, [4]Engineering Product Development, Singapore University of Technology and Design, Singapore, [5]Centre for Functional GI and Motility Disorders, University of North Carolina, United States of America, [6]Department of Gastroenterology and Hepatology, The First Affiliated Hospital, Sun Yat-Sen University, China, [7]Department of Gastroenterology and Hepatology, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China, [8]Asian Institute of Gastroenterology, Hyderabad, India, [9]Department of Gastroenterology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, India, [10]Department of Internal Medicine, University of Indonesia-dr. Cipto Mangunkusumo Hospital, Indonesia, [11]Cipto Mangunkusumo Hospital, University of Indonesia, Indonesia, [12]Department of Internal Medicine, The Catholic University of Korea, Korea, Rep., [13]Department of Internal Medicine, Korea University College of Medicine, Korea, Rep., [14]Department of Gastroenterology, Taipei Veterans General Hospital, Taiwan, [15]Department of Internal Medicine, Chulalongkorn University, Thailand, [16]Department of Medicine and Therapeutics, Institute of Digestive Disease, The Chinese University of Hong Kong, Hong Kong

Background and Aim: One of the most pervasive classification systems in gastroenterology practice is the Rome criteria for the definition and subclassification of functional gastrointestinal disorders (FGID). While the Rome criteria have been widely applied in research on FGIDs in Asia, their validity have not been critically evaluated. We used the Rome III Diagnostic Questionnaire (R3DQ) and applied principle component factor analysis to describe symptom clusters in Asian patients. Methods: One thousand eight hundred eighteen consecutive unselected FGID patients who presented for primary or secondary care to 11 centers across Asia completed a cultural and linguistic adaptation of the R3DQ that was translated to the local language. Two gastroenterologists separately identified main questions for factor analysis. Thirty-four main questions were included. A factor analysis followed by varimax rotation was performed to yield statistically independent factors. Results: Factor analysis identified nine clusters of symptoms (factors, F). There were five bowel symptom clusters, three of which with irritable bowel factors: (F1) meal related: postprandial abdominal pain cluster that was relieved with bowel movement; (F2) constipation predominant: upper abdominal pain associated with passing less frequent or passing harder stools; (F3) diarrhea predominant: with improvement of pain or discomfort after bowel movement; (F7) Obstructed defecation; and (F4) diarrhea with urgency and incontinence. There were two esophageal clusters: (F6) perception of pressure sensations in the throat/chest, associated with or without difficult passage of food or liquid and (F9) pain or burning sensations in the chest. There were two dyspepsia clusters: (F5) gas symptoms cluster with fullness, bloating, belching, and flatulence and (F8) vomiting cluster with nausea, vomiting, and regurgitation. Conclusion: We identified symptom clusters that appear to be different from Western-derived classification systems. Future studies with a Western population control group and a focused questionnaire will determine whether these clusters are unique to Asia.

# 1911 Fourteen-day hybrid therapy achieves an excellent eradication rate as 14-day bismuth containing quadruple therapy for Helicobacter pylori infection: A randomized controlled trial

Authors: WC SUN [1]; FW TSAI [1]; HC YU [1]; DC WU [2]; PI HSU [1]

Affiliations: [1] Division of Gastroenterology, Department of Internal Medicine, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, [2] Division of Gastroenterology, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

Background and Aims: The Masstricht consensus conference in year 2012 recommends bismuth-containing quadruple therapy as an alternative in area with high clarithromycin resistance. The aim of this prospective, randomized study was to investigate the efficacy of bismuth-containing quadruple therapy and hybrid therapy. Methods: From July 2013 to June 2015, eligible H. pylori-infected subjects were randomly assigned to receive either 14-day bismuth quadruple therapy (pantoprazole, bismuth subcitrate, tetracycline, and metronidazole for 14 days) or 14-day hybrid therapy (a 14-day dual therapy with pantoprazole plus amoxicillin, followed by a 7-day quadruple therapy with pantoprazole plus amoxicillin, clarithromycin, and metronidazole), Helicobacter pylori status was examined 6–8 weeks after the end of treatment by rapid urease and/or histology or urea breath test. Result: Three hundred thirty H. pylori-infected participants were randomized to receive 14-day bismuth quadruple therapy (n = 164) or 14-day hybrid therapy (n = 166). The eradication rates, by intention-to-treat analysis, were similar: 93.9% for bismuth quadruple therapy and 92.8% for hybrid therapy (P = 0.68). Per protocol analysis also showed similar results: 96.7% for bismuth group and 94.9% for hybrid therapy (P = 0.43). The eradication rates of metronidazole-resistance strains were 70% (7/10) in bismuth quadruple group and 100% (8/8) in hybrid therapy group. The frequency of adverse events was 55.5% of bismuth quadruple therapy, and 15.7% of hybrid therapy (P = 0.00). Conclusions: Fourteen-day bismuth quadruple therapy and 14-day hybrid therapy are equally effective for H. pylori eradication. Hybrid therapy has superiority in the reduced side effect.

# 2073 Effects and mechanisms of the electroacupuncture at ST36 and PC6 on the postoperative ileus in a rodent model

Authors: HARUAKI MURAKAMI [1, 2, 4]; SHIYING LI [1, 2]; JIEYUN YIN [1]; JIANDE ZH CHEN [1, 3]

Affiliations: [1] Veterans Research and Education Foundation, VA Medical Center, OK USA, [2] Department of
Background and Aim: The aim of this study was to investigate the effects and mechanisms of the electroacupuncture (EA) at ST36 and PC6 on gastrointestinal motility in a rodent model of post-operative ileus (POI). Methods: For control group (CG, n = 8), three abdominal electrodes were placed for the measurement of the heart rate variability. CG rats were performed laparotomy. For sham group (SG, n = 8)/EA group (EG, n = 8), after the same surgery of the CG, intestinal manipulation (IM) was performed for 15 min. EA was performed for 60 min after the surgery using following parameters: PC6: train of on time of 0.1 s, off time of 0.4 s, 0.5 ms, 100 Hz and 1 mA; ST36: on time of 0.1 s, off time of 0.4 s, 0.5 ms, 4 mA. Gastric emptying (GE), small intestinal transit (SIT) and post-surgery heart rate variability. CG rats were performed laparotomy. EA accelerated both gastric emptying (GE), small intestinal transit (SIT) and post-surgery heart rate variability. Scale after surgery. Serum TNF-α vs 150 EA prevented the decrease in the vagal activity (SG regular surgery (CG). EA accelerated both gastric emptying (GE), small intestinal transit (SIT) and post-surgery heart rate variability. Serum TNF-α was measured in 3 h after the surgery. Results: (1) IM delayed gastric emptying (P < 0.05) and intestinal transit (P < 0.01) in comparison with regular surgery (CG). EA accelerated both gastric emptying (P < 0.05 vs SG) and intestinal transit (P < 0.05 vs SG). (2) EA prevented the decrease in the vagal activity (SG 0–30 min vs 150–180 min: P = 0.03, EG: 0–30 min vs 150–180 min: P = 0.31) and the increase in sympathovagal balance (SG 0–30 min vs 150–180 min: P = 0.03, EG: 0–30 min vs 150–180 min: P = 0.06). (3) EA accelerated the pain relief (SG 15 min vs 120 min: n.s, EG 15 min vs 120 min: P < 0.05). (4) Serum TNF-α increased by IM (CG vs SG P = 0.02) was decreased by EA (SG vs EG P = 0.04). Conclusions: EA improves gastrointestinal transit and systemic inflammation by amelioration of the autonomic nervous balance in POI. EA accelerates the pain relief in POI.

# 2135 Incretin-based pharmacotherapy and risk of adverse pancreatic events in patients with diabetes mellitus: A population-based study Authors: CHAO-MING TSENG [1]; YAO-CHUN HSU [1,2] [3]; CHI-YANG CHANG [1]; JAW-TOWN LIN [1,4]
Affiliations: [1]Division of Gastroenterology and Hepatology, [2] Center for Database Research, E-Da Hospital/I-Shou University, Kaohsiung, [3]Graduate Institute of Clinical Medicine, China Medical University, Taichung, [4]School of Medicine, Fu Jen Catholic University, New Taipei City; all in Taiwan

Background and Aims: Pancreatic safety of incretin-based anti-diabetic medication has not been clarified. We aimed to elucidate the association of incretin-based therapy with risks of acute pancreatitis and pancreatic cancer in patients with diabetes mellitus. Methods: This is a retrospective population-based cohort study based on analysis of Taiwan National Health Insurance Research Database. One million residents randomly sampled from the entire Taiwanese population were screened. A total of 13,171 eligible patients who had received incretin-based treatment for a minimum of 2 months were matched 1:1 in age, gender, diabetes complications severity index, and the inception date with those who never used this kind of pharmaco-therapy. The two study cohorts were compared for occurrences of acute pancreatitis and pancreatic cancer. The association between incretin-based therapy and risk of adverse events was further explored by Cox proportional hazard model and stratified analyses. Results: During follow-up until the end of 2012, acute pancreatitis occurred in 71 (0.54%) incretin users and 66 (0.50%) non-users, respectively (P = 0.67). The association remained insignificant (adjusted hazard ratio [HR]: 1.06; 95% confidence interval [CI]: 0.72–1.55) after adjustment for cholelithiasis (adjusted HR, 2.76; 95% CI, 1.32–5.75), and alcohol-related disease (adjusted HR 9.14, 95% CI, 2.08–40.14) in the Cox proportional hazard model. The stratified analyses affirmed no association between incretin-based therapy and pancreatitis in any patient subgroup. Pancreatic cancer occurred in 6 (0.05%) and 10 (0.08%) patients in the user and non-user cohorts, respectively (P = 0.32). The very few cases of pancreatic cancer obviated further multivariate-adjusted analysis. Conclusions: Incretin-based therapy is not associated with adverse pancreatic events including acute pancreatitis and pancreatic cancer in diabetic patients. This population-based study provides reassuring data on pancreatic safety of this pharmacotherapy.

# 2146 Irritable bowel syndrome, particularly constipation-predominant, have more Methanobrevibacter smithii, which is associated with higher methane production on lactulose hydrogen breath test Authors: R SHUKLA; DEEPAKSHI SRIVASTAVA; UC GHOSHAL
Affiliation: Departments of Microbiology and Gastroenterology, India

Background and Aim: Because Methanobrevibacter smithii produces methane-delaying gut transit, we evaluated quantity of M. smithii among patients with IBS including constipation-predominant sub-type (IBS-C) and healthy controls (HC). Methods: Quantitative real-time PCR (qPCR) was performed in feces of 47 patients with IBS (Rome III) and 30 HC. Quantitative real-time PCR was performed in 25 IBS, fasting methane ≥10 ppm or increase by ≥10 ppm after 10-g lactulose defined methane producers. Results: Of 47 IBS, 20 had IBS-C, 20 had diarrhea (IBS-D), and seven were not sub-typed. Methanobrevibacter smithii 16S rRNA copy number was higher among IBS than HC (Log10 5.4, IQR [3.2–6.3] vs 1.9 [0.0–3.4], P < 0.001), particularly among IBS-C than IBS-D (Log10 6.1 [5.5–6.6] vs 3.4 [0.6–5.7], P = 0.001); copy number was lower among patients passing more than three stool/week than without (n = 25/47, Log10 6.3, IQR [2.4–5.6] vs 22/47, Log10 5.9, IQR [4.9–6.6], P = 0.002), which negatively correlated with stool frequency (R = −0.420, P = 0.003). IBS-C patients produced methane more often than IBS-D (8/12 [67%] vs 3/13 [23%], P = 0.047). Methanobrevibacter smithii copy number was higher among methane-producers than non-producers (Log10 6.4 [5.7–7.4] vs 4.1 [1.8–5.8], P = 0.001). Using receiver operating characteristic (ROC) curve, best cut-off of M. smithii to identify methane producers was Log10 6.0 (sensitivity: 64%, specificity: 86%, area under curve [AUC]: 0.896). AUC for breath methane correlated with M. smithii copy number among methane producers (R = 0.74; P = 0.008). Abdominal bloating was commoner among methane
producers (n = 9/11 [82%] vs 5/14 [36%], P = 0.021). **Conclusions:** Patients with IBS, particularly IBS-C, had higher copy number of *M. smithii* than HC. On LHBT, breath methane levels correlated with load of *M. smithii*.

### # 2159 Effect of probiotics on immunity-associated cytokines during 5-fluorouracil-induced intestinal mucositis in SCID mice

**Authors:** WAI-TAO CHAN [1,2]; HUNG-CHANG LEE [3]; SHAO-YI HOU [2]; SHOU-CUAN SHIH [4]; JEN-SHIU CHIANG CHIAU [5]; CHUN-YAN YEUNG [1]; CHUEN-BIN JIANG [1]; SUZU-WEN CHANG [1]; MEI-LIEN CHENG [5]

**Affiliations:** [1]Department of Pediatric Gastroenterology, Hepatology and Nutrition, Mackay Children’s Hospital, Taipei, Taiwan, [2]Graduate Institute of Engineering Technology, National Taiwan University of Technology, Taipei, Taiwan, [3]Division of Gastroenterology, Hepatology and Nutrition, Department of Pediatrics, Mackay Memorial Hospital Hsinchu Branch, Hsinchu, Taiwan, [4]Division of Gastroenterology, Department of Internal Medicine, Mackay Memorial Hospital, Taipei, Taiwan, [5]Department of Medical Research, Mackay Memorial Hospital Hsinchu Branch, Hsinchu, Taiwan

**Background and Aim:** Chemoradiotherapy for advanced rectal cancer has been reported in a significant preoperative and postoperative immune dysfunction as indicated by depression of proinflammatory cytokine release. Many studies showed the beneficial effects of probiotics in modulating immune responses. Probiotics were considered to affect immunity-associated proinflammatory cytokines during 5-fluorouracil-induced intestinal mucositis in SCID mice. The aim of this study is to observe the effect of probiotics on immunity-associated cytokines in severe mucositis induced by 5-fluorouracil (5-FU) in SCID mice. **Methods:** Male NOD/SCID BALB/c mice (6 weeks of age, n = 6 per group) received 5-FU (30 mg/kg/days) administration via intraperitoneal injection for 5 days. Mice were fed a mixed suspension of *Bifidobacterium bifidum* (1 × 10^7 cfu/mg) and *Lactobacillus acidophilus* (1 × 10^7 cfu/mg), or saline. Blood was drawn 5 days after probiotic administration. The serum was analyzed by the Bio-Plex ProTM Mouse Cytokine 23-Plex Panel kitB (Targets: Eotaxin, G-CSF, GM-CSF, IFN-γ, IL-1α, IL-1β, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-10, IL-12(p40), IL-12(p70), IL-13, IL-17A, KC, MCP-1, MIP-1α, MIP-1β, RANTES, and TNF-α). **Results:** Weight loss and diarrhea were not different among those groups. IL-1β, IL-2, IL-5, IL-6, IL-10, IL-13, IL-17A, and MCP-1 production were significantly decreased in those 5-FU treated mice who received probiotics. IL-9 and GM-CSF were undetected. **Conclusion:** Systemic 5-FU administration caused intestinal mucositis in SCID mice. Synbiotics with *Bifidobacterium bifidum* and *Lactobacillus acidophilus* could not attenuate the severity of mucositis but lead to a systemic Th1 and Th2 cytokines responses. The synbiotics exhibited anti-inflammation, as shown by lowered IL-1β value. Interestingly, a set of 5-FU induced chemokines was identified, thus suppressed by the synbiotics. We conclude that oral probiotics administration shows potential immunomodulation to immuno-compromised mice receiving chemotherapy.

### # 1099 Proper treatment after EMR artificial ulcer floor with snare cauterization under 20-mm colorectal polyps: A randomized prospective study

**Authors:** HIROHITO MORI [1]; HIDEKI KOBARA [1]; NORIKO NISHIYAMA [1]; SHINTARO FUJIHARA [1]; YOSHIHATA IKEDA [2]; TAKAAKI TSUSHIMI [2]; TSUTOMU MASAKI [1]

**Affiliations:** [1]Department of Gastroenterology and Neurology, Kagawa University, Kagawa, Japan, [2]Department of Gastroenterological Surgery, Ehime Rosai Hospital, Ehime, Japan

**Background and Aims:** Comparative studies on wound surface treatments after endoscopic mucosal resection (EMR) under 20-mm colorectal polyps have not been reported. We conducted a prospective trial of postoperative hemorrhage prevention measures after EMR of such polyps. **Methods:** Of 158 patients (429 polyps) who had undergone EMR, 70 patients (161 polyps) with from 10 to 20 mm colorectal polyps were enrolled. Using the sealed-envelope method, the subjects were randomly assigned to either a snare cauterization (82 polyps) or clip closure group (79 polyps). The primary assessment item was the wound surface treatment time (from immediately after polyectomy to wound surface treatment completion). The secondary assessment items were the incidence of delayed bleeding, perforation incidence 1–7 days after EMR, and difference in medical costs between the groups (UMIN No. 000013473). **Results:** The time required for wound surface treatment completion was 3.56 ± 1.68 min in the snare cauterization group and 13.8 ± 3.26 min in the clip closure group, thus demonstrating a significant difference (P = 0.0001). Delayed bleeding was observed in three patients in the clip group but was not observed in the snare cauterization group (P = 0.096). The clip group required the use of 745 clips that cost ¥543 320, SUS 5256.70. **Conclusions:** After EMR of with 10 to 20 mm colorectal polyps, snare cauterization was superior to clip closure in terms of procedure time, and medical costs, and not inferior to clip closure in terms of the preventing effect of delayed bleeding.

### # 1113 Diagnostic efficacy of endoscopic ultrasound-guided needle sampling for upper gastrointestinal subepithelial lesions: A meta-analysis

**Authors:** QUAN-LIN LI; PING-HONG ZHOU

**Affiliation:** Endoscopy Center and Endoscopy Research Institute, Zhongshan Hospital, Fudan University, Shanghai, China

**Background and Aim:** An increasing number of studies have been conducted on the use of endoscopic ultrasound (EUS)-guided needle sampling, including fine-needle aspiration, fine-needle biopsy, and trucut needle biopsy, for upper gastrointestinal (GI) subepithelial lesions (SEL). However, reported diagnostic efficacy varies greatly. Therefore, we did a meta-analysis to summarize and systematically review current evidences in this area. **Methods:** A reproducible strategy was used to search four databases. Seventeen studies, including a total of 978 sampling attempts, were included in the final analysis (Fig. 1). The primary outcome was the pooled efficacy of EUS-guided needle sampling in upper GI SEL. Secondary outcomes were

---

**Oral**

*Journal of Gastroenterology and Hepatology* 2015; 30 (Suppl. 4): 1–27

© 2015 The Authors. *Journal of Gastroenterology and Hepatology* © 2015 Journal of Gastroenterology and Hepatology Foundation and Wiley Publishing Asia Pty Ltd
procedure-related complications, diagnostic errors, and independent factors related to a higher success rate. **Results:** The pooled diagnostic rate of EUS-guided needle sampling was 59.9%, with a heterogeneity $I^2$ of 55.2% (Fig. 2). Subgroup analysis and meta-regression suggested that the cell block method might be correlated with a higher diagnostic rate. Few severe complications were reported. Diagnosis errors were rare. **Conclusion:** EUS-guided needle sampling is a safe but only moderately effective method for pathological diagnosis of upper GI SEL.  

**Background and Aims:** This multicenter randomized trial was conducted at 19 institutions in Japan to compare the efficacy and safety of endoscopic papillary large balloon dilation (EPLBD) alone versus EST for removal of large common bile duct (CBD) stones (UMIN-CTR number, 000010012). **Methods:** Between February 2013 and January 2015, 181 patients over 60 years of age with large CBD stones ($\geq$10 mm) and dilated distal CBD ($\geq$12 mm) were randomly assigned to groups that underwent EPLBD alone or EST. The primary outcome was the rate at which complete stone removal was achieved in the first session, and secondary outcomes included complete stone clearance rate, use of lithotripsy, stone removal time, early complications, and procedure cost. **Results:** Finally, data from 164 patients were analyzed (82 in each group). Patient characteristics were similar in both groups. The rate of complete stone removal in the first session was significantly higher in the EPLBD alone group than in the EST group (92.7% vs 80.5%, $P=0.037$). The complete stone clearance rate was similar in both groups (100% vs 96.3%, $P=0.245$). The use of lithotripsy was significantly less frequent in the EPLBD alone group than the EST group (28.0% vs 46.3%, $P=0.023$). Stone removal time was similar in both groups (36.1 vs 40.3 min, $P=0.464$). The overall early complication rate was 9.8% in each group. The rate of post-ERCP pancreatitis was 100% in each group. Hemorrhage occurred in one patient in the EST group. No perforation occurred in either group. Hemorrhage occurred in one patient in the EST group. The procedure cost was significantly lower in the EPLBD alone group (USD $1354 \pm 834$ vs $1619 \pm 834$, $P=0.032$). **Conclusions:** EPLBD alone without EST is safe and more effective than EST for the treatment of large CBD stones.  

### 1156 A multicenter randomized trial of endoscopic papillary large balloon dilation alone versus endoscopic sphincterotomy for removal of bile duct stones: MARVELOUS trial  
**Authors:** HIROFUMI KOGURE [1]; SHUHEI KAWAHATA [1,7]; TSUYOSHI MUKAI [2]; SHINPEI DOI [3,4]; TAKUJI IWASHITA [3]; TESSHIN BAN [5]; YUKIKO ITO [6]; HIROSHI KAWAKAMI [7]; TSUYOSHI HAYASHI [8]; HIROYUKI ISAYAMA [1]  

**Affiliations:** [1]Department of Gastroenterology, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan; [2]Department of Gastroenterology, Gifu Municipal Hospital, Gifu, Japan; [3]First Department of Internal Medicine, Gifu University Hospital, Gifu, Japan; [4]Department of Gastroenterology, Teikyo University Mizonokuchi Hospital, Kanagawa, Japan; [5]Department of Gastroenterology, Nagoya Daini Red Cross Hospital, Nagoya, Japan; [6]Department of Gastroenterology, Japanese Red Cross Medical Center, Tokyo, Japan; [7]Department of Gastroenterology and Hepatology, Hokkaido University Graduate School of Medicine, Sapporo, Japan; [8]Department of Medical Oncology and Hematology, Sapporo Medical University School of Medicine, Sapporo, Japan
Materials and Methods: Between June 2008 and March 2015, 302 CEs were performed for OGIB at our center. We classified them into three categories: (I) persistent overt bleeding, that is, bleeding documented within 24 h at the first evaluation, defined as emergent CE; (II) recent overt bleeding, that is, last bleeding episode >24 h prior to the first evaluation; and (III) obscure occult bleeding, that is, anemia without overt bleeding. We then examined the diagnostic yield in the three categories. Results: The ability of CE to identify a definite bleeding source was significantly higher for category I versus categories II and III (P < 0.01). However, we could not obtain detailed endoscopic images in many category I cases because of blood clots in the intestines. The results are illustrated in Table 1.

Table 1 Diagnostic yield of capsule endoscopy according to category of bleeding (n = 302)

| Category | Define | Suspicious | Negative | Poor study | Total |
|----------|--------|------------|----------|------------|-------|
| Category I | 41     | 5          | 0        | 4          | 50    |
| Category II | 99     | 61         | 20       | 11         | 191   |
| Category III | 30     | 16         | 11       | 4          | 61    |

Reference: Mahesh KG; Shounak M; Sanjeev K; Pradeepa KS; Usha Goenka: Single center experience of capsule endoscopy in patients with obscure gastrointestinal bleeding. World Journal of Gastroenterology. 2011;17(6):774-778

# 1268 Development of an e-learning system for the endoscopic diagnosis of early gastric cancer: An international multicenter randomized controlled trial
Authors: R PITTAYANON [1]; K YAO [2]; N UEDO [3]; M MUTO [4]; H ISHIKAWA [5]; F YAO [6]; SH HO [7]; C GONEN [8]; W KASETSEMIWIRYA [9]; SE KIM [10]; AND GLOBAL E-ENDO STUDY TEAM
Affiliations: [1]Division of Gastroenterology, Department of Medicine, Chulalongkorn University AND King Chulalongkorn Memorial Hospital The Thai Red Cross, Bangkok, Thailand, [2] Endoscopy, Fukuoka University Chikushin Hospital, Chikushino, [3]Department of Gastrointestinal Oncology, Osaka Medical Center for Cancer and Cardiovascular Diseases, Osaka, [4]Therapeutic Oncology, Kyoto University Graduate School of Medicine, [5]Graduate School of Medical Science, Kyoto Prefectural University, Kyoto, Japan, [6]Peking Union medical college Hospital, Beijing, China, [7]University of Malaya, Malaysia, [8]Haydarpasa Numune Training and Research Hospital, Istanbul, Turkey, [9]Faculty of Medicine Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand, [10]Kosin University College of Medicine, Busan, Korea

Introduction: Most of gastric cancer cases outside Japan and Korea were diagnosed at advanced stage. Accordingly, the authors have developed an Internet-based e-learning system to teach medical practitioners how to detect early gastric cancer using standard white light endoscopy (WLE) and evaluate effectiveness of the e-learning system. Methods: The study was a multi-center randomized controlled trial. The participants first undertook a pre-test via the Internet, and then they were randomly allocated into two groups (e-learning and non-e-learning groups). The participants only in the e-learning group were allowed to access to the e-learning system that consisted of video lectures to learn basic knowledge and self-exercise tests to accumulate experience. A post-test was conducted in both groups 2 months after the pre-test. The pre-determined primary endpoint was the difference in improvement rate of the test result between the two groups. Results: Five hundred fifteen medical practitioners from 35 countries were assessed eligibility for this study. Finally, 322 participants who met inclusion criteria completed the pre-test and enrolled in this study. One hundred sixty-six were allocated to the e-learning group and non-e-learning equally. Among them, 151 participants in the e-learning group and 144 in the non-e-learning group had completed the post-test. The mean improvement rates (SD) of the test result in the e-learning and the non-e-learning groups were 1.24 (0.26) versus 1.00 (0.16), respectively (P < 0.001). Namely, our e-learning system yielded substantial improvement to medical practitioners in the e-learning group, while there was no improvement for those in the non-e-learning group. Conclusion: This global study demonstrated efficacy of our e-learning system to improve ability for endoscopic detection of early gastric cancer among medical practitioners worldwide. The effectiveness will be evaluated on improvement of early gastric cancer detection rate of all participants in actual clinical practice (UMIN: R000012039).

Acknowledgments: HJ, Cardona, EC Castro-Filho, C Olano, A Parra-Blanco, GA Alvarado, A Piscoya, ED Fedorov, AP Bialek, AA Mitrokov, LE Caro, S Dolwani, AB Farca, LF Cuaresma, JJ Bonilla, K Ragunath, M Marini, H Li, DG Cimmino, MM Piskorz, F Iacopini, JBY So, K Yamazaki, GH Kim, TL Ang, DM Milhomem-Cardoso, CA Waldbaum, WA Piedra-Carvajal, CM Hayward, R Singh, R Banerjee, GK Anagnostopoulos, Y Takahashi
Declaration of conflict of interest: None declared.

# 1370 Incidence and risk factors of missing polyps in flexible sigmoidoscopy: A prospective multicenter study
Authors: HO YEON JUNG [1]; HYUN-SOO KIM [1]; HONG JUN PARK [1]; DONG IL PARK [2]; JAE MYUNG CHA [3]; SEUN-JA PARK [4]; HWANG CHOI [5]; JEONGEUN SHIN [6]; YEONSOO KIM [7]; JIN OH KIM [8]; HYUN GUN KIM [8]; SEONG-EUN KIM [9]; SUNG CHUL PARK [10]; TAE IL KIM [11]; SUNG NOH HONG [12]; YOUNG EUN JOO [13]; BYUNG HO NAM [14]
Affiliations: Department of Internal Medicine, [1]Yonsei University Wonju College of Medicine, Wonju, [2]Sungkyunkwan UniversitySchool of Medicine, Seoul, [3]Kyung Hee University School of Medicine, Hanam, [4]Kosin University College of Medicine, Busan, [5]Catholic University of Korea College of Medicine, Inchon, [6]Dankook University Medical College, Cheonan, [7]Hallym University College of Medicine, Chuncheon, [8]Soondunhyang University College of Medicine, Seoul, [9]Ewha Womans University School of Medicine, Seoul, [10]Kangwon National University School of Medicine, Chuncheon, [11]Yonsei
Background and Aims: In this prospective multicenter study, we sought the polyp missing rate (PMR) and factors influencing on PMR in flexible sigmoidoscopy (FS), one of the established screening tools for colorectal cancer. Methods: Asymptomatic subjects with average risk in the age of 45 to 75 years who did not undergo screening colonoscopy were enrolled in 14 tertiary hospitals. All subjects immediately underwent colonoscopy after FS in the usual manner reaching about 40–50 cm length of colon after bowel preparation. Results: A total of 1263 were enrolled, and data were analyzed. A total of 1166 polyps in 503 subjects (403 adenomas in 235 subjects) were found (PDR: 39.8%, ADR: 18.6%) in the distal colon area by FS and colonoscopy. Eventually, a total of 152 missing polyps in 119/503 subjects (adenoma miss rate: 13.4%) were documented by following colonoscopy. In addition, missing polyps in 56 subjects were not found by FS but by following colonoscopy (false negative 4.4% in FS). On univariate analysis, men, old age, obesity, diabetes, BPH, and smoking were related to missing polyps. Withdrawal time, insertion time, and inspection length were higher in the patients with missing polyps. However, endoscopists experiences, histories of GI cancers, and previous colonoscopy were not related to missing polyps. Among missing polyps, 36% (54/152) was adenoma (mean size: 4.8 mm); all missed adenomas were low-grade dysplasias and most were flat (ls type: 85%). On multivariate analysis, men, smoking, old age, and obesity were found to be subjects-related risk factors for missing polyp of sigmoidoscopy. Conclusion: Because substantial proportions of polyps and adenomas can be missed, more careful and meticulous inspection is required during FS, particularly in subjects with risk factors.

Background and Aims: Fiducial marker placement is required as a reference point for IGRT to maximize efficacy of radiation and minimize complications. EUS-guided fiducial placement (EUS-FP) has been reported for locally advanced pancreatic cancer. However, the safety and feasibility of this approach for resectable pancreatic cancer following neoadjuvant chemoradiotherapy (NACRT) is still unclear. The aim of this study is to determine the safety, feasibility, and limitations of EUS-FP for resectable pancreatic cancer. Methods: Patients with T3 resectable pancreatic cancer referred for EUS-FP and subsequent NACRT between May 2013 and May 2015. VISICIOL fiducials (RadioMed Corporation, Bartlett, USA) were back-loaded into the needle tip (22 or 19-gauge needle: Expect™, Boston Scientific) and sealed with bone wax. EUS-FP was performed under EUS and fluoroscopy guidance. CRT was administered for 1 month following chemotherapy for 2 months before surgery. Results: A total of 15 patients (M:F = 6:9) were referred for EUS-FP. The mean age was 68.2 years (range, 52–78). Tumors were located in the head of the pancreas in seven patients and the body in eight patients. The mean size was 18.7 mm (range, 10–30). All fiducials were successfully deployed, eight using transgastric and seven using transduodenal approach. Two patients developed self-limiting bleeding during procedure. NACRT was successfully performed except for one patient with repeat cholangitis, which was unrelated to marker placement. No spontaneous fiducial migration was noted during NACRT. Conclusions: EUS-guided fiducial placement for NACRT in resectable pancreatic cancer is safe and feasible. Successful placement was achieved in 100% of patients with no severe complication.
Background and Aims: Endoscopic resection for laterally spreading tumor (LST's nongranular type (LST-NG) is sometimes difficult because of poor lifting after submucosal injection. In addition, possible submucosal invasion for such lesions concerns. However, the association of submucosal invasion and poor lifting in LST-NGs has not been fully evaluated in a large series. The aim of our study was to assess the submucosal invasion rate and the association between the histology and poor lifting after submucosal injection in subtypes of LST-NG (flat type [LST-F] and pseudodepressed type [LST-PD]). Methods: The subjects were consecutive 431 LST-NGs treated endoscopically or surgically at our hospital between September 2002 and December 2011. LST-NGs were classified into two types: flat type (LST-F) and pseudodepressed type (LST-PD). We evaluated clinicopathological findings, submucosal invasion rates, invasion site, and the association between the histology and poor lifting. Results: Three hundred eight LST-Fs and 123 LST-PDs which sizes were 10–19 mm (35%), 20–29 mm (38%), 30–39 mm (17%), and >40 mm (10%) were evaluated. Submucosal invasive cancers in each size category were as follows: 1.7% (10–19 mm), 7.9% (20–29 mm), 22.6% (30–39 mm), and 36% (>40 mm), in LST-Fs, 21% (10–19 mm), 45% (20–29 mm), 41% (30–39 mm), and 25% (>40 mm), in LST-PDs, respectively. Multifocal invasions were found in 23% (17/75) of submucosal invasive cancers. In 259 mucosal lesions that lifting was assessed after submucosal injection, poor lifting were observed in 46 (18%) LST-Fs and 28 (39%) LST-PDs, respectively. Conclusions: LST-Fs ≥20 mm, LST-PDs in all size categories represented a high submucosal invasion rate (20%). Poor lifting regardless of submucosal invasion was observed in 20% of LST-Fs and 40% of LST-PDs. Endoscopic diagnosis of the depth of LST-NG lesions with poor lifting is challenging, however, essential to avoid the overuse of surgery.

Background and Aims: Nonexposed endoscopic wall-inversion surgery (NEWS) has been invented as endoscopic and laparoscopic full-thickness resection technique without exposure of the gastric lumen. In this technique, a resection area can be minimally determined, and therefore, a less-invasive, function-preserving gastrectomy for gastric tumors is realized without the risk of intraabdominal contamination and cancer cell seeding. We investigated the feasibility of NEWS. Methods: Patients having gastric subepithelial tumor (SET) less than 3 cm or cT1N0M0 gastric cancer (GC) less than 4 cm without prior treatment were enrolled. After mucosal and serosal markings and endoscopic submucosal injection, circumferential sero-muscular incision was performed laparoscopically, followed by sero-muscular linear suturing with the lesion inverted toward the inside of the lumen. Finally, circumferential muco-submucosal incision was performed endoscopically. In GC cases, NEWS was combined with sentinel node (SN) navigation surgery and performed after dissection of an SN basin including tumor-negative SNs confirmed by intraoperative pathological assessment. Results: NEWS was completed in all 18 cases (six GCs and 12 SETs). In 14 tumors excluding two ectopic pancreas and two granulomas, R0 resection was obtained in 13 cases (92.9%). A median of operation time was 254 min. Intraoperative perforation occurred in one SET case (5.6%). All patients were discharged in a median of 9.5 days without severe complications. In a median of 8.5 months after the treatment, the patients had no apparent complaints of food intake, and neither death nor recurrence occurred. Conclusion: NEWS can bridge the gap between endoscopic submucosal dissection and standard gastrectomy in terms of less invasiveness and patient’s quality of life.
comparisons of the descriptors were computed with chi-squared analysis across dysplasia grades and odds ratios reported in Table 1. The presence of IMC was strongly predicted by “nodule” (OR: 2.4 [2.0–3.0] P < 0.0001), whereas inversely, “nodularity” and “irregularity” predicted NDBE (OR: 2.0 [1.4–2.9] P < 0.0001) and LGD (OR: 1.8 [1.3–2.4] P < 0.0001). This predictive trend held true for samples separated by pre-high-definition and post-high-definition endoscopy. **Conclusion:** This is the first time that a classification system has been established for describing elevated lesions in BE. We have found that lesion elevation is highly correlated with degree of neoplasia. This classification system can easily be used to evaluate and predict cancer risk in BE.

**Keywords:** Barrett’s esophagus, EMR, endoscopic mucosal resection, lesion, nodule, nodular, radiofrequency ablation, RFA

---

**Table 1** Comparison of categorical nodular Barrett’s esophagus ratings to endoscopic mucosal resection pathology grade; OR = Odds ratios (95% confidence intervals), non-nodule = nodularity + irregularity

| Category | Non-Nodule | Nodule (0.15) | Nodule (0.20) | Nodule (0.25) | Nodule (0.30) | Nodule (0.35) | Nodule (0.40) | Nodule (0.45) | Nodule (0.50) |
|----------|------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|          | Non-Nodule | Nodule (0.15) | Nodule (0.20) | Nodule (0.25) | Nodule (0.30) | Nodule (0.35) | Nodule (0.40) | Nodule (0.45) | Nodule (0.50) |
| Nondysplasia | OR: 0.5 p < 0.0001 | OR: 0.4 p < 0.0001 | OR: 0.5 p < 0.0001 | OR: 0.6 p < 0.0001 | OR: 0.7 p < 0.0001 | OR: 0.8 p < 0.0001 | OR: 0.9 p < 0.0001 | OR: 1.0 p < 0.0001 | OR: 1.1 p < 0.0001 |
| LGD | OR: 0.9 p < 0.0001 | OR: 0.8 p < 0.0001 | OR: 0.9 p < 0.0001 | OR: 1.0 p < 0.0001 | OR: 1.1 p < 0.0001 | OR: 1.2 p < 0.0001 | OR: 1.3 p < 0.0001 | OR: 1.4 p < 0.0001 | OR: 1.5 p < 0.0001 |
| NDG–EGD | OR: 1.0 p < 0.0001 | OR: 1.1 p < 0.0001 | OR: 1.2 p < 0.0001 | OR: 1.3 p < 0.0001 | OR: 1.4 p < 0.0001 | OR: 1.5 p < 0.0001 | OR: 1.6 p < 0.0001 | OR: 1.7 p < 0.0001 | OR: 1.8 p < 0.0001 |
| HGD | OR: 1.2 p < 0.0001 | OR: 1.3 p < 0.0001 | OR: 1.4 p < 0.0001 | OR: 1.5 p < 0.0001 | OR: 1.6 p < 0.0001 | OR: 1.7 p < 0.0001 | OR: 1.8 p < 0.0001 | OR: 1.9 p < 0.0001 | OR: 2.0 p < 0.0001 |
| IMC | OR: 2.2 p < 0.0001 | OR: 2.3 p < 0.0001 | OR: 2.4 p < 0.0001 | OR: 2.5 p < 0.0001 | OR: 2.6 p < 0.0001 | OR: 2.7 p < 0.0001 | OR: 2.8 p < 0.0001 | OR: 2.9 p < 0.0001 | OR: 3.0 p < 0.0001 |

# 1946 Animal validation study of endoscopic stomach volume estimation for bariatric endoluminal gastroplasty

**Authors:** JAE HYUNG LEE; HOON JAI CHUN; SEUNG HUN KANG; IN KYUNG YOO; SEUNG HAN KIM; JAE MIN LEE; HYUK SOON CHOI; EUN SUN KIM; BORA KEUM; YOON TAE JEEN; HONG SIK LEE; CHANG DUCK KIM; SANG WOO LEE; JONG-JAE PARK

**Affiliation:** Division of Gastroenterology and Hepatology, Department of Internal Medicine, Institute of Gastrointestinal Medical Instrument Research, Korea University College of Medicine, Seoul, Korea

**Background and Aims:** The shape of stomach is variable among individuals and conditions, so estimation of stomach volume is still difficult even though the recent development of various imaging modalities (CT or MRI). We proposed the possibility of endoscopic stomach volume estimation previously (Digestive Disease Week 2014, Mo1154). In this study, we aimed to validate the accuracy and value of endoscopic stomach 3D reconstruction and volume estimation using extracted porcine stomachs. **Methods:** Three extracted porcine stomachs were used to test the accuracy of endoscopic stomach volume estimation. First, internal dimensions of porcine stomachs were measured using endoscopic guide-wire. Then, 3D stomach models were reconstructed using 3D graphic software (Cinema4D R12, MAXON Computer, Germany). Stomach volumes were estimated from the reconstructed 3D models, and these results were compared with the real volumes measured by filling the stomach with water. Second, we performed bariatric gastroplasty using our novel endoscopic suture device (Endoscopy 45(8): 655–660), aiming to reduce the stomach volume by 30%. In this step, we took advantage of previously constructed 3D stomach model by simulating the most suitable gastroplasty for predetermined volume reduction. After gastroplasty, real volume of deformed stomachs was measured by filling with water.
Results: Stomach volume estimation by endoscopy was relatively accurate (mean error was about 10% of stomach volume). In addition, planned bariatric gastroplasty for predetermined stomach volume reduction by endoscopic suture device was possible with the help of simulation using 3D graphic software, which was not feasible by random suturing. Conclusion: Endoscopic stomach 3D reconstruction and volume estimation was useful, accurate method, which can be used for the future tailored bariatric treatment.

Keywords: bariatric, endoscopy, stomach, 3D reconstruction

# 1971 Predictive factors for gastroduodenal stenting outcomes in patients with gastric outlet obstruction; a multicenter retrospective study in Western Japan

Authors: TAKASHISA KAYAHARA [1]; KENTARO YAMAO [2]; MASAYUKI KITANO [2]; ETSUJI ISHIDA [1]; KOUSUKE MINAGA [2, 5]; SUMIHIRO OKABE [3]; MASANORI ASADA [3]; YASUTAKA CHIBA [4]; YUKITAKA YAMASITA [5]

Affiliations: [1]Department of Gastroenterology and Hepatology, Kurashiki Central Hospital, Kurashiki, Japan, [2] Department of Gastroenterology and Hepatology, Kinki University Faculty of Medicine, Osaka-sayama, Japan, [3] Department of Gastroenterology and Hepatology, Osaka Red Cross Hospital, Osaka, Japan, [4] Department of Clinical Research Center, Kinki University Faculty of Medicine, Osaka-sayama, Japan, [5] Department of Gastroenterology and Hepatology, Japanese Red Cross Society of Wakayama Medical Center

Background and Aims: The placement of metal stents is a safe and effective palliative treatment method for patients with symptomatic gastric outlet obstruction. However, the predictive factors that may successfully indicate the outcomes of this procedure are unclear. The aims of this retrospective study were to evaluate the clinical efficacy of stent placement and to identify predictive factors associated with an ineffective outcome, stent dysfunction, and complications after metallic stent placement. Methods: We enrolled 278 patients treated with metallic stent for malignant gastric outlet obstruction at four tertiary medical centers in west Japan from March 2009 to March 2014. The outcomes of patients who did not achieve a GOOSS of 2 or more and relief of symptoms 7 days after stent placement were defined as ineffective. Performance status was evaluated using the Karnofsky Performance Status (KPS). Results: Although stent placement was a success in 99.6% of patients, 35 of 277 patients (12.6%) had an ineffective outcome. Three or more stenosis sites and KPS ≤ 50 were significant predictive factors for clinical ineffectiveness.

Stent dysfunction (ingrowth, overgrowth, migration, and others) occurred in 46 patients. Multivariable analysis revealed a relationship between both liver metastases and bile duct stenosis with overgrowth risk and covered stent with migration risk. A risk factor for perforation was the deployment of two stents in the first session. Conclusion: Gastroduodenal stenting tended to be ineffective in patients with poor performance status and long stenosis sites. Deployment of two stents was a risk factor for perforation. Identification of these risk variables may help yield better gastroduodenal stenting outcomes.

# 1973 The efficacy of various endoscopic transpapillary sampling methods for malignant biliary lesions

Authors: SEUNG HAN KIM; HONG SIK LEE; IN KYUNG YOO; JAE MIN LEE; SEUNG JOO NAM; HYUK SOON CHOI; EUN SUN KIM; BORA KEUM; YOON TAE JEEN; HOON JAI CHUN; CHANG DUCK KIM; HO SANG RYU

Affiliation: Division of Gastroenterology and Hepatology, Department of Internal Medicine, Institute of Digestive Disease and Nutrition, Korea University College of Medicine

Background and Aims: Various methods for endoscopic transpapillary sampling have been developed. However, the accuracy rate of these methods for bile duct cancer is controversial. The aim of the present study was to determine the factors affecting the accuracy of endoscopic transpapillary sampling methods. Methods: We reviewed the results from 92 patients with bile duct cancer who underwent transpapillary sampling by aspiration bile cytology, brushing cytology, and fluoroscopic forceps biopsy. The final diagnosis of bile duct cancer was made on the basis of pathological evaluation of specimens obtained at surgery or the clinical course over at least 1 year in patients not operated. We carried out subgroup analyses for the factors affecting the accuracy of each transpapillary sampling method. Results: Transpapillary biopsy (71.2%) had a significantly higher level of sensitivity for cholangiocarcinoma than brush cytology (58.8%) and bile cytology (62.5%). Bile cytology (85.7%) showed higher diagnostic yield for pancreatic cancer with bile duct invasion than transpapillary biopsy (60%) and brush cytology (66.7%). In patients with negative biopsy results, bile cytology had a higher diagnostic yield than brush cytology. Conclusions: Transpapillary bile duct biopsy is a simple, safe, and effective technique for diagnosing biliary malignant lesion. It showed more sensitive for cholangiocarcinoma than for pancreatic cancer with bile duct invasion. After negative biopsy result, bile cytology presented higher diagnostic yield.

# 1987 The minimum biopsies required to detect intestinal metaplasia in patients with tongue-like Barrett’s esophagus

Authors: KUNG-HUNG LIN [1, 2]; PING-I HSU [2]; SUNG-SHUO KAO [2]; HUAY-MIN WANG [2]; FENG-WOEI TSAI [2]; WEI-LUN TSAI [2]; WEI-CHIH SUN [2]; CHUN-YAO LIAO [2]; HSIEH-YEN CHU [1, 2]; GUANG-YUAN MAR [1]; KWOK-HUNG LAI [2]

Affiliations: [1] Health Management Center, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, [2] Division of...
Background and Aims: Many Asians with Barrett’s esophagus (BE) have only short mucosal tongues without circumferential metaplasia (tongue-like BE). For these patients to whom the “four-quadrant biopsies” is not applicable, biopsy protocols have not been standardized. This study is aimed to elucidate factors associated with detection of intestinal metaplasia (IM) at follow-up endoscopy in patients with biopsy-proven, tongue-like BE.

Methods: Patients with tongue-like BE carrying IM received follow-up endoscopies. Biopsies were carried out at mucosal tongues ≥0.5 cm, and the sampling numbers were left to the discretion of the individual endoscopist. Factors associated with detection of IM were examined. Results: Thirty patients (26 men), with a median age of 56.7 and a median Barrett’s length of 1.5 cm, received follow-up endoscopies after a median interval of 11.1 months. Twenty two patients received proton pump inhibitors (PPI) for a median duration of 4 months. IM was detected in 15 of 30 patients. More biopsies and shorter maximal tongue length were associated with detection of IM by multivariate analysis. The ratio of biopsy number-to-maximal length of tongue (in centimeter) could predict detection of IM better than each factor alone (area under receiver operating characteristic curve 0.884). The best cut-off value of biopsy number-to-maximal length ratio was 1.8, or 2 for simplicity. Obtaining biopsies at least twice the maximal length detected IM in 14 of 17 patients, whereas those obtained more than twice detected only one among 13 (P < 0.001).

Conclusions: The minimum biopsies should be at least twice the length of maximal tongue (in centimeter) to detect IM in patients with tongue-like BE.

# 2006 Initial experience of extracorporeal shock wave lithotripsy for large common bile duct and pancreatic duct stones without anesthesia

Authors: UV TAKALKAR; AB CHINCHOLE; DN REDDY
Affiliation: United CIIGMA Hospital, Aurangabad, Maharashtra, India

Background and Aims: Extracorporeal shock wave lithotripsy (ESWL) is one of the preferred therapeutic modalities for management of large common bile duct (CBD) and pancreatic duct (PD) stones, which cannot be managed by routine endotherapy. ESWL with traditional lithotripter needs epidural or general anesthesia. We performed ESWL without anesthesia with direct focusing lithotripter (PIEZOLITH 3000), which has integrated C-arm and in-line ultrasound probe. Present study is a comprehensive review of 100 cases with special emphasis on pain score, stone clearance, and relief of symptoms. Patients with large, impact stones in CBD and PD that could not be extracted with ERCP underwent ESWL. Acute cholangitis, coagulopathy are relative, and pregnancy is absolute contraindication for direct focusing lithotripter. We aimed to fragment the stones at optimum fine diameter <5 mm that can be subsequently cleared by ERCP. Initially, ERCP was performed in all cases and nasobiliary tube placed for CBD stones. ESWL carried out without anesthesia or sedation with total 5000 shockwaves during each session at intensity level 12–16 with frequency of 2 shockwaves/s and focal length Fl. Results: We achieved optimum fine fragmentation in 100 patients. Post-ESWL prophylactic ERCP was carried out for stone clearance. More than 90% of the patients needed three or fewer sessions of ESWL. Fifty percent of patients achieved fragmentation in a single session, while 30% required second session, and the remaining needed 20% third session. Five (5 %) patients needed surgical intervention. Average pain score during procedure was 0.5 with significant relief of pain on follow up also. ESWL without need of anesthesia is absolutely safe, noninvasive procedure for large CBD and PD calculi. Conclusion: Nonsurgical clearance of large calculi in CBD and PD without anesthesia is a prime advantage of direct focusing lithotripter. It is a reliable, safe technique without any adverse event.

# 2021 Endoscopic resection for rectal nets (neuroendocrine tumors): EMR-C (EMR using a cap), EMR-L (EMR with a ligation device), or conventional EMR (EMR)

Authors: MITSUNARI YAMADA [1]; HIROSHI KASHIDA [2]; YORIAKI KOMEDA [2]; KAZUKI OKAMOTO [2]; MASASHI KONO [2]; RIE TANKA [2]; TEPPEI ADACHI [2]; HIROMASA MINE [2]; TOMOYUKI NAGAI [2]; YOSHIHISA OKAZAKI [2]; YUTAKA ASAKUMA [2]; TOSHIHARU SAKURAI [2]; SHIGENAGA MATSUI [2]; MASATOSHI KUDO [3]
Affiliations: [1]Kindai University Hospital, Faculty of Medicine, [2]Department of Gastroenterology, Kinki University, Faculty of Medicine, [3] Kinki University Faculty of Medicine

Background and Aims: As we have more opportunities to undergo colonoscopic examination, and as have colonoscopes with higher definition than before, it seems that rectal neuroendocrine tumors (NETs) are more frequently found. The aim of this study was to compare efficiency and safety of EMR-C/EMR-L and conventional EMR for rectal NETs. Methods: Snare master stiff type (Olympus, Japan) was used for EMR or EMR-L. Snare master soft type with semilunar shape (Olympus) and oblique cap with a groove for the snare (Olympus) was used for EMR-C. A ligation device for esophageal varices (Sumitomo Bakelite, Japan) was used for EMR-L. Results: We have encountered 63 cases of gastrointestinal NETs from July 2014 to July 2015. Among them, 44 cases were located in the rectum, with no ulceration or no depression at the top, and the tumor depth is not beyond the submucosal layer in EUS. Thus, 38 cases of rectal NET were treated with conventional or modified method of EMR. The mean age was 59.3 years. Male : female ratio was 16:21. The mean tumor size was 6.08 mm in diameter. The breakdown of endoscopic treatment was EMR-C in 17 cases, EMR-L in eight cases, and conventional EMR in 11 cases. The margin was positive in one case of EMR, and in one case of EMR-C, but the resection was complete in all the cases with EMR-L. Lymphovascular invasion, and vascular invasion, was found in one case of EMR-L, and therefore, an additional surgery was carried out. There has been neither recurrence nor metastasis within the follow-up period. Conclusions: Rectal NETs, which met our criteria, were successfully treated endoscopically without local recurrence or distant metastasis. EMR-C and EMR-L would be better than conventional EMR technique from the view point of en bloc with free margin.
**# 2024 Endoscopic decompression for malignant colorectal obstruction comparing transanal drainage tube and self-expandable metallic stent**

**Authors:** KENTARO KOJIMA; NOBUO TODA; SATOSHI KAWAMURA; YUKI HAYATA; YUKI KARASAWA; DAISAKU ITO; TAKAMASA OHKI; MICHIHARU SEKI; KAZUMI TAGAWA

**Affiliation:** Department of Gastroenterology, Mitsui Memorial Hospital, Tokyo, Japan

**Background and Aim:** Transanal drainage tube (TDT) or self-expandable metallic stent (SEMS) is endoscopic decompression for malignant colorectal obstruction. SEMS is said to be superior to TDT at quality of life (QOL) for the patients, but the comparison between TDT and SEMS for malignant colorectal obstruction was few; reported include the clinical efficiency, safety and prognosis. **Aim and Methods:** The aim of this study is to evaluate the clinical efficiency and safety between TDT and SEMS for malignant colorectal obstruction. **Methods:** We retrospectively analyzed 58 patients who underwent TDT or SEMS insertion for malignant colorectal obstruction from April 2009 to March 2015 on the basis of single-center experience in Japan. SEMS was inserted for bridge to surgery (BTS) or permanent colorectal decompression, and TDT was inserted for BTS or bridge to SEMS placement. **Results:** There were 38 patients in TDT group (men 57.9%, median age 65 ± 15.3 years) and 20 patients in SEMS group (men 35.0%, median age 67 ± 17.5 years). The endoscopic decompression for BTS was performed in 92.6% of TDT group and 62.5% of SEMS group. Technical success rate was 100% of SEMS group and 94.7% of TDT group. The significan difference between SEMS and TDT group was not shown in postoperative complications, such as perforation (15.8% vs 10.0%, P = 0.53), re-obstruction (2.6% vs 15.0%, P = 0.09), and migration (2.6% vs 5.0%, P = 0.65). The significant difference between SEMS and TDT group was not shown in the period from endoscopic decompression to surgery (15.1 ± 4.7 days vs 10.5 ± 6.5 days, P = 0.053) and the hospitalization (33.9 ± 25.7 days vs 45.9 ± 35.5 days, P = 0.19). Otherwise, SEMS group was significantly superior to TDT group in the rate of resuming meals (90.0% vs 26.3%, P < 0.001) and temporary discharge (50.0% vs 0.0%, P < 0.001). **Conclusion:** SEMS had the equivalent safety and was superior at QOL comparing TDT as endoscopic decompression for malignant colorectal obstruction.

---

**# 2043 Indications and clinical utility for single operator cholangioscopy: Results from a large multi-national registry**

**Authors:** JH MOON [1]; M RAMCHANDANI [2]; MK GOENKA [3]; SP BHANDARI [4]; DW SEO [5]; R RERKNIMITR [6]; JK LEE [7]; A ALJEBREEN [8]; S NIAZ [9]; NO NGUYEN [10]; J LAU [11]; J REICHERBERGER [12], T ITOI [13]; TL ANG [14]; B DEVEREAUX [15]; FOR THE SPYGGLASS™ REGISTRY GROUP

**Affiliations:** [1]Soon Chun Hyang University Hospital, Bucheon/Seoul, Korea, [2]Asian Institute of Gastroenterology, Hyderabad, India, [3]Apollo Gleneagles Hospital, Kolkata, India, [4]Baldota Institute of Digestive Sciences, Mumbai, India, [5]Assan Medical Center, Seoul, South Korea, [6]King Chulalongkorn Memorial Hospital, Bangkok, Thailand, [7]Samsung Medical Center, Seoul, South Korea, [8]King Khalid University Hospital, Riyadh, Saudi Arabia, [9]Civil Hospital Karachi, Karachi, Pakistan, [10]Royal Adelaide Hospital, Adelaide, Australia, [11]Prince of Wales Hospital, Shatin, Hong Kong, [12]Netcare Unitas Hospital, Pretoria, South Africa, [13]Tokyo Medical University, Tokyo, Japan, [14]Changi General Hospital, Singapore, Singapore, [15]Royal Brisbane and Women's Hospital, Herston, Australia

**Background and Aims:** Addition of cholangioscopy to endoscopic retrograde cholangiopancreatography (ERCP) may improve diagnosis and increase therapeutic efficiency in diseases of the biliary tract. A large registry aims to document indications and clinical utility for single operator cholangioscopy (SOC) used per standard of practice in Asia, the Middle East, and Africa. **Methods:** Prospective registry on SOC at 24 centers in 12 countries. Per oral SOC using SpyGlass™ system (Boston Scientific Corp, Marlboro, MA, USA). Enrollment ongoing. Updated findings will be presented on approximately 300 cases. Procedural success defined as follows:

1. For indeterminate strictures/filling defects: ability to visualize defect, provide visual impression of malignancy, and, when applicable, obtain SpyBite biopsy adequate for histology.
2. For biliary stones: ability to achieve stone clearance in one or more SpyGlass procedures.
3. For other indications: ability to establish diagnosis and/or complete therapy as intended.

**Results:** To date, 108 patients (pts) completed follow-up. SOC was performed for assessment of indeterminate strictures/filling defects in 54 (50%), clearance of biliary stones in 47 (44%), and other indications in seven (6%) pts, including pre-operative assessment of ductal tumor (four), selective guidewire placement (two), and assessment of unexplained hemobilia (one). Procedural success was reached in 95 (88%) pts. Failures were inability to reach stone clearance (nine), intraductal SpyBite biopsies yielding inconclusive histopathology (three), and inability to provide impression of malignancy (one). There was one mild acute post-ERCP pancreatitis. **Conclusions:** SOC using SpyGlass™ has clinical utility in a wide range of indications with high procedural success rate and good safety profile.

---

**# 1001 The natural course and predictive factors of hepatitis B e antigen-negative hepatitis during chronic hepatitis B virus infection from children to adults**

**Authors:** JIA-FENG WU [1]; HUEY-LING CHEN [1,2]; YEN-HSUAN NI [1,3]; HONG-YUAN HSU [1]; MEI-HWEI CHANG [1,2]

**Affiliations:** [1,2]Departments of Pediatrics, [2]Hepatitis Research Center, National Taiwan University Children's Hospital, Taipei, Taiwan

**Background and Aim:** Hepatitis B e antigen (HBeAg)-negative hepatitis is a clinical indicator of poor outcome for chronic
Oral cacy and safety of the ledipasvir 90 mg/sofosbuvir 400 mg IFN-free and RBV-free therapies are needed in Korea and treatment options. Highly effective, safe and well-tolerated these patients are interferon (IFN) and ribavirin (RBV)-experi-

**Affiliations:** [1]Chang Gung University, Keelung-Taiwan, [2] Kaohsiung Medical University, Kaohsiung-Taiwan, [3]China Medical University, Taichung-Taiwan, [4]National Cheng Kung University, Tainan-Taiwan, [5]Taipei Veterans General Hospital, Taipei-Taiwan, [6]Gilead Sciences, Inc., Foster City-United States, [7]Mackay Memorial Hospital, Taipei-Taiwan, [8]Chang Gung Medical Foundation-Linkou, Taoyuan-Taiwan, [9]Changhua Christian Hospital, Changhua-Taiwan, [10]National Taiwan University, Taipei-Taiwan

**Background and Aims:** In Korea and Taiwan, ~50% of patients with chronic HCV have genotype (GT) 1 infection. Many of these patients are interferon (IFN) and ribavirin (RBV)-experienced, RBV-ineligible, or RBV-intolerant and have no current treatment options. Highly effective, safe and well-tolerated IFN-free and RBV-free therapies are needed in Korea and Taiwan. **Methods:** Open-label, Phase 3 study evaluated the efficacy and safety of the ledipasvir 90 mg/sofosbuvir 400 mg (LDV/SOF) fixed-dose combination tablet administered orally, once daily for 12 weeks in Korean and Taiwanese adults with chronic GT1 HCV infection, with and without cirrhosis. There was no upper age limit, no entry restriction applied for neotrophils, and the minimum platelet count was 50 000/μL. NS5A and NS5B resistance associated variants (RAVs) were evaluated by deep sequencing. The primary efficacy end point was SVR12. **Results:** One hundred seventy-eight subjects enrolled: mean (range) age was 54 (20–75) years and BMI 24 (18–38) kg/m². Majority of subjects were women (56%), treatment experienced (51%), non-cirrhotic (85%), GT1b-infected (93%), and had IL28B CC genotype (72%). Overall, 98% (175/178) of subjects achieved SVR12. Baseline NS5A RAVs were detected in 38 subjects: 37/38 (97%) achieved SVR12. Headache was the only adverse event (AE) reported in ≥10% of subjects. No AE leading to discontinuation or SAEs occurred in less than one patient. No significant laboratory abnormalities were observed. **Conclusions:** A single-tablet regimen of ledipasvir/sofosbuvir administered once daily for 12 weeks is highly effective and well tolerated in Korean and Taiwanese patients with genotype 1-infection, including those with cirrhosis.

### Table 1 SVR12 rates in GT 1-infected patients and difficult-to-treat subgroups

|                  | Korea (N = 93) | Taiwan (N = 85) | Overall (N = 178) |
|------------------|---------------|-----------------|------------------|
| **Virologic response (ITT):** |               |                 |                  |
| Overall, SVR12, n (%)         | 92 (99)       | 83 (98)         | 175 (98)         |
| On-treatment failure, n (%)   | 0             | 0               | 0                |
| Relapse, n (%)                | 1 (1)         | 1 (1)           | 2 (1)            |
| Withdraw consent, n (%)       | 0             | 1 (1)           | 1 (<1)           |
| **SVR12 by subgroup:** |               |                 |                  |
| Treatment-experienced (TE), n/N (%) | 46/47 (98) | 41/43 (96) | 87/90 (97) |
| Cirrhotic, n/N (%)            | 17/17 (100)   | 9/9 (100)       | 26/26 (100)      |
| TE with cirrhosis, n/N (%)    | 13/13 (100)   | 4/4 (100)       | 17/17 (100)      |

**Declaration of conflict of interest:** YS Lim: Consultant: Gilead Sciences, WL Chuang: Consultant: Gilead Sciences, SH Ahn: Consultant: Gilead Sciences, CY Peng: Consultant: Gilead Sciences, SW Paik: Consultant: Gilead Sciences, RN Chien: Consultant: Gilead Sciences, CJ Chu: Consultant: Gilead Sciences, J Yang: Employee: Gilead Sciences, H Mo: Employee: Gilead Sciences, B Gao: Employee: Gilead Sciences, P Pang: Employee: Gilead Sciences, S Knox: Employee: Gilead Sciences, J McHutchison: Employee: Gilead Sciences, YJ Lee: Consultant: Gilead Sciences, TT Chang: Consultant: Gilead Sciences, SH Jeong: Consultant: Gilead Sciences, KH Han: None Declared, JH Kao: Consultant: Gilead Sciences.

### # 1075 98% SVR12 in Korean and Taiwanese patients with chronic GT2 HCV infection receiving 12-weeks of sofosbuvir+ribavirin: An international phase 3 study

**Authors:** CHENG-YUAN PENG [1]; JIA-HORNG KAO [2]; RONG-NAN CHIEN [3]; TING-TSUNG CHANG [4]; CHI-
SVR12 by subgroup: (18 subjects enrolled: mean (range) age 54 (22–85) years) were detected. Adverse events (AE) reported in genotype (84%). Overall, SVR12 rate was 98% (212/216). No treatment-naïve (69%), non-cirrhotic (88%), and had IL28B CC.”

**Conclusions**: Sofosbuvir plus RBV for 12 weeks is highly effective and well tolerated in Korean and Taiwanese patients with GT2 HCV infection, including those with cirrhosis.

### Table 1 SVR12 rates in GT 2-infected patients and difficult-to-treat subgroups

| Group               | Korea (N = 129) | Taiwan (N = 87) | Overall (N = 216) |
|---------------------|-----------------|-----------------|-------------------|
| Virologic response (ITT): |                 |                 |                   |
| Overall, SVR12, n (%) | 125 (97)        | 87 (100)        | 212 (98)          |
| On-treatment failure, n (%) | 0 (1)           | 0 (1)           | 0 (1)             |
| Relapse, n (%)      | 1 (1)           | 0 (1)           | 1 (2)             |
| Lost to follow-up, n (%) | 0 (2)           | 0 (2)           | 2 (2)             |
| SVR12 by subgroup: |                 |                 |                   |
| TE, n/N (%)         | 24/24 (100)     | 44/44 (100)     | 68/68 (100)       |
| Cirrhotic, n/N (%)  | 13/13 (100)     | 13/13 (100)     | 26/26 (100)       |
| TE with cirrhotic, n/N (%) | 7/7 (100)      | 9/9 (100)       | 16/16 (100)       |

**Declaration of conflict of interest**: JH Kao; Consultant: Gilead Sciences, SH Ahn; Consultant: Gilead Sciences, RN Chien; Consultant: Gilead Sciences, SH Jeong; Consultant: Gilead Sciences, CY Peng; Consultant: Gilead Sciences, YS Lim; Consultant: Gilead Sciences, J Yang; Employee: Gilead Sciences, H Mo; Employee: Gilead Sciences, LL Han; Employee: Gilead Sciences, D. Brainard; Employee: Gilead Sciences, S Knox; Employee: Gilead Sciences, J McHutchison; Employee: Gilead Sciences, YJ Lee; Consultant: Gilead Sciences, TT Chang; Consultant: Gilead Sciences, SW Paik; Consultant: Gilead Sciences, CJ Chu; Consultant: Gilead Sciences, WL Chuang; Consultant: Gilead Sciences, KH Han; None declared.

**# 1480 Impact of metabolic risk factors and co-infection with hepatitis B virus on clinical outcomes in patients with chronic hepatitis C: A cohort study of 7151 subjects**

**Authors**: SHREENIDHI SUBRAMANIAM [1]; YEE-KIT TSE [2,3,4]; TERRY CF YIP [5]; VINCENT WS WONG [2,3,4]; HENRY LY CHAN [2,3,4]; GRACE LH WONG [2,3,4]

**Affiliations**: [1]Faculty of Medicine, [2]Institute of Digestive Disease, [3]Department of Medicine and Therapeutics, [4]State Key Laboratory of Digestive Disease, [5]Department of Statistics, The Chinese University of Hong Kong

**Background and Aims**: Studies have demonstrated a higher prevalence of diabetes mellitus (DM) in patients with chronic hepatitis C (CHC). Furthermore, co-infection with hepatitis B virus (HBV) is common because of their similar parenteral routes of transmission and its endemcity in Asian-Pacific regions. We aimed to investigate the impact of DM and HBV on clinical outcomes in Chinese CHC patients.

**Methods**: We conducted a territory-wide cohort study using the database from Hospital Authority, which provides medical services at both in-patient and out-patient settings for 70–80% of the Hong Kong citizens. We identified CHC patients by International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes, diagnosed between 2000 and 2012. The primary outcome was death.

**Results**: Of CHC patients, 7151 were included. Seven hundred twenty-two (10.1%) patients were co-infected with HBV. Their mean age was 56 years, 69% were men. The prevalence of DM was similar in mono-infection and co-infection cohorts (18% and 17%, respectively). Multivariable analysis showed men, age ≥50 years, serum albumin<35 g/L, total bilirubin ≥18 μmol/L, renal failure, lack of anti-HCV treatment, and DM were independent predictors of death. The adjusted hazard ratio of anti-HCV treatment and DM was 0.175 (95% confidence interval [CI] 0.138–0.222) and 1.126 (95% CI 1.027–1.235), respectively. The 5-year survival of patients who did or did not receive anti-HCV treatment was 94.7% and 55.1%, respectively. That of DM and non-DM patients was 52.1% and 64.1%, respectively. Our cohort provides a large sample size, conferring a high statistical power to this analysis. The Hong Kong population has numerous distinctive characteristics, namely, a significant proportion of patients is infected by genotype 6 HCV and lower body mass index compared with the West. **Conclusions**: DM and HBV co-infection were independent predictors of death, whereas anti-HCV treatment improved the survival in Chinese CHC patients.

**Financial support**: This work was supported by the Health and Medical Research Fund from the Food and Health Bureau of the Hong Kong Government (Reference no: CU-15-A9).
# 1537 Long-term clinical outcomes after fatty liver screening in patients undergoing coronary angiogram: A prospective cohort study
Authors: VINCENT WAI-SUN WONG [1,2]; GRACE LAI-HUNG WONG [1,2]; JENNY LIMOQUACO [1,3]; ANGEL MEI-LING CHIM [1,2]; CHEUK-MAN YU [1]; HENRY LI-YUEN CHAN [1,2]
Affiliations: [1]Department of Medicine and Therapeutics and, [2]State Key Laboratory of Digestive Disease, The Chinese University of Hong Kong, Hong Kong, China, [3] Chong Hua Hospital, Cebu City, Philippines

Background and Aims: There is ongoing debate on whether screening for nonalcoholic fatty liver disease (NAFLD) is worthwhile in high-risk groups. Because of shared risk factors, NAFLD is highly prevalent in patients with coronary artery disease. We aimed to test the hypothesis that NAFLD screening in patients requiring coronary angiogram would identify high-risk patients and predict long-term clinical outcomes. Methods: This was a prospective cohort study. Abdominal ultrasonography was performed by two operators for NAFLD screening before coronary angiogram in 612 consecutive patients. The patients were followed until the last enrolled patient had reached 5 years of follow-up. Results: At baseline, 356 (58.2%) patients had NAFLD. NAFLD patients, compared with those without, were more likely to have >50% stenosis in one or more coronary arteries (84.6% vs 64.1%; P < 0.001) and therefore require percutaneous coronary intervention (68.3% vs 43.4%; P < 0.001). During 3679 patient-years of follow-up, 47 (13.2%) NAFLD patients and 59 (23.0%) patients without NAFLD died (age-adjusted and sex-adjusted hazard ratio [aHR] 0.36; 95% confidence interval [CI] 0.18–0.70; P = 0.003). Composite cardiovascular outcomes (cardiovascular deaths, nonfatal myocardial infarction, heart failure, or secondary interventions) were similar between groups (36.5% vs 37.1%; aHR 0.90; 95% CI 0.69–1.18). Older age and diabetes were the only factors independently associated with cardiovascular events. Only two patients, both in the NAFLD group, died of hepatocellular carcinoma. No other patients developed liver-related complications. Conclusions: In patients with clinical indications for coronary angiogram, the presence of NAFLD is associated with coronary artery stenosis and need for coronary intervention but not increased mortality or cardiovascular complications. HCC and cirrhotic complications are rare. Based on the current evidence, screening for NAFLD cannot be recommended in this patient group. (This study was partly supported by a grant from the Research Grants Council, the Hong Kong SAR Government [Project reference CUHK477813]).

# 1595 Interleukin 6 confers poor prognosis of hepatocellular carcinoma through cancer stemness properties
Authors: TE-SHENG CHANG [1]; YU-CHIH WU [2]; CHING-CHI CHI [3]; SHUI-YI TUNG [1]; THAI-YEN LING [4]; YEN-HUA HUANG [2,5]
Affiliations: [1]Department of Gastroenterology and Hepatology, Division of Internal Medicine, Chang Gung Memorial Hospital, Chiayi, Taiwan, [2]Department of Biochemistry and Molecular Cell Biology, College of Medicine, Taipei Medical University, Taipei, Taiwan, [3]Department of Dermatology and Centre for Evidence-Based Medicine, Chiayi Chang Gung Memorial Hospital, Chiayi, Taiwan, [4]Department of Pharmacology, College of Medicine, National Taiwan University, Taipei, Taiwan, [5]Graduate Institute of Medical Sciences, College of Medicine, Taipei Medical University, Taipei, Taiwan

Methods: This was a prospective cohort study. Abdominal ultrasonography was performed by two operators for NAFLD screening before coronary angiogram in 612 consecutive patients. The patients were followed until the last enrolled patient had reached 5 years of follow-up. Results: At baseline, 356 (58.2%) patients had NAFLD. NAFLD patients, compared with those without, were more likely to have >50% stenosis in one or more coronary arteries (84.6% vs 64.1%; P < 0.001) and therefore require percutaneous coronary intervention (68.3% vs 43.4%; P < 0.001). During 3679 patient-years of follow-up, 47 (13.2%) NAFLD patients and 59 (23.0%) patients without NAFLD died (age-adjusted and sex-adjusted hazard ratio [aHR] 0.36; 95% confidence interval [CI] 0.18–0.70; P = 0.003). Composite cardiovascular outcomes (cardiovascular deaths, nonfatal myocardial infarction, heart failure, or secondary interventions) were similar between groups (36.5% vs 37.1%; aHR 0.90; 95% CI 0.69–1.18). Older age and diabetes were the only factors independently associated with cardiovascular events. Only two patients, both in the NAFLD group, died of hepatocellular carcinoma. No other patients developed liver-related complications. Conclusions: In patients with clinical indications for coronary angiogram, the presence of NAFLD is associated with coronary artery stenosis and need for coronary intervention but not increased mortality or cardiovascular complications. HCC and cirrhotic complications are rare. Based on the current evidence, screening for NAFLD cannot be recommended in this patient group. (This study was partly supported by a grant from the Research Grants Council, the Hong Kong SAR Government [Project reference CUHK477813]).
Background and Aims: Liver cirrhosis is a major risk factor for hepatocellular carcinoma (HCC) in patients with chronic hepatitis B virus (HBV) infection. However, little is known about the association of viral factors, including viral load and mutants, with HCC as well as cirrhosis-related complications in HBV patients with compensated cirrhosis. Methods: A total of 603 treatment-naïve HBV patients with compensated cirrhosis who received a long-term follow-up were consecutively enrolled from 1985 to 2000. Baseline serum viral markers were determined to correlate with development of HCC and cirrhosis-related complications. Results: During a mean follow-up of 9.06 years, 160 patients developed HCC, with an annual incidence rate of 2.93%. Older age, male sex, a lower platelet count, genotype C, and basal core promoter (BCP) mutant were found to be independent risk factors for HCC development. When correlating with cirrhosis-related complications, only older age and a lower platelet count remained significant. In addition, both risks of HCC and cirrhosis-related complications were comparable between patients having high and low viral loads, with the HBV DNA cutoff of 2000 IU/mL. Finally, the sensitivity analysis confirmed most of our findings when only enrolling patients fulfilling the objective diagnostic criteria of cirrhosis. Conclusions: In Asian HBV patients with compensated cirrhosis, viral genotype C and BCP mutant rather than viral load are associated with higher HCC risks.

Keywords: basal core promoter, chronic hepatitis B, genotype, HBsAg, HBV, precore

# 1728 The NIACE score helps predict the survival of Asian hepatocellular carcinoma patients

Authors: TUNG-HUNG SU [1,2]; CHUN-JEN LIU [1,2]; HUNG-CHIH YANG [2]; CHEN-HUA LIU [2]; PEI-JER CHEN [1,2]; DING-SHIN CHEN [1,2]; XAVIER ADHOUTE [3]; MARC BOURLIERE [3]; JIA-HORNG KAO [1,2]

Affiliations: [1]Graduate Institute of Clinical Medicine, National Taiwan University College of Medicine, Taipei, Taiwan; [2]Division of Gastroenterology and Hepatology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan; [3]Hepatology, Hepatology department hospital saint-Joseph, Marseilles, France

Background and Aims: The NIACE score provides additional prognostic values to the Barcelona clinic liver cancer (BCLC) staging for hepatocellular carcinoma (HCC) patients in European studies. We aimed to evaluate its prognostic value in Asian HCC patients. Methods: This was a retrospective study from a tertiary medical center in Taiwan. Patients with HCC were included consecutively, and their clinical data were recorded. The NIACE score was calculated as: 1× (nodular numbers 0 if <3, 1 if ≥3) + 1.5× (infiltrating tumors: 0 if no, 1 if yes) + 1.5× (alpha-fetoprotein: 0 if <200, 1 if ≥200 ng/ml) + 1.5× (Child-Pugh score: 0 if A, 1 if B) + 1.5× (ECOG score 0 if 0, 1 if ≥1). The primary outcome was all-cause mortality. Results: A total of 468 patients with HCC were enrolled between 2009 and 2014; where 239, 141, and 88 patients were BCLC stages A, B, and C, respectively. Regardless of treatment modalities, NIACE score (0, 1–1.5, 2.5–3, and ≥4) significantly predicted survival (logrank P < 0.0001). NIACE scores 1, 1.5, and 3 further predicted survival in BCLC A, B, and C patients, respectively (all P < 0.01). The prognostic value of NIACE score was comparable with BCLC staging in patients receiving surgery, radiofrequency ablation, and systemic therapy. However, NIACE score (0, 1–3, and ≥4) significantly predicted survival in patients receiving transarterial chemoembolization (logrank P < 0.001), compared with BCLC staging (logrank P = 0.07). Conclusions: The NIACE score helps discern different prognoses among BCLC A, B, and C subgroups of patients with HCC, especially in subgroups of those receiving transarterial chemoembolization.

Keywords: alpha-fetoprotein, BCLC, Child-Pugh score, ECOG; transarterial chemoembolization

# 1835 Immune tolerance and intolerance in IgG repertoires of hepatitis B carrier children

Authors: YH CHANG [1,4]; HC KUAN [2,4]; TC HSIEH [3]; KH MA [3]; CH YANG [1]; WB HSU [1]; SF TSAI [1]; A CHAO [3]; HH LIU [1,2,5]

Affiliations: [1]IMGM, National Health Research Institutes, Zhunan 35053, Taiwan, [2]Pediatrics, En Chu Kong Hospital, Sanxia 23702, Taiwan, [3]Institute of Statistics, National Tsing Hua University, Hsin-Chu 30043, Taiwan, [4]Equal contribution, [5] Correspondence: Hong-Hsing Liu MD PhD

Background and Aim: This study aimed to implement sequence-driven analyses of IgG repertoires to comprehend chronic hepatitis B infections and immune tolerance to vaccination. Methods: Repertoires were prepared from four carrier–noncarrier sibling pairs both before and 2 weeks after vaccination as sequence sets of the complementarity-determining region 3 (CDR3) on IgG heavy chains. Analyses were carried out in a framework shaped by both CDR3 clusters and diversity measures modeled from numerical ecology. Results: Carriers’ repertoires clustered in principal component analysis (Fig. A). A huge set of related CDR3 clones presented almost exclusively among carriers (Fig. B). Vaccination increased CDR3 diversities among noncarriers (Fig. C), and tolerance at focused spectra of carriers’ repertoires was distinguishable with post-vaccination clusters from noncarriers (Fig. D). Conclusion: Both vaccine tolerance and virus intolerance in children with chronic hepatitis B infections were distinct features strongly perceivable at perspectives of diversity measures and sequence clusters, demonstrating great potentials of immune repertoires in disease annotations.

# 1836 Sequence diversity of IgG repertoires among chronically hepatitis B infected children and adults

Authors: TUNG-HUNG SU, CHUN-JEN LIU, HUNG-CHIH YANG, CHEN-HUA LIU, PEI-JER CHEN, DING-SHIN CHEN, XAVIER ADHOUTE, MARC BOURLIERE, JIA-HORNG KAO

Affiliations: [1]Graduate Institute of Clinical Medicine, National Taiwan University College of Medicine, Taipei, Taiwan; [2]Division of Gastroenterology and Hepatology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan; [3]Hepatology, Hepatology department hospital saint-Joseph, Marseilles, France

Fig (A) Principal component analysis, (B) carriers’ cluster connected with indel-free Hamming distance 1, (C) CDR3 diversity shifts, and (D) noncarriers’ post-vaccination clusters.
Radiofrequency ablation (RFA) is indicated for early stage hepatocellular carcinoma (HCC), but the therapeutic efficacy between RFA and surgical resection (SR) is inconclusive. We aim to develop a prognostic nomogram for recurrence-free survival (RFS) after RFA and to evaluate its ability in improving treatment algorithm. **Methods:** We retrospectively enrolled 836 patients with Barcelona Clinic Liver Cancer very early/early HCC receiving SR or RFA. Nomogram was constructed with Cox proportional hazards model. RFA patients were stratified into low-risk and high-risk groups. The RFS and overall survival (OS) of two risk groups were compared with SR patients with propensity-score matching analysis. **Results:** A prognostic nomogram was built based on number and size of tumor, platelet count, albumin level, and model for end-stage liver disease score with a concordance index of 0.69. SR provided better RFS and OS compared with high-risk (nomogram score >9.8) RFA patients in the propensity model. The 5-year RFS rates were 36% versus 11%, while 5-year OS rates were 74% versus 60% for SR and high-risk RFA group, respectively (both P < 0.05). However, SR was associated with better RFS (5-year RFS rates 41% versus 29%), but similar OS (5-year OS rates 80% versus 81%), compared with low-risk (nomogram score < 9.8) RFA patients in the propensity model (both P < 0.05). **Conclusions:** The user-friendly nomogram offers individualized survival risk estimation and stratification for early HCC patients receiving curative RFA and can be integrated into current treatment algorithm. SR should be considered the first-line treatment for high-risk patients to achieve better outcomes.

---

**Background and Aim:** Hepatitis B virus (HBV) replication plays the key role in HBV progression. In the present of familial tendency of hepatocellular carcinoma (HCC), genetic factor associated with clinical progression were different among several genome-wide association studies. Non-genetic factors could play important roles. We evaluate factor associated with HBV replication in relatives of patients with HCC. **Methods:** Relatives of 355 HCC cases were interviewed using a structured questionnaire. Demographics, relationship to index case, HBsAg status of mothers and index cases, HBV DNA levels, and HBV genotypes were evaluated for association with HBV replication. We used the generalized estimating equation (GEE) method for analyzing correlated data with a binary response (e.g. for HBsAg status and HBV DNA level) using the exchangeable working correlation structure. Univariate and multivariate analyses were assessed by using GEE with the PROC GENMOD procedure in SAS 9.3 (SAS Institute Inc., Cary, NC, USA). **Results:** Among 729 relatives participated in this study, multivariate generalized estimating equation analysis revealed parent generation (OR = 0.11, \(P = 4.12 \times 10^{-8}\)), child generation (OR = 0.46, \(P = 0.006\)), an HBsAg-positive mother (OR = 2.83, \(P = 0.0003\)), and an HBsAg-positive indexed case (OR = 4.16, \(P = 5.76 \times 10^{-8}\)) were independent risk factors on persistent HBV infection. After excluded coinfection of hepatitis C (n = 10) and HBV genotype C (n = 45), we examined factors associated with HBV replication among 260 HBsAg positive relatives. Based on a multivariate generalized estimating equation analysis, parent generation (OR = 4.5, \(P = 0.0281\)) and male gender (OR = 2.3, \(P = 0.0065\)) were associated with high HBV replication. HBV replication was examined in 46 families clustered with HBsAg-positive siblings with same gender. Male siblings of HBsAg positive mother were more likely to have higher levels HBV replication than female siblings. **Conclusions:** Gender and generation play roles in HBV replication. Maternal age at birth and nutritional changes could be the reason of difference on HBV replication between generations.


# 1062 Impact of HBV DNA level and antiviral agent on the recurrence of patients after liver resection for hepatitis B virus-related hepatocellular carcinoma

Authors: TAE YOO [1,2]; KYUNG-SUK SUH [1]; KWANG-WOONG LEE [1]; NAM-JOON YI [1]; GEUN HONG [1]; YOUNGROK CHOI [1]; HYEYOUNG KIM [1]; MIN-SOO PARK [1]; SUKWON SUH [1]

Affiliations: [1]Department of Surgery, Seoul National University College of Medicine 101 Daehak-ro, Jongno-gu, Seoul, Republic of Korea, [2]Department of Surgery, Hallym University College of Medicine, Hwaseong, Republic of Korea

Background and Aim: The aim of this study is to investigate the significance of HBV DNA levels and antiviral agent for predicting recurrence in HCC patients who underwent curative liver resection. Methods: From 2005 to 2010, 341 HBV-related HCC patients who underwent tumor resection in SNUH were enrolled. HBV DNA levels (preoperative and post-operative periods) and antiviral treatment were analyzed for association with HCC recurrence, together with other clinical variables. Results: Of the 294 patients, patients (n = 164) with low post-operative HBV DNA (1 x 10³ IU) had better outcome than those (n = 130) with high load in recurrence (5-yr recurrence free survival [RFS] = 43.2 vs 22.2%, P < 0.001). In terms of antiviral agents, untreated group (n = 136) had worse outcome than treatment group (n = 158) in recurrence (5-yr RFS = 28.3 vs 56.3%, P < 0.001). In subgroup analysis, if the treatment group had high HBV viremia postoperatively, they had good RFS as group with low viremia (5-yr RFS = 54.1 vs 58.3%). But, even if untreated patients had low viremia, they had poor outcomes as untreated group with high viremia (5-yr RFS = 37.1 vs 11.9%). Moreover, whether it is advanced stage (3) or not, low post-operative HBV load showed the better recurrence outcome but antiviral treatment did not present difference in advanced stage. Finally, post-operative AFP levels and microvascular invasion were independent risk factors for RFS in multivariated analysis. Conclusions: Low HBV DNA load and antiviral therapy may be important factors after the curative treatment of HBV-related HCC in terms of tumor recurrence. Therefore, to maintain the low level of HBV viremia, antiviral therapy should be considered after curative treatment of HCC.

Keywords: antiviral agent, hepatitis b, hepatocellular carcinoma, liver resection

# 1430 Pancreas transplant at Taipei Veterans General Hospital

Authors: YI-MING SHYR; SHIN-E WANG

Affiliation: From Division of General Surgery, Departments of Surgery, Taipei Veterans General Hospital, National Yang Ming University, Taipei, Taiwan

Background and Aims: Type 1 diabetes eventually leads to nephropathy, neuropathy, retinopathy, and angiopathy after 10–30 years. Currently, pancreas transplant is the treatment of choice in tight control of blood sugar for IDDM patients, and further to stabilize, prevent or even to reverse the diabetic complications. Methods: We will present our experience in pancreas transplant, which was initiated on September 19, 2003. From September 2003 to February 2015, there were 104 pancreas transplants performed for 100 patients at Taipei Veterans General Hospital, with 39 SPK, 10 PAK, 40 PTA, and 15 PBK. Most (82.3%)
of our pancreas transplants were for IDDM patients. **Results**: The blood sugar usually returned to normal level within 5 h (median) after revascularization of the pancreas grafts. The fasting blood sugar maintained within normal range thereafter throughout the whole clinical course in most cases. There were two surgical mortality. The technical success rate was 96.0%. Excluding the four cases with technique failure, overall 1 year pancreas graft survival is 98.5% and 5 year is 94.1%, with 100% 1 year for SPK, 97.1% 1 year for PTA, 100% 1 year for PAK, and 100% 1 year for PBK.

**Conclusions**: In conclusion, pancreas transplant provided an ideal insulin-free solution for DM, especially IDDM. Pancreas transplant could be performed with similar successful rate irrespective of the type of pancreas transplant at our hospital.

# 1504 The role of lymph nodes in predicting the prognosis of ampullary carcinoma after curative resection

**Authors**: SHIH-CHIN CHEN; YI-MING SYHR; SHU-CHENG CHOU; SHIN-E WANG

**Affiliation**: Division of General Surgery, Department of Surgery, Taipei Veterans General Hospital, National Yang Ming University

**Background and Aims**: Lymph node involvement is one of the well-demonstrated prognostic factors in ampullary carcinoma. The aim of this study is to clarify the role of lymph nodes in predicting the survival outcome of ampullary carcinoma. **Methods**: A cohort of consecutive curative pancreaticoduodenectomies for ampullary carcinoma from 1999 to 2014 was retrospectively analyzed. The effect of node-associated variables, including lymph node status, positive lymph node number, total harvested lymph node (THLN) number, and lymph node ratio (LNR) was examined using univariate and multivariate analyses for survival outcome prediction. **Results**: In 194 evaluable patients, univariate analysis demonstrated that stage, cell differentiation, perineural invasion, and nodal status were significant conventional prognostic factors. Concerning the node-associated variables, positive nodal status, positive lymph node number $\geq 2$, THLN number $< 14$, and LNR $\geq 0.15$ were significantly associated with poorer survival outcomes, with a 5-year survival rate of 20.3%, 38.9%, 25.4%, and 18%, respectively. By multivariate analysis, nodal status and THLN number were two independent predictors of survival. The most favorable 5-year survival rate was 84.4% in patients with negative nodal involvement and THLN number $\geq 14$, compared with the poorest 5-year survival rate of 16.1% in those with positive nodal status and THLN number $< 14$. **Conclusions**: Tumor biology reflected by lymph node status is the most important independent prognostic factor; nevertheless, surgical radicality based on THLN number also plays a significant role in the survival outcome for patients with ampullary carcinoma after curative pancreaticoduodenectomy.

# 1605 Super-selective hepatic artery fluorescence guide image demarcating the hepatic segment: Proof of concept in the porcine model

**Author**: YU-YIN LIU

**Affiliation**: Department of General surgery, Chang Gung Memorial Hospital, Linkou, Chang gung university, Taoyuan, Taiwan

**Background and Aims**: Location of small HCC and anatomical resection are still challenging during laparoscopic liver resection. We hypothesized injection of ICG into selective hepatic artery will be helpful to identify demarcation of target liver segment. **Methods**: A total of four (two males) swine were used in this non-survival study. We insert the angio-sheath via right femoral artery and cannulate the celiac trunk orifice by angiocatheter. Then we advanced the microcatheter via celiac trunk orifice to the different segmental artery branches. Four pig were used to test the feasibility of demarcation in the different sizes of liver segment and another. **Results**: In first stage, bright signal enough to identify demarcation of target hepatic segment was obtained from 0.1 mg/ml. CT angiography after laparoscopic clip marking in four different segments are corresponding with the territory of selective hepatic artery. The test shows the ability for demarcation between target segment and other tissues. **Conclusions**: Intrahepatic arterial ICG injection produces near-infrared fluorescent videography and visualizes the demarcation of target hepatic segment. This new technique could well improve visual ability of target hepatic segment.

# 1764 Three- and five-year outcomes of surgical resection for pancreatic duct adenocarcinoma: Long-term experiences in one medical center

**Authors**: CHIH-PO HSU; TASNN-LONG HWANG; SHIH-CHING KANG; BEING-CHUAN LIN; YU-PAO HSU; JUN-TE HSU; CHUN-NAN YEH; TA-SEN YEH

**Affiliation**: Department and institution: Division of General Surgery, Chang Gung Memorial Hospital, Taoyuan city, Taiwan

**Background and Aims**: Pancreatic duct adenocarcinoma is one of the most malignant human cancers. Surgical resection provides the only chance for a cure in patients with resectable tumors. The aims of this study are to evaluate the 3- and 5-year outcomes of surgical results for pancreatic duct adenocarcinoma and to determine whether statistically identified prognostic factors can be used to predict survival. **Methods**: This retrospectively reviewed study was conducted from January 1981 to June 2009. Patients who had resectable pancreatic ductal adenocarcinoma and received surgical treatment were included. Cases of hospital mortality were excluded. The relationships of several clinicopathological factors to 3- and 5-year survival were analyzed. **Results**: During the study period, 229 patients with pancreatic ductal adenocarcinoma who received surgical treatment were included in this study. The 3-year and 5-year survival rates were 19.9% and 10.4%, respectively. The tumor size, $N$ status, resection margin, and use of adjuvant chemotherapy were independent predictive factors for 3-year survival. The tumor size and free resection margin were independent predictive factors for 5-year survival. Despite having a large tumor size, positive margins, positive lymph nodes, and/or not receiving adjuvant chemotherapy, some patients exhibited prolonged survival. **Conclusion**: The tumor size and resection margin are the two most important prognostic factors that predict both 3-year and 5-year survival. The use of chemotherapy and the lymph node status only predicted the 3-year survival. Poor prognostic factors do not preclude long-term survival. To overcome these limitations, further studies should focus on the tumor biology of pancreatic ductal adenocarcinoma.
# 1794 Etiology of small bowel strictures without any mass lesion

Authors: U SONIKA [1]; S SAHA [2]; P DAS [3]; V AHUJA [1]; P SAHNI [2]

Affiliations: [1]Department of Gastroenterology and Human nutrition, AIIMS, New Delhi, India, [2]Department of Gastrointestinal Surgery, AIIMS, New Delhi, India, [3]Department of Pathology, AIIMS, New Delhi, India

**Background and Aim:** Patients presenting with small bowel strictures can have varied etiologies. Globally, no data are available on demographic profile and etiology of small bowel strictures. 

**Methods:** A retrospective study conducted at a tertiary care center in north India. We analyzed case records of all patients who were operated from January 2000 to October 2014. Patients of small bowel strictures without any mass lesion and who remained undiagnosed after imaging and endoscopic studies were included. Demographic parameters, imaging, endoscopic findings, and histological diagnosis were noted. Statistical analyses were performed using STATA software version 12.1. 

**Results:** Eighty-nine patients were included. Most common site of strictures was proximal to small intestine (41.5%). The histological diagnosis of small bowel strictures were tuberculosis (27%), Crohn’s disease (23.5%), non-specific stricture (20%), ischemic strictures (10%), adenocarcinoma (9%), lymphoma (4.4%), and others (5.5%). Multivariate analysis to identify the distinguishing factors between tuberculosis and Crohn’s disease was carried out. Diarrhea was the only factor that predicted the diagnosis of Crohn’s disease (OR 6.50, CI 1.10–38.25; P = 0.038). 

**Conclusion:** Malignancy can be present in around 15% patients who present with small bowel strictures without any mass. We recommend low threshold for surgery in these patients.

**Keywords:** Crohn’s disease; malignancy; small intestinal stricture; tuberculosis

# 1870 Management of metastatic neuroendocrine tumor to liver: Analysis of surgical treatment and outcomes

Authors: YI-JU LEE; TSANN-LONG HWANG; JUN-TE HSU; TA-SEN YEH

Affiliation: Department of General Surgery Chang Gung Memorial Hospital

**Background and Aim:** Management of neuroendocrine tumor (NET) with liver metastasis (NELM) remains controversial, with some advocating an aggressive surgical approach, while others have adopted a more conservative strategy. Treatment options for NETs may vary greatly and include surgery, systemic chemotherapy, targeted radiotherapy, and regional strategies, such as ablative therapies and chemoembolization. The aim of our study was to compare outcome after liver resection and/or other therapy with that of non-surgical treatment in patients with liver metastases from NET. 

**Methods:** The study included patients of LinKou Chang Gung Memorial Hospital between 1995 and 2013. A total of 60 patients (aged 11–87 years; 27 men/33 women) with NELM underwent surgical treatment or non-surgical treatment. Patients’ data related to demographics and characteristics, surgical and medical treatments, tumor characteristics, tumor grading, and survival were retrospectively reviewed, using Kaplan–Meier to analyze. 

**Results:** Among the 60 patients, patients who received hepatectomy with/without other treatments showed better outcomes in progression-free survival (PFS), (1 year 81.8%; 3 year 50.9%, P-value 0.026) and overall survival (OS), (1 year 100%; 3 year 77.1%, P-value 0.003), respectively, including G3 cases (42.9%). Patients received targeted therapy or hormone therapy showed better outcomes in PFS (1 year 78.9%, 75.0%; 3 year 57.0%, 53.3%, P-values 0.030 and 0.008) and OS (1 year 94.7%, 90.0%; 3 year 67.2%, 74.7%, P-values 0.005 and 0.003), respectively, which all cases were G1 or G2. Patients received chemotherapy had worsen outcome, which mostly were G3 (88.9%) in tumor grade, respectively. 

**Conclusion:** Our study showed that NET patients with liver metastasis had better survival outcomes by treatment of metastatic tumor resection, targeted therapy, or hormone therapy, comparing with those received chemotherapy or none of treatment performed in NELM. Surgical treatment of NELM could provide favorable prolonged survival.

# 1992 Preoperative evaluation of the risk of surgery in patients with colorectal cancer, focusing on malnutrition and anesthesia evaluation

Authors: TZU-CHI HSU

Affiliations: Attending Surgeon, Division of Colorectal Surgery, Department of Surgery, Mackay Memorial Hospital; Professor of Surgery, Taipei Medical University; Professor Surgery, Mackay Medical College

**Background and Aims:** Patient with cancer frequently have altered intake and decreased absorption of nutrients. They are frequently presented with protein calorie malnutrition, which leads to immune dysfunction. The purpose of the study is (1) to evaluate the risk of operation based on preoperative serum albumin and total lymphocyte count and (2) to evaluate the risk of surgery based on preoperative classification of American Society of Anesthesiologists (ASA) score in patients with colorectal cancer. 

**Materials and methods:** Nine hundred twenty-four patients with primary colorectal cancer operated by a single surgeon from November 1995 to September 2014 were preoperatively evaluated and retrospectively analyzed. There were 497 men and 427 women. Age ranged from 19 to 93 years, with an average of 62.19 years. Four hundred seven patients were 65 years or older. 

**Results:** Albumin was checked in 910 patients, with 162 (17.8%) patients less than 3.5 g/dL. Total lymphocyte count was checked in 920 patients, with 383 (41.6%) patients less than 1500/μL. There were eight mortality (0.87%) and 41 (4.44%) complications. Thirty four complications (3.68%) were considered to be infectious. In the patients with complications, albumin was less than 3.5 g/dL in 14 patients, five patients (35.7%) expired, and a patient had severe infection. Complications correlated well with serum albumin level (P < 0.001), but not with total lymphocyte count. Using ASA classification, 45 patients were classified as class I, 526 patients as class II, 181 patients as class III, four patients as class IV, and 169 patients were not classified. It was found that complication rate was not correlated with ASA classification. 

**Conclusion:** This series suggested that malnutrition was associated with increased morbidity. Albumin remained as the most important marker to predict patient’s postoperative outcome in the patients with colorectal cancer. ASA classification was not able to predict patient’s complications. Early intervention of nutritional therapy is indicated in the group of patients with high risk of complications.