Magnet Assisted Capsule Endoscopy (MACE) in the Esophagus and Stomach Using the Novel MiroCam-Navi System

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Background/Aims: Attempts in employing a simple technique of capsule endoscopy for visualisation of the upper GI tract has, thus far, been experimental, cumbersome and potentially expensive. We describe the human series for comprehensive visualisation of the esophagus and stomach using the simple Intromedic MiroCam-Navi system. Our aim was to demonstrate the control and manoeuvrability of the MiroCam-Navi magnetic capsule.

Materials and Methods: 26 volunteers observed a 12 hour overnight fast but were allowed to drink clear water. 30 minutes before the examination volunteers drank a preparation mixture of 20 mg of metoclopramide syrup, and 100 mls of water with simethicone and pronase. The MiroCam-Navi magnet was placed at strategic points on the body and rotated to hold and manoeuvre the capsule. Control and manoeuvrability was assessed by moving and holding the capsule for 1 minute to visualise each of the following stations: lower oesophagus, cardia, fundus, body, incisura, antrum and pylorus and also traversing across the stomach and through the pylorus. All volunteers underwent an upper GI endoscopy within 3 days of the procedure.

Results: Median age was 38 (range 26-45), median BMI 24.1 (range 19.4-38.2), median additional volume of water consumed 800 mls (range 200 mls-1500 mls) and median procedure time 24 minutes (range 12-39 minutes).Landmark visualisation rate was 92%, 88%, 96%, 100%, 96%, 96% and 100% in GOJ, cardia, fundus, body, incisura, antrum and pylorus. The capsule could be moved from the fundus to the antrum in all cases and traverse the pylorus in 50% (n=13). Age ≥40 was associated with successful pyloric traversing (p=0.04). There was positive concordance for 8 out of 9 minor pathological findings with conventional upper GI endoscopy.

Conclusions: This is the convincing demonstration of the potential value of MACE in the esophagus and stomach using the MiroCam-Navi system. There is a high degree of visualisation, control and manoeuvrability.

Key Words: Magnet assisted capsule endoscopy, Esophagus and stomach

New Technique for GI Endoscopy Using 3D Printing

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Background and Study Aim: Cap assisted endoscopic mucosal resection (EMRC) procedure is a less invasive, valuable treatment modality of esophageal mucosal lesion. But it is difficult to target accurately the lesion because esophageal lesion is located vertically to the insertion direction of the endoscope. The aim of this study was to evaluate the feasibility of various novel endoscopic accessories using 3D printing technique.

Patients and Methods: A total of 14 patients underwent cap assisted endoscopy (CAE) by a single expert endoscopist. Procedure details were cap assisted endoscopic mucosal resection (EMRC) (n=3), endoscopic submucosal dissection (ESD) (n=8), and trucut biopsy (TCB) (n=3). Instead of conventional endoscopic cap, the designing and fabricating custom-made caps by a 3D printer was used for each procedure. Three types of 3D printing cap were used; disposable distal attachments; we named them each, “Side hole” cap, “Oblique head” cap and “Wide head” cap.

Result: EMRCs in esophagus (n=2) and gastro-esophageal junction (G-E junction) (n=1) were completed with “Side hole” cap. Pathologic diagnosis included esophageal leiomyoma (n=2), differentiated adenocarcinoma (n=1). Curative resection was achieved in 3/3 patients (100%). All ESDs in stomach (n=8) were completed with “Oblique head” cap. The final pathologic mapping revealed differentiated adenocarcinoma (n=5), carcinoma with lymphoid stroma (n=2) and low grade dysplasia (n=1). All of these cases were resected en bloc. Curative resection was achieved in 7/8 patients (87.5%). TCBs in esophagus (n=3) were completed with “Wide head” cap. All pathologic diagnosis of TCBs were leiomyoma (n=3). Overall technical success rate for diagnosis was 100% (n=3/3). There was no significant complication, such as bleeding or perforation.

Conclusion: The novel endoscopic caps using 3D printing technology were feasible in diagnostic or therapeutic GI endoscopy.

Key Words: 3D printing technology, EMRC, ESD, TCB
Endoscopic Photoacoustic Tomography Imaging for Sentinel Lymph Node Detection: Ex-vivo Phantom Feasibility Study

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Background and Aim: In the era of pursuing minimally destructive operation for gastric adenocarcinoma, it is beneficial to understand precise sentinel LN preoperatively. However, there has been no preoperative way to evaluate LN drained from the lesion directly. We aimed to investigate the feasibility of endoscopic photoacoustic tomography (EPAT) for sentinel LN detection through Ex-vivo phantom study.

Method: A pulsed 720 nm Nd:YAD laser with 10 Hz repetition rate was used for EPAT. The output end of optical fiber was integrated with a 20 MHz transducer to form an EPAT probe. The phantom gut and LN model was made by porcine esophagus. The phantom LN was made from indocyanine green interposed between resected stomach walls. Phantom LN was attached to the distal esophagus by suture; indocyanine green was also injected into subserosa (Fig. 1). Customized programs were used to achieve the images.

Result: The B-scan EPAT images cover a radial distance of 40 mm and a lateral angular coverage of 360°corresponding to a complete rotation of the probe. EPAT successfully visualized the ICG inside the phantom LN and injected into subserosa (Fig.2).

Conclusion: This phantom study showed that EPAT has potential to be used to evaluate preoperative sentinel LN distribution.

Key Words: Gastric cancer, Lymph node

Therapeutic Endoscopy Using Various Lasers

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Background/Aims: During the era of therapeutic gastrointestinal endoscopy, this study aims to evaluate the feasibility of novel laser systems when performing treatment of gastric epithelial neoplasia.

Methods: A total of 24 patients were enrolled into this study. 18 patients were diagnosed as gastric adenoma (n = 7) or adenocarcinoma (n = 11) and underwent ESD by a single expert endoscopist. Thulium or diode laser system were used for all ESD procedures including marking, mucosal incision and submucosal dissection. Instead of endoscopic knives, a 550-μm flexible silica fiber was inserted through the working channel of the endoscope. The remaining 6 patients underwent ablation therapy due to pathologic result of lateral margin positivity after previous ESD.

Results: In 18 patients, ESD was completed using only thulium or diode laser without the need to change other endoscopic knives. The median time for total procedure was 49 minutes (range, 35-203 minutes). In 16 of 18 patients, active bleeding was not observed during ESD. Curative resection was achieved in 83.3% (n = 15/18) of patients. All patients underwent ablation therapy did not show local recurrence during follow-up. There were no significant complications, such as delayed bleeding and perforation.

Conclusions: The various laser systems are feasible in endoscopic management of gastric epithelial neoplasia.

Key Words: Thulium laser, Diode laser, Gastric epithelial neoplasm

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Endoscopic Stomach Volume Estimation for Bariatric Endoluminal Gastroplasty: Animal Validation Study

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Background: 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 (63rd congress of the KSGE, oral presentation UGI-75). 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 50%. 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 were measured by filling with water.

Results: Stomach volume estimation by endoscopy was relatively accurate (mean error was less than 10% of stomach volume). In addition, planned bariatric gastroplasty for predetermined stomach volume reduction by endoscopic suture device was possible with the help of suturing 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.

Key Words: Endoscopy, Stomach, 3D Reconstruction, Bariatric

Feasibility of Terahertz Reflection Spectroscopic Imaging Techniques for Discrimination of Early Gastric Cancers

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Introduction: Terahertz (THz) electromagnetic waves are highly sensitive to biomolecules and water contents; hence they have applied to many biomedical applications. In addition, THz wave analysis can distinguish between different normal gastrointestinal tract tissues from a rat model in our preclinical experiment. We aimed to evaluate the feasibility of terahertz reflection spectroscopic imaging techniques for discrimination of early gastric cancer.

Methods: Eight fresh tissues of early gastric cancers were obtained from the patients who had undergone endoscopic submucosal dissection (ESD) in Severance Hospital between March and April 2014. THz reflection spectroscopic images for these fresh tissues were taken by the conventional reflection-mode THz time-domain imaging system with a photconductive antenna. The acquired 2D images were extracted using peak-to-peak values from reflected THz signals.

Results: All of 8 gastric cancers were resected completely by ESD. Of 8 lesions, 7 were differentiated cancer, and the remaining one was undifferentiated cancer. All lesions were confined to the mucosa. The median lesion size was 7 mm (range, 4-20 mm). In all lesions, high intensity signals were noted around the margin of the ESD specimens. It may be due to the effect of saline, which was injected around the lesion during the ESD. In addition, high intensity signals were also identified in the center of the specimens. These signals were well-correlated with the lesion visually. In one lesion, distinct boundary of the lesion was unclear on THz reflection spectroscopic image, because the margin of the specimen was too close to the lesion. Other 7 lesions, however, were well-delimited on THz reflection spectroscopic images.

Conclusion: THz reflection spectroscopic imaging techniques may be feasible for discrimination of early gastric cancers.

Key Words: Terahertz reflection spectroscopic image, Early gastric cancer, Feasibility
A Korea Multi-Center Study to Evaluate the Efficacy of the OTSC System

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Background & Aim: Recently, a new over-the-scope clip (OTSC) (Ovesco Endoscopy, Tuebingen, Germany) system has been developed and used for the primary non-surgical closure of GI tract perforations and fistulas. The aims of this study were to investigate the therapeutic yield of endoscopic management by the OTSC system.

Methods: We performed a multicenter prospective study. Total six experts (five centers) performed OTSC procedure.

Results: This study involved total 17 patients (median age 55 years [range 32-77 years], 12 men) with GI leaks from anastomotic dehiscence, fistulas, and esophageal perforation due to Boerhaave’s syndrome. Three gastrojejunostomy site, three esophagojejunostomy site, three esophagogastrostomy site, two Boerhaave’s syndrome, two gastrobronchial fistula, one gastrocolonic fistula, one endoscopic full thickness resection site closure, one jejuno-jejunal fistula, one colonopseudocyst fistula. The diameter of leaks ranged between 5 and 20 mm. Mean procedure time was 18.3 min. Technically, all procedure was succeeded. Complete sealing of leaks was achieved by using OTSC alone in 14 of 17 patients. For one OTSC fail patient, closure was completed by placing one additional covered stent. Two fistula cases required surgical repair.

Conclusion: The OTSC system is very useful in the management of GI leaks especially in case of anastomotic leakage after bowel surgery.

Key Words: OTSC, Perforation, Leakage, Fistula

Detection of Submucosal Invasion or Lymphovascular Invasion according to Section Intervals in Early Gastric Cancer

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Background/Aim: Expanded criteria for endoscopic submucosal dissection (ESD) in early gastric cancer (EGC) were suggested based on surgical database. Recommended section interval of surgically resected specimen (5-7 mm) is broader than that of ESD (2 mm) cases. Because some submucosal (SM) invasion or lymphovascular invasion (LVI) is focal, broad section intervals may miss focal SM invasion or LVI which may result in underestimation of LN metastasis risk factors. Therefore, we analyzed detection rates of SM invasion and LVI according to section intervals in EGC cases.

Methods: We prospectively enrolled consecutive 415 EGCs (≤3 cm) cases in 397 patients treated at the National Cancer Center from April 2012 to December 2013. All of the ESD and surgical specimens were sectioned in 2-mm interval. SM invasion or LVI detection rates were calculated according to section interval of 4 mm or 6 mm.

Results: A total of 114 cases with SM invasion and 38 cases with LVI were detected in 2-mm section intervals in 415 EGC cases. In 4-mm section intervals, SM invasion detection rates were 88.6-89.5% and LVI detection rates were 63.2-78.9%. Cases which always detected SM invasion were 78.1% (89/114) and were 42.1% (16/38) for LVI detection. In 6-mm section intervals, SM invasion detection rates were 75.4-84.2% and LVI detection rates were 55.3-63.2%. Cases always not affected were 59.6% (68/114) for SM invasion and only 21.1% (8/38) for LVI.

Conclusions: As the section interval increased, detection rates of SM invasion and LVI decreased especially in 6-mm interval recommended in surgical specimen handling. Thus, further validation might be needed for ESD expanded criteria, which are based on surgical database.

Key Words: Early gastric cancer, Expanded criteria, Lymphovascular invasion

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UGI-9

Diagnostic Trend and Clinical Characteristics of Eosinophilic Esophagitis in Korea: Based on Single Center Database

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Background/Aims: The prevalence of eosinophilic esophagitis (EoE) is increasing in Western countries. However, its prevalence is still unknown in Korea. We tried to investigate the diagnostic trend and its clinical characteristic of EoE in Korea using an endoscopic data base at a tertiary care center.

Methods: From January 2006 to July 2014, all patients who underwent esophagogastroduodenoscopy (EGD) and esophageal biopsy in the Department of Asan Medical center were included. We reviewed 18399 biopsy specimens and the presence of more than 15 eosinophils per high power field in biopsy specimens was considered cases of EoE.

Results: A total of thirty-seven patients (M:F=29:8, mean age=44.0 ±13) were diagnosed as EoE. The endoscopic appearance of EoE in 34 (91.8%) cases, including linear furrows in 24 (64.8%), ringed esophagus in 8 (21.6%), and white exudates in 8 (21.6%). By the analysis using Cochran-Armitage trend test, the diagnosis rate of EoE increased between 2006 and 2014 (P for trend<0.001, Figure)

Conclusions: In our study, the number of patients in whom diagnosed with EoE has significantly increased over the past 9 years in spite of marginally increased number of esophageal biopsy.

Key Words: Endoscopy, Eosinophilic esophagitis

UGI-10

A Simple Risk Score Accurately Predicts Rebleeding in Acute Peptic Ulcer Bleeding

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Objective: There are already existing risk scoring systems for calculating mortality in acute peptic ulcer bleeding, however, they cannot accurately predict the risk of rebleeding. Our goal was to create a simple prognostication tool that predicts 30-day rebleeding in acute peptic ulcer bleeding.

Methods: Between January 2009 and July 2014, 439 patients with acute peptic ulcer bleeding were investigated. By logistic regression, we derived a risk score that predicts patients’ risks of 30-day rebleeding. From this score, we developed a simplified screen for use. Accuracy to predict rebleeding was assessed by the area under the receiver operating characteristic (AUROC) curve. We compared the new score with the AIMS65 and Glasgow-Blatchford risk score.

Results: The overall mortality rate was 5% and 18.7% of patients experienced rebleeding. Of the 28 variables studied using univariate analysis, 8 factors were associated with the high risk of rebleeding. The stepwise logistic regression confirmed that CRP, albumin, minimum hemoglobin and Forrest classification were independent predictors of the high risk of rebleeding. Patients’ risk scores were calculated by adding the score components. Our score was well calibrated for patients who experienced rebleeding within 30 days. The area under the ROC curve was 0.80, which was significantly higher than that for AIMS65 score (0.64) and Glasgow-Blatchford score (0.63). The score of 6 or more maximized the sum of the sensitivity and specificity for 30-days rebleeding, respectively.

Conclusion: Our score identified patients at high risk of rebleeding in acute peptic ulcer bleeding. Therefore, this score could assist the clinical management of patients presenting with acute peptic ulcer bleeding, but requires validation.

Key Words: Score, Rebleeding, Peptic ulcer bleeding
UGI-11

**Patients’ Comfort, Safety and Quality of Upper Gastrointestinal Endoscopy after Short Period of Liquid Fasting**

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**Background and Aims:** Current ASGE guideline recommends 6 hour fasting for solid and 4 hour fasting for liquid before upper gastrointestinal endoscopy. In Korea, majority hospitals recommend no oral intake of any solid or liquid on the examination day, so does the KSGE (Korean Society of Gastrointestinal Endoscopy). There have been several reports for short liquid fasting before upper gastrointestinal endoscopy, but no study was performed for Korean subjects. We aimed to define the patient’s satisfaction, safety and quality of endoscopy after short period of liquid fasting.

**Methods:** Patients were divided into three groups according to the liquid fasting time (2 hr, 4 hr, and more than 6 hour). On the examination day, only pure water was permitted according to the protocol. Patients’ discomfort during fasting period was assessed by VAS (visual analogue scale) questionnaire. For safety assessment, any fluid in the stomach was aspirated and the volume and pH of gastric fluid were measured. Also, any events (e.g., aspiration, regurgitation, or vomiting) during endoscopy were recorded. Endoscopic mucosal visibility was assessed by endoscopist using categorical and Likert scale questions.

**Results:** Patients’ satisfaction was significantly superior in short liquid fasting group (2 hr or 4 hr) compared to standard fasting group. The volume and pH of gastric juice was not different among three groups and mucosal visibility was excellent for all groups.

**Conclusions:** Short period of clear liquid fasting (up to 2 hr before the procedure) is safe and comfortable protocol without compromising quality of endoscopic examination.

**Key Words:** Upper GI endoscopy, Liquid fasting, Comfort, Quality, Safety

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UGI-12

**Discrepancy between Endoscopic Ulcer and Pathologic Ulcer: Can We Estimate of Ulcer with Endoscopic Morphology?**

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**Background and Aims:** Endoscopic submucosal dissection (ESD) is a powerful method for treating gastric epithelial neoplasms. The presence of ulceration is one of the most important factors that determine the choice of treatment for patients with mucosal gastric cancer. However, the exact diagnosis of presence of ulcer in early gastric cancer is not easy only with endoscopic finding. The aim of this study is the accuracy of endoscopic estimation of presence of ulcer and the discrepancy between endoscopic ulcer and pathologic ulcer.

**Patients and Methods:** The endoscopic and pathologic findings of total 104 patients who underwent ESD or curative gastrectomy for early gastric cancer showing endoscopical ulcer at Hanyang University Hospital from 2013 to 2014 were retrospectively reviewed.

**Results:** Among total 104 patients, 72 (69.2%) were men and 32 (30.8%) were women. Their median age was 65.68 ± 10.23 years. 41 patients received an ESD procedure, 63 patients received a gastrectomy. Two expert pathologists reviewed pathologic slides again. The discrepancy between endoscopic ulcer and pathologic ulcer was 46.15 % (48/104). These 48 cases showing discrepancy were EGC IIc type lesion showing only erosive lesion on pathologic review.

**Discussion:** Considering a high discordance rate of ulceration between endoscopic finding and pathologic finding, performing endoscopic resection for confirmative diagnosis before gastrectomy can be a good option.

**Key Words:** Discrepancy, Endoscopic ulcer, Pathologic ulcer
UGI-13

Difference of Lymph Node Metastasis according to the Depth of Invasion in Early Gastric Cancer Confined to the Mucosa

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Background/Aims: Early gastric cancers (EGCs) invading mucosal layer of the gastric wall had small risk of lymph node (LN) metastasis. This study assessed whether LN metastasis rate is different in intramucosal EGCs according to the depth of invasion of the lamina propria (LP) and muscularis mucosa (MM).

Methods: We retrospectively reviewed data of patients who underwent surgery for EGC between 2001 and 2013. Poisson regression analyses were performed for comparing the risk of LN metastasis according to the depth of tumor invasion in patients with mucosal tumor.

Result: Among 1,671 patients included, 540 (32.3%) had tumors confined to the lamina propria (LP group) and 1,131 (67.7%) had tumors invading the muscularis mucosa (MM group). Sixty-four patients (3.8%) had LN metastasis, and the MM group had significantly higher rate of LN metastasis (55 patients, 4.9%) than the LP group (9 patients, 1.7%; $p=0.001$).

A multivariate analysis showed that tumors invading the muscularis mucosa (adjusted risk ratio, 2.30; $p=0.026$), tumor size $>$ 3 cm, presence of ulceration, undifferentiated histologic type, and lymphovascular invasion were significantly associated with LN metastasis in all patients. In the LP group, tumor size $>$ 3 cm and lymphovascular invasion were the risk factors associated with LN metastasis. Meanwhile, in the MM group, the significant risk factors for LN metastasis were tumor size $>$ 3 cm, undifferentiated histologic types, presence of ulceration and lymphovascular invasion.

Conclusions: Patients with mucosal EGCs had different risk factors for the LN metastasis according to the depth of invasion within mucosal layer. Tumors invading the muscularis mucosa had higher rate of LN metastasis than those confined to the lamina propria.

Key Words: Early gastric cancer, Mucosal, Lymph node metastasis, Risk factor

UGI-14

Efficacy of Endoscopic Incisional Biopsy on Gastric Sub-Epithelial Tumor to Diagnosis and Treatment

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Background and Aims: Subepithelial tumors (SETs) of the stomach are frequently encountered during esophagoduodenoscopy without any specific symptoms. The aims of this preliminary study are to evaluate the efficacy of an endoscopic incisional target biopsy technique and to provide predictable diagnostic criteria to define benign features of hypoechoic gastrointestinal SETs depending on anatomic location and EUS findings.

Patients and Method: A prospective multicenter on-going trial to evaluate gastric SETs by endoscopic incisional target biopsy and EUS. A total of 15 patients with SETs of the stomach were evaluated as pre data. All patients underwent EUS and incisional target biopsy and treated by pathological findings, in accordance with management protocol.

Results: The diagnostic yield of incisional target biopsy was 86.6% (13/15). The mean procedure time was 15.5 minutes with no procedure-related complication. The results of incisional target biopsy changed the treatment plans in 11/15 patients (73.3%). 2 patients with GIST, 1 patient with mesenchymal tumor, 1 patient of glomus tumor were scheduled for wedge resection and 5 patients with leiomyoma of diameter $\geq$ 2cm avoided surgery. Surprisingly, out of 15 cases, 11 cases of gastric SETs were located at the upper part of stomach (cardia, fundus, upper body) with only 2 cases of GIST and rest with benign features.

Conclusions: Currently, management of upper gastrointestinal SETs is not clearly established. Incisional target biopsy by endoscopy combined with EUS can be an alternative diagnostic method which is safe, effective and less aggressive technique for patients with gastrointestinal SETs. Also, further study on SETs by the stomach location and pathologic confirmation can provide additional tools to manage upper gastrointestinal SETs.

Key Words: Subepithelial tumor, Incisional target biopsy
The Implication of Endoscopic Ulcer in Early Gastric Cancer: Can We Predict the Clinical Behaviors of EGC?

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Background/Aim: Although the presence of ulcer in early gastric cancer (EGC) is important for the feasibility of endoscopic resection, only a few studies have examined the implication of ulcer on clinicopathologic factors in EGC. This study aimed to determine the role of endoscopic ulcer as a predictor of clinical behavior in EGC.

Method: Medical records of patients with EGC who underwent surgery between January 2005 and December 2012 were reviewed retrospectively. The clinicopathologic characteristics were analyzed according to the presence and stage of ulcer in EGC. The stage of ulcer was categorized into active (A1, A2), healing (H1, H2) and scar (S1, S2) based on the endoscopic findings.

Results and Conclusions: Of the 3270 patients who included in this study, the presence of ulcer was observed in 2343 (71.7%) patients. The proportions of ulcer according to the stage were 7.4% (A1), 22.2% (A2), 28.0% (H1), 30.9% (H2), 8.9% (S1) and 2.6% (S2). Submucosal (SM) invasion, lymph node metastasis (LNM), lymphovascular invasion (LVI), perineural invasion, and undifferentiated-type histology such as poorly differentiated adenocarcinoma or signet ring cell carcinoma were significantly higher in ulcerative EGC than non-ulcerative EGC. When compared according to the stages of ulcer, SM invasion, LNM, LVI, and undifferentiated-type histology were significantly associated with active ulcer stages. Ulcerative EGC showed more aggressive behavior than non-ulcerative EGC. In addition, the stage of ulcer may predict the clinicopathologic behavior of EGC. Therefore, endoscopic appearance of ulcer should be carefully examined for an adequate management strategy in EGC.

Key Words: Early gastric cancer, Ulcer, Endoscopy

Risk Factors of Gastric Neoplasm in Gastric Atypical Epithelium on Endoscopic Forceps Biopsy

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Background/Aims: Gastric atypical epithelium is considered as atypical changes interpreted as questionable dysplasia with a detailed description. However, there are no definite guidelines for the management of gastric atypical epithelium on endoscopic forceps biopsy. Therefore, the aim of this study was to evaluate the clinical outcomes of gastric atypical cell on endoscopic forceps biopsy and predictable factors for gastric neoplasm.

Methods: Between January 2005 and December 2013, a total of 518 patients proven gastric atypical epithelium on endoscopic forceps biopsy were included in this study. Of 518 cases, final diagnostic methods for gastric atypical epithelium were as followed: re-biopsy (n= 298, 57.5%), EMR (n=46, 8.9%), ESD (n=127, 24.5%), and operation (n=47, 9.1%).

Results: Of the 518 cases, gastric cancer (n=166, 32%) and adenoma (n=61, 11.8%) lesions were finally diagnosed in 227 cases. Among 220 lesions performed endoscopic or surgical resection, non-neoplastic lesions were 34 cases (15.4%). Multivariate analysis revealed that age (OR 1.031, [95% CI 1.013-1.049]), lesion diameter more than 1cm (OR 5.524, [3.261-9.355]), recurrent atypical cell on follow-up endoscopy (OR 4.656, [1.823-11.893]), no change on follow-up endoscopy (OR 11.273, [5.253-24.190]) were significant risk factors for gastric neoplasm.

Conclusion: Precautions should be taken in the management of patients with gastric atypical epithelium, especially when risk factors including old age, and size of 1cm or greater are present. Considering the follow-up endoscopy findings such as recurrent atypical epithelium and no change of lesion are significantly associated with gastric neoplasm, a follow-up endoscopy with a forceps biopsy rather than diagnostic resection is recommended.

Key Words: Gastric atypical epithelium, Gastric neoplasm, Follow-up endoscopy
UGI-17

Prognostic Implications of EUS Non-Traversability in Patients with Advanced Locoregional Squamous Esophageal Cancer

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Background: EUS is the most accurate locoregional staging modality for esophageal cancer (EC). However, approximately 30% of patients cannot complete EUS due to EC stricture (EUS non-traversability). This study aimed to investigate prognostic implications of EUS non-traversability in patients with advanced locoregional squamous EC receiving preoperative chemoradiotherapy (CRT) and esophagectomy.

Method: We retrieved data on 89 consecutive patients with advanced locoregional squamous EC (stage II or III) who were treated with preoperative CRT followed by esophagectomy. Relevant clinical and cancer-specific parameters were retrospectively reviewed.

Result: EUS non-traversable EC was found in 26 of 89 (29.2%) patients. Patients with EUS non-traversable EC showed a higher rate of dysphagia and stent insertion. Median serum albumin level (3.6 vs 3.9 g/dL; p = 0.028), tumor length (6.0 vs 4.0 cm; p = 0.002), and percentage of clinical stage III disease (65.4% vs 38.1%; p = 0.019) were significantly different between the patients with EUS non-traversable and traversable EC, respectively. Patients with EUS non-traversable EC demonstrated a significantly lower 5-year overall survival rate (5-YSR) than patients with EUS traversable EC (30.8% vs 49.3%, p = 0.023). The rates of complete (CR) and partial response to preoperative CRT were 23.1% and 53.8% in EUS non-traversable EC (vs. 54.0% and 25.4% in EUS traversable EC). The 5-YSR was 66.7% when patients with EUS non-traversable EC achieved CR (vs 78.1% of patients with EUS traversable EC who achieved CR; p = 0.193). In EUS non-traversable and traversable EC patients with non-CR, 5-YSR was 20.0% and 14.4%, respectively (p = 0.972).

Conclusion: Patients with EUS non-traversable EC demonstrated a significantly lower 5-YSR than patients with EUS traversable EC. The poor prognosis of EUS non-traversable EC patients may be ascribed to a larger tumor volume and lower rate of CR to preoperative CRT.

Key Words: Endosonography, Esophageal neoplasm, Squamous cell carcinoma, Malignant stricture, Prognosis

UGI-18

Comparison of Clinical and Endoscopic Characteristics among Upgrade, Concordance and Downgrade Pathology after ESD

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Background: Histologic discrepancies between endoscopic forceps biopsy (EFB) and endoscopic resection (ER) specimens, including ESD and endoscopic mucosal resection, have been reported at rates ranging from 2.7-49%. Our aims were to analyze the prevalence of upgraded, concordant, and downgraded pathology results after ESD and to compare their clinical and endoscopic characteristics.

Method: We retrospectively reviewed the 1186 consecutive ESD performed at our center from February 2005 and December 2011, and included 838 cases diagnosed as low or high grade dysplasia on the pre-ESD endoscopic forceps biopsy. The following endoscopic variables were analyzed: mean length, surface area, sampling ratio (tumor size/number of forceps biopsies), predominant gross morphology, and surface configuration such as depression or ulceration.

Result: There was upgrade group in 215 cases (25.6%), concordance group in 559 cases (66.7%), and downgrade group in 64 (7.6%). Our database presented the mean length as follows: upgraded group 20±9.5 mm, concordant group 18±8.6 mm, and downgraded group 12±6.3 mm. The mean surface were represented as these: upgraded group 305±289 mm², concordant group 253±240 mm², and downgraded group 101±141 mm². Mean sampling ratio in tumor size were calculated as follows: upgraded group 6.9±3.9 mm/fragment and 99.2±90.2 mm²/fragment, concordant group 6.9±4.3 mm/fragment and 92.7±102.8 mm²/fragment, and downgraded group 3.9±2.8 mm²/fragment and 35.0±52.3 mm²/fragment. Compared with upgraded and concordant group, the downgraded group showed smaller tumor size and lower sampling ratios (all, p < 0.001). And then the upgraded group had higher incidence of ulceration (13.5% vs 4.1%) and depression (46.5% vs 32.9%) more than concordant group (all, p < 0.001).

Conclusion: The tumor size and sampling ratio were predictable factor for downgraded final pathology after of ESD. And the ulceration and depression were forecasted for upgraded final pathology after ESD.

Key Words: ESD, Tumor size, Sampling ratio, Endoscopic characteristics
Clinical Outcomes of Mallory-Weiss Tear by the Endoscopic Managements and Glasgow-Blatchford Score in Emergency Room

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Backgrounds and Aims: There have been not enough studies about the proper methods of therapeutic endoscopy and the efficacy of Glasgow-Blatchford score (GBS) for Mallory-Weiss tear. Therefore, we tried to investigate clinical outcomes of MWT according to the treatment modalities and to evaluate the efficacy of GBS in predicting the need for endoscopic procedures at emergency room.

Patients and Methods: From January 2004 to December 2012, 168 patients were diagnosed as MWT by endoscopy at emergency department of Asan Medical Center. We retrospectively reviewed the medical records and calculated GBS to analyze the clinical outcome of MWT.

Results: Of total 168 patients, the median age was 49 years (interquartile range, 39-59 years) and men were 149 (88.7%), and mean GBS was 6.0 (±4.3) points. Endoscopic hemostasis was applied in 86 cases (51.1%) and GBS was significantly higher in the hemostasis group than the observation group (6.7±3.8 and 5.2±4.7, respectively, p=0.022). For the treatment of MWT, hemoclip with/without injection therapy was used in 55 patients (64%), band ligation alone was in 17 patients (19.8%), and injection therapy alone was in 11 patients (12.8%). Among 86 patients with endoscopic treatment, rebleeding happened in 11 cases (12.8%) and 2 patients with hepatic dysfunction died due to hemostasis failure. Success rates of treatment were higher in hemoclip based therapy and band ligation than injection therapy alone (90.9%, 88.2%, and 63.6%, respectively, p<.001). In patients with GBS more than 6 points, the rates of hemostasis, transfusion, admission, and rebleeding were higher with significance (p<0.05 in all factors).

Conclusions: In non-variceal bleeding with MWT, GBS can be helpful to decide the treatment with therapeutic endoscopy. For the endoscopic methods of MWT, injection therapy alone should be avoided for the better clinical results.

Key Words: Endoscopy, Glasgow-Blatchford score, Hemorrhage, Mallory-Weiss Syndrome

Comparison of Scoring Systems for Predicting Clinical Outcomes in Patients with Non-Variceal Upper Gastrointestinal Bleed

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Background/Aims: Several scoring systems for predicting rebleeding in patients with non-variceal upper gastrointestinal bleeding (UGIB) have been introduced. However, the best scoring system has not been elucidated. The aim of this study was to evaluate the best scoring system for the prediction of mortality, re-bleeding, transfusion requirement, and endoscopic intervention in Korean patients with acute non-variceal UGIB.

Methods: Patients who had undergone endoscopy due to non-variceal UGIB between January 2009 and December 2013 at Incheon St. Mary’s hospital were retrospectively analysed through chart review. We calculated and compared area under the receiver-operating characteristic curves (AUROC) of AIMS 65, clinical Rockall, full Rockall and Glasgow-Blatchford score (GBS) for mortality, rebleeding, transfusion requirement and endoscopic intervention.

Results: Of the 430 patients, gastric ulcer bleeding was found in 230 patients, duodenal ulcer bleeding in 122 patients, Mallory-Weiss tearing in 37 patients, Dieulafoy’s lesion in 13 patients, gastric cancer bleeding in 25 patients, and other causes in 3 patients. Of the 430 patients, 5 patients (1.2 %) died within 30 days and 12 patients (2.8 %) experienced re-bleeding. 322 patients (74.9 %) required transfusion and 170 patients 40.9 % required endoscopic intervention. The full Rockall score was superior to other scores for the prediction of endoscopic intervention (AUROC, 0.761; p<0.0001). The GBS was superior to other scores for the prediction of transfusion requirement (AUROC, 0.815; p<0.0001). However, there was no significant difference among these scores for the prediction of 30 days mortality and rebleeding among the 4 scoring systems.

Conclusion: There was no best scoring system which predicted the every clinical outcome. Adequate scoring system should be selectively chosen for predicting re-bleeding and/or mortality.

Key Words: Non-variceal upper gastrointestinal bleeding, Score
Comparison of Emergent and Elective Intervention for Prevention of Rebleeding in Cirrhotic Patients with Old Blood Clots
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Background/Aim: When active bleeding varices or stigmata indicating recent bleeding are not seen on endoscopy, the outcomes between timing of endoscopic intervention after initial endoscopy are lacking in liver cirrhotic patients with old blood clots in the stomach. The aim of this study was to compare the outcomes of emergent endoscopic varix ligation (EVL) and elective intervention.

Methods: From Jan 2009 to June 2014, emergent prophylactic EVL in 26 cases (Emergent group) and elective intervention (EVL or EVO [endoscopic variceal obliteration] or BRTO [balloon-occluded retrograde transvenous obliteration]) in 38 cases (Elective group) were performed in situation which identified blood clots in the stomach without active bleeding including the stigmata. Each group was analyzed regarding their clinical outcomes including rebleeding rate, mortality.

Results: The 5-day rebleeding rates was significantly higher in emergent group than elective group (4/26 [15.4%] and 0/38 [0%], \(p=0.024\)). No significant difference in the 42-day rebleeding rates was demonstrated between the emergent and elective groups (3/26 [11.5%] and 2/38 [5.3%], respectively). In elective group, 6 gastric varices (21.1%) identified during second-look endoscopy were treated by EVO or BRTO. Mortality regarding with variceal bleeding was not different significantly between both groups, but death due to bleeding occurred only in emergent group (3/26[10.7%] and 0%, \(p=0.062\)). About the site of bleeding related with death, 2 cases were gastric varices and the last was unknown due to poor endoscopic vision limited by much blood.

Conclusions: Elective EVL after emergent endoscopy may be more effective strategy for prevention of rebleeding in situation with old clots in the stomach without active bleeding or stigmata.

Key Words: Variceal bleeding, Esophageal varix, Gastric varix, EVL, EVO

Clinical Characteristics of Code Blue Situation Occurring in an Endoscopy Unit of Tertiary Hospitals
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Background/Aims: Little has been known for life threatening situations occurring during endoscopy. The aim of this study was to evaluate clinical characteristics of emergency condition what is called ‘code blue’ developing in endoscopy units.

Methods: We retrospectively collected code blue cases that occurred in an endoscopy unit of 6 tertiary hospitals from January 2012 to June 2014. Code blue was defined as an alert call for resuscitation team under an emergency situation of respiratory failure or cardiac arrest. Demographic data, clinical features, and probable causes were assessed. Associated factors with mortality were also elucidated.

Results: Overall, 38 cases of code blue occurred during the period (male 65.8%, median age 62). Gastrointestinal bleeding (GIB) such as hematemesis or melena was the most common indication of endoscopy (22, 57.9%). Half of cases were conducted using sedative agents. Emergency situations for code blue were as follows; respiratory insufficiency (18, 47.4%), decreased blood pressure (10, 26.3%), and cardiac arrest (9, 23.7%). Although most of these conditions were detected during endoscopy (26, 68.4%), a third of cases (31.6%) were found before or after procedure. The most frequent plausible cause of cases was aggravation of underlying diseases (23, 60.5%) such as uncontrolled bleeding or exacerbation of lung disease, followed by sedative drug-related condition (10, 26.3%), and aspiration (3, 7.9%). Despite an effort of resuscitation, 18 patients (47.4%) died. GIB was a single independent risk factor for mortality of code blue cases (OR 36.19, 95% CI 2.11-619.84, \(p=0.013\)).

Conclusions: Emergency situation requiring resuscitation can occur during endoscopy. More attention should be paid while endoscopy is performed for GIB, even before or after procedure. Thorough monitoring of patients condition and proper management with appropriate equipment are prerequisite for coping with the code blue in the endoscopy unit.

Key Words: Endoscopy, Code blue, Emergency, Resuscitation
Feasibility of Self-Expandable Metal Stent Placement with Side-Viewing Endoscope for Malignant Duodenal Obstruction

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Background and Aims: Self-expandable metal stents (SEMSs) has been a good treatment option for malignant intestinal obstruction. However, stent placement with a gastroscope can be technically difficult for the distal duodenum obstruction. A side-viewing duodenoscope may be helpful for these patients. We report our experiences in the insertion of SEMSs to distal duodenum with a side-viewing endoscope.

Methods: We retrospectively analyzed our database of SEMS placement for malignant distal duodenal obstruction between April 2006 and April 2013. All patients underwent SEMS placement using the side-viewing endoscope (duodenoscope). Main outcomes are technical success, clinical success, complication rates, stent patency, and overall survival. In addition, database from other tertiary center was analyzed, where SEMS insertion was performed with forward-viewing endoscopes (gastroscope or colonoscope). Success and complication rates were compared with ours.

Results: A total of 31 patients were reviewed. Pancreatic cancer was the most common cause (87.1%). Technical and clinical success was achieved in all cases. Procedure-related complication occurred in one patient, who experienced micro-perforation of the duodenum. The patient improved with conservative treatment. Median duration of stent patency was 125 days (95% CI 75-175), and median overall survival was 134 days (95% CI 77-191). Biliary obstruction was present in 12.9% of patients, who underwent biliary stent placement at the same time without changing endoscopes. In forward-viewing endoscopes group, 15 cases were included. Technical and clinical success was achieved in all cases, and no procedure-related complication occurred.

Conclusions: The insertion of SEMSs to distal duodenum with a duodenoscope could be performed effectively and safely in patients with malignant obstruction.

Key Words: Duodenal obstruction, Duodenoscopes, Gastrointestinal neoplasms, Stents

Effect of Carcinomatosis on the Outcomes of Patients Undergoing SEMS Insertion for Malignant Gastric Outlet Obstruction

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Background/Aims: Peritoneal carcinomatosis is considered as a relative contraindication to self-expandable metallic stent (SEMS) insertion for malignant gastric outlet obstruction (GOO). There have been few reports on the outcomes of SEMS insertion and its effect remains controversial in patient with malignant GOO and peritoneal carcinomatosis.

Methods: Between 2009 and 2013, 155 patients (88 patients without carcinomatosis and 67 patients with carcinomatosis) underwent endoscopic SEMS insertion for malignant GOO. Factors were analyzed affecting the clinical success three days after SEMS insertion and clinical failure one month after SEMS insertion (decrease of gastric outlet obstruction score compared to that in three day after SEMS insertion).

Results: Patients with carcinomatosis showed higher Eastern Cooperative Oncology Group (ECOG) score than those without carcinomatosis. Technical success rates were 100% and 100% in both groups. Clinical success rates three days after SEMS insertion were 88.1% and 97.7% in patients with and without carcinomatosis, respectively. In multivariate analysis, only ECOG score was identified as an independent predictor of clinical success. A total of 104 patients were available for examination one month after SEMS insertion. Clinical failure rates were 31.7% and 6.3% in patients with and without carcinomatosis, respectively. Stent failure rates were 23.9% and 28.4% in each group and were comparable. In multivariate analysis, only peritoneal carcinomatosis was identified as an independent predictor of clinical failure one month after SEMS insertion (hazard ratio: 7.56).

Conclusion: Peritoneal carcinomatosis had a negative effect on short-term clinical outcomes after SEMS insertion in patients with malignant GOO. Therefore, peritoneal carcinomatosis should be considered when deciding the SEMS insertion in patients with malignant GOO.

Key Words: SEMS, Carcinomatosis, Obstruction
Endoscopic Balloon Dilatation: Simple and Safe Treatment in Benign Duodenal Stricture
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Background and Aims: Standard treatment for benign gastric outlet obstruction (GOO) is operation. However, endoscopic treatment (TTS, through the scope) might be another alternative method for inoperable patients. We studied retrospectively EBD (endoscopic balloon dilatation) for benign GOO in Uijongbu St. Mary’s hospital.

Patients and Methods: Medical records were reviewed retrospectively. EBD was performed on 19 procedures in 13 patients with benign duodenal stricture between January 2001 and August 2014. The causes of stricture were recurrent duodenal ulcer (n=12), and postoperative stenosis (n=1). The stricture sites were duodenal bulb (n=11), 2nd portion (n=1), and postoperative efferent loop (n=1).

Results: The mean diameter of dilatation balloon was 13.7 mm (range 10mm-17mm), and mean dilatation number per patient was 1.5 times (1-3). After EBD, 12 of 13 patients showed early symptom improvement within a week (92.3%) and 6 of 13 patient kept asymptomatic state from single procedure without recurrence for 4.2 months (1month11months). There were recurrences of stricture in six among the thirteen patients (46.1%). Two patients who recurred in the short time after EBD (mean 35 days), underwent surgery. In 4 of 13 patients, late recurrence was occurred in 35.5 months (272). They were treated with repeated EBD, and had good results without obstructive symptom for 6.3months (113) except one who had emergency surgery because of delayed duodenal perforation developed in one procedure (1/19, 5.2%) at 6 days after EBD. There was no acute complication.

Conclusion: EBD might be considered as a simple and safe mode of treatment in patients of benign duodenal stricture with low complication.

Key Words: Benign duodenal stricture, Endoscopic balloon dilatation

Factors Associated with Clinical Success in Endoscopic Metal Stent Placement Due to Malignant Gastric Outlet Obstruction
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Background: The endoscopic metal stent placement is a well-established treatment of malignant gastric outlet obstruction. The purpose of this study was to identify factors associated with clinical outcome of the endoscopic metallic stent placement.

Method: In a retrospective single-center study, we reviewed medical records of 124 patients who underwent the endoscopic metal stent placement due to malignant gastric outlet obstruction (GOO) from January 2009 to May 2014 Pusan national university Yangsan Hospital. We evaluated the change of the Gastric Outlet Obstruction Scoring System (GOOSS) after the procedure. Then we analyzed some factors associated with the change of GOOSS.

Result: Technical success rates was 98% (122/124). In our study, clinical success was defined as the improvement of GOOSS within 7days after stent placement and clinical success rates was 81.1% (99/122). Primary diagnosis was stomach cancer 39 (32%), pancreatic cacer 37 (30.3%), cholangiocarcinoma 20 (16.4%), ampulla of vater cancer 8 (6.6%), gall bladder cancer 12 (9.8%) and secondary metastasis 6 (4.9%). We analyzed variables associated with improvement of GOOSS. Therefore we identified some factors such as external compression (odds ratio 4.62, \( p=0.008 \)), carcinomatosis peritonei (odds ratio 29.4, \( p<0.01 \)), absence of nausea and vomiting before the procedure (odds ratio 4.14, \( p=0.02 \)) and the impossibility of passing the endoscope through obstructive site (odds ratio 3.958, \( p=0.013 \)). We conducted multivariate analysis by using the logistic regression and identified that absence of nausea and vomiting (odds ratio 23.8, \( p=0.002 \)) and the impossibility of passing the endoscope through obstructive site(odds ratio 41.08, \( p=0.014 \)) were factors associated with clinical success.

Conclusion: We presented some factors associated with clinical success of endoscopic metal stent placement in GOO but our study had several limitations.

Key Words: Gastric outlet obstruction, Gastric Outlet Obstruction Scoring System, Endoscopic metal stent placement
UGI-27

Discrepancy between Pre and Post Endoscopic Submucosal Dissection Result in Aspect of Insurance Guideline

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Background & Aims: Endoscopic submucosal dissection (ESD) is a powerful method for treating gastric epithelial neoplasms. In Korea, insurance payment for ESD is in force since 2011. However, the insurance decision is based on preoperative results. The aim of this study is to assess the discrepancy between pre ESD estimation and post ESD result and to suggest the limitation of current Korea ESD insurance guideline.

Patients & Methods: We retrospectively reviewed the pre and post ESD results in patients performed ESD during study period. ESD was performed by one expert endoscopist.

Results: From September 2013 to September 2014, total 188 patients received ESD procedure due to stomach cancer (n=98) or adenoma (n=90). Of these, 127 were men and 61 were women. Their median age was 63.28 ± 12.23 years. When we performed pre ESD estimations with size, differentiation and invasion depth, among total 188 cases, 122 cases (64.9 %) were compatible with current insurance guideline and the rest 66 cases (35.1 %) were outside the insurance guideline. However, when we reanalyzed after ESD with a final pathologic result, among total 188 cases, 47 cases (25%) showed discordance with pre ESD estimation results. In detail, among 122 cases estimated within insurance guideline before ESD, 20 cases (16.3%) were changed to outside the insurance guideline after ESD. And, among 66 cases estimated outside insurance guideline, 27 cases (40.9%) were changed to within the insurance guideline after ESD.

Conclusion: Current Korea ESD insurance guideline determined by pre ESD estimation should require revisions.

Key Words: Discrepancy, ESD, Insurance

UGI-28

The Role of Tumor Size for Decision of Additive Treatment after Endoscopic Resection

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Background/Aim: Endoscopic resection (ER) for early gastric cancer (EGC) has been performed based on histologic differentiation, size, depth of invasion and so on. An additive treatment is necessary when the pathologic result is beyond the criteria of ER. However, it is unclear how strictly additive treatment should be carried out according to the criteria of ER regarding tumor size. Therefore, this study aimed to access the role of tumor size for decision making after ER.

Methods: Between January 2005 and December 2012, data for 3246 patients who underwent gastrectomy for EGC were reviewed retrospectively. The patients were classified into the following three groups according to the ER criteria for EGC; ulcer-negative intramucosal cancer with undifferentiated histology, minute submucosal (SM1) cancer with differentiated histology and ulcerative intramucosal cancer with differentiated histology. The risk of additional treatment after ER was defined as at least one positive result of lymph node metastasis, lymphovascular invasion or perineural invasion. The risk was compared between individual tumor size and ER size criteria in each group using area under receiver operating characteristic (AUROC) curves.

Results and Conclusions: The risk was 4.05% in ulcer-negative intramucosal cancer with undifferentiated histology, 21.96% in SM1 cancer with differentiated histology and 2.42% in ulcerative intramucosal cancer with differentiated histology group. The risk could increase when the difference is 1mm size compared with ER size criteria in ulcerative intramucosal cancer with differentiated histology group. However, the risk was not increased with more than 10mm size difference compared with ER size criteria in other two groups. Therefore, the tumor size should be considered more strictly within ER criteria when EGC revealed as an ulcerative intramucosal cancer with differentiated histology after ER.

Key Words: Early gastric cancer, Endoscopy, Size
UGI-29

Effectiveness of Endoscopic Submucosal Dissection for Atypical Epithelium in Previous Histological Diagnosis

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Background & Aims: Atypical glandular structures are lined by mucus-depleted cell with large hyperchromatic nuclei and thickened nuclear membranes. Regenerative atypia can be difficult to distinguish from dysplasia. In contrast to dysplastic mucosa, regenerating or reactive mucosa generally does not exhibit the same degree of architectural atypia or disorganization as dysplastic process. We conducted a study to evaluate the final histological diagnosis for atypical epithelium on previous endoscopic biopsy and the effectiveness of Endoscopic submucosal dissection (ESD) for atypical epithelium in previous histological diagnosis.

Patient and Methods: We retrospectively reviewed and enrolled 371 patients proven atypical epithelium on initial histology of an endoscopic biopsy from performed EGD between November 2008 to August 2014. Of 371 patients, total ESD (n = 23, 6.2%), total operation (n = 12, 3.2%), observation (n = 96, 25.9%), ongoing follow-up (n = 76, 20.5%), loss of follow-up (n = 164, 44.2%) were performed.

Results: Of the 371 patients, total ESD case were 23 case. Of the 23 cases, gastric cancer (n = 15, 65.2%), adenoma (n = 3, 13.0%), gastritis (n = 4, 17.4%) and gastritis with regenerative atypia (n = 1, 4.3%) lesions were finally diagnosed in ESD cases. Age, sex, endoscopic results (size, shape, location, color, fibrosis, atrophy, metaplasia), H. pylori and number of biopsy did not significantly influence the result of final outcome. Also, type of atypical epithelium from the initial histological endoscopic biopsy was not statistically significant factor for the final histological diagnosis.

Conclusions: Of the atypical epithelium cases, the rate of malignant and premalignant lesions was 8.6%. But of the ESD cases, the rate of cancer and adenoma was 78.3%. Therefore, We would be needed follow-up endoscopic Biopsy and endoscopic submucosal dissection can be considered in patients with malignant or premalignant lesion on endoscopic biopsy.

Key Words: Atypia, ESD

UGI-30

Is the Recent WHO Pathological Classification for Gastric Cancer Helpful in Applying to Endoscopic Resection?

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Background/Aims: Endoscopic resection (ER) has been performed in early gastric cancer with undifferentiated histology (UD-EGC) based on Japanese classification. Whereas, we previously found that different approach is necessary between poorly differentiated (PD) & signet ring cell carcinoma (SRC) for curative resection. However, according to 2010 WHO classification, diffuse type PD and SRC are categorized into the same group as poorly cohesive carcinoma. Thus, we assessed whether the WHO classification is helpful to perform ER of UD-EGC.

Methods: Among 3,419 EGC underwent surgery, we analyzed the clinicopathologic features of 1,112 lesions with SRC and PD. We re-categorized into intestinal PD, poorly cohesive carcinoma (SRC, diffuse PD), and compared in terms of clinical behavior such as lymph node metastasis (LNM). We also re-categorized 209 lesions (82 PD; 127 SRC) treated by ER into intestinal PD, poorly cohesive carcinoma (SRC, diffuse PD), and compared in terms of outcomes of ER.

Results: According to surgical data, the rate of LNM was high in order from intestinal PD, diffuse PD and SRC (15.8%, 13.5%, and 6.3%). Similarly, the rate of LVI was significantly lowest in SRC compared with diffuse and intestinal PD. When compared between diffuse PD and SRC categorized as poorly cohesive carcinoma, the rate of LNM and LVI was significantly higher in diffuse PD than SRC. According to ER data, there was no recurrence in all of them if curatively resected. However, the most common cause of non-curative resection was different between SRC and PD irrespective of intestinal or diffuse type. The most common cause was positive lateral margin in SRC, whereas positive vertical margin in both intestinal and diffuse PD.

Conclusions: Clinical behaviors are different between diffuse PD and SRC categorized as poorly cohesive carcinoma in WHO classification. Considering LNM and outcomes of ER, the recent WHO classification may not be helpful to perform ER for UD-EGC.

Key Words: ESD, Endoscopy, EGC
UGI-31
Development of an Novel Suturing Mechanism for a Safe and Rapid Endoscopic Surgery
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**Background:** Endoscopic surgical technology has been developing rapidly. The authors have developed an endoscopic suturing device (Patent No: 10-2012-0044913) to continuously close a viscerotomy of stomach. Previous applied suction cut in our endoscopic suturing device can effectively fix a stomach wall during suturing is being performed, but it has a limitation of interrupting a sight of operator or making unintended wound on organs outside stomach. In this study, we developed new endoscopic suturing mechanism to overcome previous limitations, and evaluated the work stability and compared strength of various closure techniques through *in-vitro* animal testing.

**Method:** New suturing mechanism including reversed needle tool and protection cap was developed. The reversed needle tool is designed to pull tissues replacing suction cap and the protection cap prevent needle from making unintended wounds. This endoscopic suturing device with new closure mechanism was compared with two other closure techniques; endoscopic clips and hand-sewn in porcine stomach. After closure, each stomach was inflated by an automated pressure gauge. The pressures to achieve air leakage and liquid leakage were recorded.

**Results:** The time of suture process was 5.7 minutes. In the *in vitro* model, the burst pressure according to groups were mean 87.5 mmHg in the hand sewn group, 65.4 mmHg in the KUMC closure device group, 46.4 mmHg in the endoscopic clip group. Using one way ANOVA analysis, the KUMC closure device was statistically significant compared with either the hand-sewn closure or the endoscopic clip closure in the *ex vivo* model. Post hoc paired comparison using Tukey HSD revealed that KUMC suture model is superior to endoscopic clip.

**Conclusions:** This new suture method can reduce the stitch number of process and beads needed for suture, so operation time was shortened greatly. Our new suture mechanism competently produced a tight and reliable closure comparing with previous suture method.

**Key Words:** Endoscopy, Suture

UGI-32
Gastrostomy Closure Using the Novel Occluder Device: An *in Vivo* Animal Study
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**Background and Aims:** Endoscopic management of gastrointestinal (GI) leaks meet with only limited success. Previously we reported the novel occluder device (Leakludder®, S&G biotech, Seongnam, Korea) can provide an effective and immediate seal for a GI leaks in an *ex vivo* porcine model. This study was performed to evaluate the feasibility and safety of the occluder device for sealing of NOTES gastrotomy in an *in vivo* animal model.

**Methods:** The novel occluder device is a self-expandable metal stent which looks like a flattened hourglass. While the both flares of the occluder are coated with polyurethane which can lead to immediate sealing after deployment, the central portion between the flares is uncovered to permit tissue ingrowth. The device is preloaded in the 3.3-mm tube for through-the-scope delivery. Six mini pigs underwent transgastric natural orifice transluminal orifice surgery (NOTES) peritoneoscopy. After a perforation was made on the anterior wall of stomach using a needle knife and a 12-mm balloon, peritoneoscopy was performed through the gastrotomy. Then the occluder device was deployed to seal the gastrotomy. Three, 2, and 1 animal were sacrificed for pathologic examination after follow-up endoscopy at 1 week, 4 weeks, and 8 weeks, respectively.

**Results:** Air-tight sealing was achieved just after deployment of the occluder in all animals. The mean procedure time for closure was 186 seconds (range 122-248). There was no death or acute adverse event during the observation period. Histopathology showed the central uncovered portion of the occluder device was filled with regenerative tissue at 1 week. All 3 animals which were observed for more than 4 weeks showed natural expulsion of the occluder device into gastric lumen and complete healing of gastrostomy at 4 weeks (2) and 8 weeks (1).

**Conclusions:** The novel occluder device provides safe, immediate, and permanent sealing for NOTES gastrotomy.

**Key Words:** Gastrotomy, NOTES, Occluder
**UGI-33**

**Clinical Usefulness of Endoscopic Submucosal Dissection Technique Biopsy for Patients with Subepithelial Tumor**

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**Background and Aims:** Subepithelial tumors (SETs) are small, mostly asymptomatic lesions with normal overlying mucosa and usually are identified incidentally on endoscopy. The aim of this study is to evaluate the diagnostic yield and the impact of endoscopic submucosal dissection (ESD) technique biopsy on the clinical management of patients with SETs.

**Patients and Methods:** A total of 50 subepithelial lesions were included in this study. EUS images were examined for mass size, echogenicity, invasion layer. We performed endoscopic biopsy of SETs by using the ESD technique.

**Results:** The mean diameter of SET was 23.1±8.0 mm. The diagnostic yield of this method was 90% (45/50). Of the 50 SETs, 45 (90%) were located in the stomach, 3 in the esophagus, and 2 in the duodenum. Their pathologic diagnoses were as follows: 15 leiomyomas, 12 GISTs, 12 ectopic pancreases, and 2 lipomas, 2 carcinomas, 2 others, and 5 remained undiagnosed (10%). Mean procedure time was 12.56 ± 3.81 minutes. There were no complications such as bleeding or perforation during or after the procedures.

**Discussion:** Deep biopsy via ESD technique can find histopathologic nature for SET. This method can reduce the need for unnecessary surgery for benign SETs.

**Key Words:** Subepithelial tumor, Biopsy, ESD

**UGI-34**

**Laparoscopy-Assisted Endoscopic Full-Thickness Resection for Gastric Submucosal Tumor Originated from Muscularis Proper**

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**Background and Aims:** Laparoscopic wedge resection (LWR) has been mainly performed for gastric submucosal tumors which are originated from muscularis proper (MP) layer. However, LWR could be difficult if the lesions are not seen with laparoscopic view and could induce gastric deformity if the lesions are located in antrum. We performed a prospective pilot study to evaluate the efficacy of laparoscopy-assisted endoscopic full-thickness resection (LAEFTR) for patients with gastric SMT originated from MP layer.

**Patients and Methods:** We enrolled patients who were diagnosed as gastric submucosal tumor originated from in MP layer with intragastric growing pattern or which is located in antrum between October 2011 and September 2013. Endoscopic full-thickness resection was performed with endoscopic knives by a half of tumor circumference and followed by laparoscopic resection for the rest of tumor circumference. The feasibility, safety, and effectiveness of LAEFTR for gastric SMT were evaluated.

**Results:** Of twelve patients who were enrolled in this study, 8 patients received LAEFTR and the conversion to LWR occurred in four patients, because SMT lesions were visualized laparoscopically. The median age was 51 year (24-68). The median times of total operation and endoscopic resection were 117 and 34 minutes. The rates of en-bloc resection and complete resection were 100%. Significant intra/post-operative complication did not occur.

**Discussion:** LAEFTR is feasible and safe for gastric SMT originated from MP layer, especially which has intragastric growth pattern and is located in antrum.

**Key Words:** Gastric neoplasm, Endoscopic resection, Laparoscopy-assisted surgery
An Endoscopic Gastroplasty for Obesity Treatment Using Endoscopic Suture Device: In Vivo Animal Study

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Background: Obesity is a major health problem worldwide. The primary treatment for obese patients is weight reduction, which can improve comorbidity. Procedure to reduce gastric volume has been widely used for surgical treatment of morbid obesity. An endoscopic approach to treat obesity has advantage of less invasive than laparoscopy or surgery. We made an endoscopic suture device with suction cap for reducing stomach volume. The objective of this study is to evaluate the feasibility and effectiveness of an endoscopic suturing procedure for weight loss in vivo.

Methods: Ten live Yorkshire pigs weighing 30 to 40kg were used in this study. A prototype suture device was created using needle, beads and suction cap. This novel device was used to suture wall of stomach. After suturing, the thread was retracted to reduce the volume and was tied using the knotting device. We used several suture method including number of sutures, thickness of suture and location of stomach to evaluate safety and feasibility of this method. All pigs had been scheduled to observe for 30 days after suture procedure.

Results: All pigs had survived for 30 days. The procedure time was 15min~30min according to suture method. Three of ten pigs failed at keeping the knotting for a month. Several sutures in different gastric parts showed stronger and more effective suture state than suturing wide area of stomach at a time. Full thickness suture showed longer and stronger suture than partial thickness suture, but we found the injury of organ outside the stomach in two pigs. Body and fundus of stomach is more feasible to suture strongly than antrum. Endoscopic gastric reduction with our device is technically feasible on a live porcine model.

Conclusion: It is possible to achieve transoral endoscopic gastroplasty with an endoscopic continuous suture device at short time. The strength of suture was higher in the greater number of sutures, full thickness and body of stomach.

Key Words: Obesity, Gastroplasty, Bariatric
UGI-37

Risk Factors of Recurrence after Endoscopic Resection for Gastric Adenoma

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Background/Aims: Endoscopic resection has been widely conducted for the treatment of gastric adenoma. However, risk factors of recurrence has been reported rarely. Thus, the aim of study was to investigate risk factors of recurrence after endoscopic resection for gastric adenoma.

Methods: We reviewed medical records of 377 patients who underwent endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD) for gastric adenoma from January, 2007 to December, 2013 at Chungnam National University Hospital. The study group consists of 178 recurred and 199 nonrecurred patients. For all subjects, the data collected included age, sex, resection method, margin clearance, morphology, location, size, atrophy, intestinal metaplasia and dysplasia grade.

Results: The median follow up period was 14 months (range,0-81 months). The analysis of relationship between recurrence and risk factors showed that age (p=0.744), sex (p=0.007), resection method (p=0.707), margin clearance (p=0.001), morphology (p=0.854), location (p=0.002), size (p=0.953), atrophy (p=0.135), intestinal metaplasia (p=0.141) and dysplasia grade (p=0.006)

Conclusions: Recurrence of adenoma after endoscopic resection was associated with sex, margin clearance, location and dysplasia grade.

Key Words: Gastric adenoma, EMR, ESD, Recurrence, Risk factor

UGI-38

Endoscopic Submucosal Dissection Using a Q-type Knife for Early Gastric Cancers and Adenomas

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Background and Aims: Endoscopic submucosal dissection (ESD) is more difficult and has a higher rate of complications, compared with conventional endoscopic resection. The aim of this study was to evaluate the feasibility and safety of a new Q-type (star shape fixed tip) knife for ESD.

Methods: ESD using Q-type knife was carried out on 158 patients with early gastric cancers (n=76), adenomas (n=80), and hyperplastic polyps (n=2) at two medical centers (two experts, five trainees) in Daegu- Gyeongbuk, Korea, between October 2011 and October 2013. The procedure time, en bloc and margin-free resection rates, and adverse events were evaluated.

Results: Mean procedure time was 39.1 minutes (range 6-194). En-bloc and margin-free resection rates were 95.6% and 94.9%, respectively. Perforations occurred in 1.3% of patients (n=2). The incidence of postoperative hemorrhage was 3.8% (n=6). All complications were treated endoscopically, and surgery was not necessary.

Conclusions: ESD using the Q-type knife for early gastric cancers and adenomas is feasible and safe.

Key Words: ESD, Knife
Long Term Outcomes after Argon Plasma Coagulation Ablation for Gastric Adenoma with Low Grade Dysplasia

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Background: Argon plasma coagulation (APC) ablation is a good treatment option for many gastrointestinal tract diseases. For the treatment of gastric adenoma (GA) with low grade dysplasia (LGD), APC ablation seems to be easier and safer than other endoscopic treatment modalities such as EMR or ESD.

Aim: The purpose of this study was to evaluate the long-term outcomes and prognostic factors for local recurrence after APC ablation for GA with LGD on an outpatient basis.

Material and Method: Patients with GA with LGD were treated with APC ablation (60w) after submucosal saline injection on an outpatient basis at Ajou University Hospital from January 2004 to June 2014. We scheduled follow-up endoscopy with forceps biopsy at 3, 6, 12 months, thereafter every 12 months.

Results: 97 lesions of GA with LGD from 91 patients (mean age 60.9, range 34-81) were treated with APC ablation. The endoscopic pattern of the lesions included flat elevated type in 83 and depressed type in 14. The location of the lesions included 3 in the upper part of the stomach, 35 in the middle part and 59 in the lower part. After APC ablation procedure, 5 patients re-visited to the hospital due to abdominal pain (2), moderate bleeding (2) and pneumoperitoneum without evidence of perforation (1), which could be managed with conservative care. During 39 months of the median follow-up period (3~134 months), local recurrence of GA with LGD were noted in 4.1% (4/97). Depressed lesion was identified as a unique predictive factor of local recurrence on univariate analysis (p value=0.018), although longest diameter, shortest diameter and surface area were also identified as its predictive factors on univariate analysis.

Conclusion: APC ablation for treatment of GA with LGD is an effective treatment option with a low local recurrence rate, low rates of adverse events and short hospital stay time. We may expect depressed lesion as an affecting factor for local recurrence after APC ablation.

Key Words: APC ablation, Gastric adenoma, Low grade dysplasia, Outpatient

The Risk of Lymph Node Metastasis for Mixed Adenocarcinoma in Early Gastric Cancer

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Background/Aims: Endoscopic submucosal dissection (ESD) is widely accepted as treatment for early gastric cancer (EGC) due to its minimal invasiveness, and better quality of life associated with preserving gastrointestinal function. However, there is no consensus on ESD for mixed adenocarcinoma. This study aimed to evaluated the risk factor of lymph node (LN) metastasis and validate the ESD criteria as a curative resection for mixed adenocarcinoma in EGC.

Methods: Of 692 EGC patients who had undergone gastrectomy with LN dissection between 2001 and 2013, 60 were diagnosed as mixed adenocarcinoma after histological evaluation in surgical specimens and were analyzed retrospectively.

Results: LN metastasis was detected in 13 (21.7%) of 60 mixed adenocarcinoma. There were no significant differences in the gender ratio of male to female (74.5% : 25.5% in LNN group vs. 53.8% : 46.2% in LNP group, p=0.181) and age (58.9 ± 11.7 in LNN group vs. 57.8 ± 12.3 in LNP group, years, p=0.770) between LN negative group (LNN group) and LN positive group (LNP group). The histological evaluation showed that the size of EGC was significant larger in LNP group than in LNN group (26.1 ± 10.0 in LNN group vs. 36.1 ± 8.7 in LNP group, mm, p=0.002). The rates of LN metastasis were different according to the tumor size (35.1% in tumor > 20 mm vs. 0% in tumor ≤ 20 mm, p=0.003) and the presence of submucosal invasion (32.5% in submucosal cancer vs. 0% in mucosal cancer, p=0.006). None of mucosal cancer ≤ 20 mm and 48.1% of submucosal cancers > 20 mm in size had LN metastasis.

Conclusions: The risk of LN metastasis is high in mixed adenocarcinoma with more than 20 mm in size and submucosal invasion. Therefore, additional surgical treatment should be recommended in mixed adenocarcinoma with high risk factors even after complete resection by endoscopic procedures.

Key Words: Mixed adenocarcinoma, Early gastric cancer, Lymph node, Metastasis
Long-Term Outcome between Endoscopic Submucosal Dissection and Surgical Resection for Early Gastric Cancer

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Background/Aims: The aim of this study is to evaluate the long-term clinical and oncologic outcome of ESD for differentiated EGC of an expanded indication compared to surgical resection.

Methods: Retrospective analyses were performed in patients who underwent ESD or surgical resection for EGC of an expanded indication from 2006 and 2008 in Incheon St. Mary’s Hospital, Seoul St. Mary’s Hospital, Yeouido St. Mary’s Hospital, and St. Paul’s Hospital. First arm study was performed according to pre-ESD diagnosis including pathologic diagnosis and endoscopic findings. Second arm study was obtained from post-ESD final pathologic result. All the patients were checked with endoscopy and stomach CT regularly at least 5 years. Clinical outcomes, disease free survival and overall survival were compared between the ESD group and surgical resection group in each arm.

Results: In first arm study, 41 patients who received ESD and 106 patients who received surgical resection were enrolled. Metachronous recur was found in 4 patients among ESD group and in 2 patients among surgical resection group during the follow up period. There was no local recurrence in both groups. The disease free survival was not different between the two groups (ESD vs surgical resection; 87.8 vs 95.3%, p=0.291). The 5-year overall survival rate was 100% in both groups. In second arm study, 74 patients who received ESD and 165 patients who received surgical resection were enrolled. Metachronous recur was found in 5 patients among ESD group and in 2 patients among surgical resection group during the follow up period. Local recurrence did not occur in both groups. Surgical resection group was superior to ESD group in disease free survival (97.6% vs 87.6%, p=0.002). The 5-year overall survival rate was 100% in both groups.

Conclusions: ESD for EGC might be acceptable considering the overall survival rates. However, intensive surveillance should be performed to find the metachronous recur after ESD.

Key Words: Early gastric cancer, ESD

Endoscopic Resection for Undifferentiated-Type Early Gastric Cancer: Endoscopic Outcome and Long-Term Survival

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Backgrounds and Aims: Endoscopic resection has been performed carefully for a curative treatment of intramucosal undifferentiated early gastric cancer (UEGC), ≤ 2 cm in size without ulceration (expanded indication). The aim of this study was to evaluate the short-term endoscopic outcome and long-term survival of patients with UEGC.

Patients and Methods: Between January 2004 and December 2010, we identified 204 patients who were treated with endoscopic resection for UEGC and analyzed 82 cases with expanded indication. Short-term endoscopic results and patients’ survival were reviewed retrospectively.

Results: The median age of 82 study patients was 55 years (interquartile range [IQR], 46-64 years) and median follow-up period was 60 months (IQR, 47-77 months). En bloc and curative resections were achieved in 81 (98.8%) and 74 (90.2%) patients, respectively. Bleeding occurred in 9 (11.0%) patients and perforation occurred in 1 (1.2%) patient. During median follow-up of 15 months (IQR 6-74 months), 4 cases of recurrence were found. There was no gastric cancer-related death. According to the size, 20 cases of 10 mm or less sized cancer showed no lymphovascular invasion and recurrence. Meanwhile, lymphovascular invasion and recurrence were found 3 cases and 4 cases, respectively, of the 62 cases with 11 mm to 20 mm sized cancer.

Conclusions: Endoscopic resection can be a curative treatment option for a highly selected case of UEGC. Patients with intramucosal UEGC, ≤ 1 cm in size without ulceration showed excellent short-term endoscopic outcome and long-term survival.

Key Words: Clinical outcome, Endoscopic resection, Stomach neoplasm
Clinical Outcomes of Endoscopic Submucosal Dissection for Superficial Esophageal Squamous Neoplasms

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Background/Aims: ESD allows high rates of en bloc resection, precise histological assessment and low rate of local recurrence, but have substantial risks of perforation, bleeding and stricture in esophagus. The aim of this study was to evaluate the efficacy and safety of endoscopic submucosal dissection for superficial esophageal neoplasms.

Methods: We retrospectively reviewed 35 esophageal ESDs for superficial squamous neoplasms in 32 patients between March 2009 and August 2014 in Gangnam Severance Hospital.

Results: The median age was 64 years, and 30 males and 2 females were included. The indications were early esophageal cancer in 24, HGD in 6, LGD in 5 lesions. The median ESD procedure time was 38 (10-240) minutes. The median specimen size and tumor size were 27 (12-64) mm and 16 (3-52) mm. The en bloc resection rate and R0 resection rate were 97.1% (34/35) and 91.4% (32/35), respectively. The median length of hospitalization was 4 days (3-13 days). Microperforation and post-ESD bleeding occurred in 5.7% (2/35), and 2.9% (1/35), respectively, and could be managed by conservative endoscopic management. Post-ESD esophageal stricture was developed in six patients (17.1%), who could be managed by balloon dilatation (median No. of session 3, (2-9)). There was a gross perforation event during balloon dilatation in one patient who had post-ESD stricture. The patient could be managed with temporal stenting and PEG tube insertion. Five patients (14%, CCRTx in 3 patients, RTx in 1 patient, surgery in 1 patient) had additional treatment for esophageal cancer after ESD, because of positive basal margin in 1, lymphovascular invasion in 1 and deep submucosal invasion in 3 patients. There was no disease specific mortality during median follow up for 31 months.

Conclusion: We could achieve excellent clinical outcomes in ESD for superficial esophageal neoplasm. Esophageal ESD is a good treatment option for superficial esophageal neoplasm, in terms of efficacy and safety.

Key Words: ESD, Esophageal neoplasm

Metachronous Recurrence after Endoscopic Resection of Gastric Adenoma Is as High as That of Gastric Carcinoma

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Background/Aims: Metachronous recurrence after endoscopic resection (ER) of gastric cancer is known to be high. However, recurrence rate of metachronous lesions after ER of gastric adenoma has not been studied well. The aim of the study was to compare the metachronous recurrence between gastric carcinoma and adenoma patients.

Methods: We analyzed 1647 patients who underwent ER of gastric neoplasm from January 2005 to August 2013. Of these, a total of 947 cases including 408 carcinoma and 539 adenoma patients were enrolled in the study. Follow-up endoscopic examinations were conducted at 3, 6, and 12 months after ER, and then yearly thereafter.

Results: At 27 months’ median follow up (interquartile range, 16-45 months), 43 metachronous recurrence was diagnosed in carcinoma patients and 45 in adenoma patients. There was no significant difference in the incidence of recurrent metachronous neoplasm between carcinoma and adenoma patients (p=0.728, log-rank test). After excluding metachronous adenoma, cancer recurrence was not different either between two groups (p=0.943). After adjusting for age, sex, multiplicity, and Helicobacter pylori status, the risk of the metachronous development of gastric cancer in adenoma patients was similar with that in carcinoma patients (hazard ratio, 0.96; 95% confidence intervals, 0.63-1.45).

Conclusions: Metachronous gastric cancer after ER of gastric adenoma occurred as high as that of gastric carcinoma. Similar endoscopic surveillance program should be applied for both gastric carcinoma and adenoma patients after ER.

Key Words: ESD, Gastric adenoma, Metachronous neoplasm
UGI-45

Outcome Over 10 Years of Endoscopic Submucosal Dissection for Early Gastric Cancer

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Background/Aims: Endoscopic submucosal dissection (ESD) for early gastric cancer (EGC) is considered as standard therapy in Korea. However, the long term clinical outcomes remain unknown. We investigated the tumor recurrence and survival after ESD for EGC during 10 years.

Methods: ESD was performed for patients with EGC that fulfilled the expanded criteria: mucosal cancer without ulcer findings irrespective of tumour size; mucosal cancer with ulcer findings \(\leq 3\) cm in diameter; submucosal invasive cancer \(\leq 3\) cm in size; and minute undifferentiated mucosal cancer without ulcer findings \(\leq 2\) cm in diameter. We reviewed medical records of 84 patients who underwent ESD for EGC from October, 2003 to August, 2004. The patients underwent ESD and then received periodic endoscopic follow-up and metastatic surveys over 10 years. The main outcome measures were curability (curative or non-curative), recurrent rate, and survival rates.

Results: 74 of 84 lesions (88.1%) were deemed to have undergone curative resection. 8 patients underwent additional surgery for incomplete resection or complication following ESD. Only 1 patient was diagnosed local recurrence after ESD and she underwent additional surgery. The 10 year overall survival rates and disease free survival of the patients after ESD were followed up for over 10 years was 89.2% (66/74) and 98.5% (65/66), respectively. A total of patients 8 expired, but causes of death are not related gastric cancer.

Conclusions: The 10 year overall survival and disease free survival of ESD for EGC are excellent. Expanded indications for ESD can be applied safely to EGC.

Key Words: EGC, ESD, Long-term outcome

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UGI-46

Endoscopic Prediction of Recurrence in Patients with Early Gastric Cancer after Margin-Negative Endoscopic Resection

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Background and Aims: Although follow-up endoscopy is routinely performed after endoscopic resection for early gastric cancer (EGC), it has not been determined which endoscopic findings are suggestive of recurrence and when we take a biopsy at resection site.

Methods: Among 3037 cases of margin-negative endoscopic resection (including endoscopic mucosal resection and endoscopic submucosal dissection) for EGC between June 1995 and December 2011, a consecutive 22 patients with recurrent carcinoma at the site of endoscopic resection were identified. For each case, 4 controls were matched by age, sex and resectability (en-bloc or piecemeal). Endoscopic review was performed by consensus of 2 endoscopists based on the characteristic endoscopic criteria categorized as gross morphology (evenly elevated, unevenly elevated and flat), hyperaemic change, mucosal defect (erosion or ulcer) and spontaneous bleeding.

Results: The mean age was 63.8 years and male was 72.9%. En-bloc resection was achieved in 110 (90.9%) cases. The mean (± standard deviation) interval between endoscopic resection and the diagnosis of recurrence was 16.8 (± 11.3) months. Using endoscopic criteria of ‘elevated gross morphology (both evenly and unevenly) or hyperaemic change’ at resection scar, the sensitivity, specificity, and positive and negative predictive values of recurrence rate at resection site were 95.5%, 68.2%, 2.1% and 99.95%, respectively. When applying these criteria to histologically differentiated and en-bloc resected EGCs, the values were 100%, 71.4%, 2.5% and 100%, respectively.

Conclusion: Recurrence at endoscopic resection scar after margin negative resection of EGC is very rare. Routine follow-up biopsy seems not to be necessary for cases in which flat mucosa without hyperaemic changes at the scar, especially when tumor with differentiated histology was completely resected in an en-bloc pattern.

Key Words: Recurrence, Early gastric cancer (EGC), Endoscopic resection

The affiliation of Dr. Joo Young Cho and Dr. Weon Jin Ko was changed to <Digestive Disease Center, CHA Bundang Medical Center, CHA University, Seongnam, Korea> from November 1.
How Often Synchronous and Metachronous Lesions Develop after Endoscopic Submucosal Dissection for Gastric Tumors?

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Background and Aim: Endoscopic submucosal dissection (ESD) has become a standard method of treatment for gastric tumors. Metachronous recurrence should be a consideration after ESD has been performed. The aim of this study was to review our experiences in the management of patients with synchronous and metachronous lesions, and to evaluate their incidence and clinicopathologic features.

Patients and Methods: We reviewed 194 patients who underwent ESD for gastric tumors between January 2007 and December 2011. Synchronous lesions were defined as secondary gastric tumors detected within 6 months after the initial ESD. Metachronous tumors were defined as those detected more than 6 months after the initial ESD. We investigated the incidence and clinicopathologic features of synchronous and metachronous tumors after ESD.

Results: In total, 20 patients (10.3%) had synchronous lesions and 19 patients (9.8%) had metachronous lesions. The annual incidence of metachronous tumors after ESD was 2.93%. The median period until discovery after initial ESD was 40.1 months. Female patients developed synchronous and metachronous tumors more frequently than male patients ($p=0.037$). Patients with *H. pylori* infections developed tumors more frequently than those without ($p=0.04$). There were no significant differences with respect to the type and differentiation of tumors.

Conclusions: Synchronous and metachronous lesions of gastric tumors were considerably prevalent after ESD. Considering the results of this study, careful endoscopic investigation should be performed after ESD for female patients and those with *H. pylori* infections. However, further large-scale and longer prospective studies are needed.

Key Words: ESD, Synchronous, Metachronous

Outcome Over 5 Years of Minimally Invasive Treatment of Early Gastric Cancer beyond Endoscopic Submucosal Dissection

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Background/Aims: The aim of this study was to evaluate the long term outcomes of combined endoscopic submucosal dissection (ESD) with laparoscopic lymph node dissection (LLND) and endoscopic full-thickness resection (EFTGR) with laparoscopic regional lymph node dissection (hybrid natural orifice transluminal endoscopic surgery, hybrid NOTES) for early gastric cancer (EGC).

Methods: This is a retrospective analysis at a single tertiary referral center. A total of 23 patients with EGC underwent combined ESD with LLND and hybrid NOTES for early gastric cancer beyond endoscopic submucosal dissection between February 2007 and August 2009. Then the patients received periodic endoscopic follow-up and metastatic surveys over 5 years. The main outcome measures were curability (curative or non-curative), recurrent rate, and survival rates.

Results: The curative resection rate of all cases was 95.7% (ESD with LLND 90.0% vs. hybrid NOTES 100%, respectively). Incomplete resection was shown in 1 (tumor-positive vertical margin). Histologically, 11 cases were mucosal cancers, and 12 were submucosal cancers. And there were 12 undifferentiated cancers. The median tumor size was 3.4 cm (range, 1.2-5.7 cm) in long diameter. The lymphovascular invasion was found in 3 cases with 1 lymph node metastasis. 5 patients underwent additional gastrectomy because of tumor-positive margins or treatment-related complications. During over 5 year follow-up periods, none showed local recurrence or lymph node metastasis. The 5 year overall survival rates and disease free survival of the patients was 100% in both.

Conclusion: Combined ESD with LLND and hybrid NOTES showed favorable long term clinical outcomes. They could be utilized as a bridge between ESD and gastrectomy in selected patients with a risk of lymph node metastasis.

Key Words: ESD, Hybrid NOTES, Laparoscopic lymph node dissection

The affiliation of Dr. Joo Young Cho and Dr. Weon Jin Ko was changed to <Digestive Disease Center, CHA Bundang Medical Center, CHA University, Seongnam, Korea> from November 1.
Risk Factors of Submucosal/Lymphovascular Invasion in Early Gastric Cancer Resected by Endoscopic Submucosal Dissection

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Background: Accurate diagnosis of the invasion depth prior to endoscopic submucosal dissection (ESD) remains a challenge and can only be confirmed by final pathologic report following ESD. In addition, patients with submucosal or lymphovascular (SM/LV) invasion may require additional surgery. We performed a retrospective study to find the risk factors for SM/LV invasions.

Methods: We reviewed clinicopathological data in patients underwent ESD from Jan 2009 to May 2014 and presenting EGC of 2.0 cm or smaller in size, a differentiated-type adenocarcinoma, and without ulceration.

Results: Among 409 lesions consecutively resected by ESD, 309 lesions in 297 patients were included in this study. Submucosal and lymphovascular invasions were detected in 35 lesions. Multivariate analysis revealed two independent risk factors for SM/LV invasions: Histology of moderate-differentiated (odds ratio (OR) 4.072; 95% CI 1.925-8.616; \( p = 0.000 \)), location of upper and middle third (U/M) of stomach (OR 2.817, 95% CI 1.310-6.058; \( p = 0.008 \)).

Table. Characteristics of EGC lesions resected by ESD which were \( \leq 2 \) cm in tumor size and a histologically differentiated type of adenocarcinoma without ulceration

<table>
<thead>
<tr>
<th></th>
<th>SM/LV invasion (+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean ± SD (range)</td>
<td>65.83 ± 9.28 (45/86)</td>
</tr>
<tr>
<td>Sex, male/female</td>
<td>221/53</td>
</tr>
<tr>
<td>Gross type (elevated/distressed)</td>
<td>46/50/178</td>
</tr>
<tr>
<td>Tumor Location, U/M/L</td>
<td>10/53/211</td>
</tr>
<tr>
<td>Tumor number, solitary/multiple</td>
<td>249/24</td>
</tr>
<tr>
<td>Tumor size, mean ± SD (range)</td>
<td>10.92 ± 4.81</td>
</tr>
<tr>
<td>Invasion depth, m/sm1/sm2/sm3</td>
<td>274/0/0/0</td>
</tr>
<tr>
<td>Histology</td>
<td>Well/Moderate/differentiated</td>
</tr>
</tbody>
</table>

Conclusions: Moderate-differentiated adenocarcinoma, and location of U/M were identified as independent risk factors of SM/LV invasion in EGC meeting absolute criteria for ESD.

Key Words: Early gastric cancer, ESD, Submucosal invasion, Lymphovascular invasion

Prognosis of Vertical Incomplete ESD of Early Gastric Cancer

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Background: Endoscopic submucosal dissection (ESD) for early gastric cancer (EGC) is a minimal invasive treatment. Although increasing ESD at EGC treatment, the suitable strategy for incomplete resection such as positive vertical margin has not been established yet. This study aimed to investigate a prognosis of vertical incomplete resection of EGC patients.

Method: From January 2007 through December 2011, 33 vertical incomplete ESD cases who received ESD at Korea university Guro hospital were reviewed retrospectively

Results: Among the 33 total cases, 7 cases (21.2%) were received additional total or subtotal gastrectomy, and 26 cases (78.8%) were closely observed because they refused operation (duration; 4.2 ± 1.2 years). Among patients who underwent additional gastrectomy, only one case (14.3%) had residual cancer on resection specimen, whereas six of 26 cases (23.1%) had recurrence of tumor among the observed patients during follow-up (interval; 3 ± 1.5 years) and 20 cases had no recurrence for 5 years. Substantially, 7 of 33 cases (21.2%) has remnant tumor (1 residual tumor case of gastrectomy group and 6 recurrence tumor case of observation group; remnant group) and 26 of 33 cases (78.8) has no remnant tumor (non-remnant group). However, there were no statistical differences for tumor size, differentiation, gross type, location, depth of invasion and lymphovascular invasion between remnant and non-remnant tumor group.

Conclusions: Overall, 21.2% has remnant cancer among vertical incomplete ESD of EGC patients. A larger scaled multicenter study might be necessary for prediction of prognostic risk factors in vertical incomplete ESD of EGC.

Key Words: Vertical incomplete ESD, Endoscopy, EGC
Survival Benefit of Additional Surgery after Non-Curative Endoscopic Resection of Early Gastric Cancer

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Background/Aims: In cases of non-curative endoscopic resection (ER) of early gastric cancer (EGC), additional surgery is generally recommended. However, there have been few controversial reports on survival benefit of additional surgery.

Methods: Between 2000 and 2011, 341 patients underwent non-curative ER of differentiated-type EGC. After excluding 67 patients with positive lateral resection margin as the only non-curative factor, 274 patients (194 patients undergoing additional surgery and 80 patients without additional treatment) were finally enrolled. The median duration of follow-up after non-curative ER was 60.5 months.

Results: Additional surgery group showed younger age, lower Charlson comorbidity index score, smaller tumor size, and higher lymphovascular invasion rate than no treatment group. Among 194 patients undergoing additional surgery, lymph node (LN) metastasis was found in 11 patients (5.7%). Patients with LN metastasis were significantly associated with older age and tended to have deeper tumor invasion into SM2 or SM3 layer and moderately differentiated histology than those without LN metastasis. Five-year overall survival rates of additional surgery group and no treatment group were 94.3% and 84.7%, respectively. In univariate analysis, patients with younger age (< 65 versus ≥ 65 years), lower Charlson comorbidity index score (<4 versus ≥ 4), and additional surgery showed significantly longer five-year overall survival rates. In Cox-proportional hazards model, only additional surgery was identified as an independent predictor of overall survival (hazard ratio (95% confidence interval): 0.425 (0.181-0.998)).

Conclusion: Additional surgery had a beneficial effect on overall survival and therefore should be considered in patients undergoing non-curative ER for EGC.

Key Words: Early gastric cancer, Endoscopic resection, Surgery, Survival

Management and Treatment for Complication (Accident) after Peroral Endoscopic Myotomy (POEM) in Achalasia

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Background: The aim of this study was to inform the safety of peroral endoscopic myotomy (POEM). So we investigated the management for complications after POEM in patients suffering from esophageal achalasia.

Methods: A total of 54 cases for achalasia patients who underwent POEM from November 2011 to August 2014 were enrolled. The complications that arose after operation, and during follow-up were analyzed.

Results: Postoperative complications included pneumoperitoneum (42.6%, 23/54), pleural effusion (37.0%, 20/54), subcutaneous emphysema (31.5%, 17/54), atelectasis of the lungs (20.4%, 11/54), pneumomediastinum (18.5%, 10/54), pneumonia (14.8%, 8/54), pneumoretroperitoneum (13.0%, 7/54), pulmonary congestion (3.7%, 2/54), gastric emphysema (1.9%, 1/54), and alveolar hemorrhage (1.9%, 1/54). No deaths occurred. All complications were resolved through conservative treatment.

Conclusion: Complications arising after POEM can be treated and resolved by using conservative treatment. POEM was the safe endoscopic operation and can be expected to become the preferred treatment for achalasia.

Key Words: Esophageal achalasia, Peroral endoscopic myotomy, Complication

The affiliation of Dr. Joo Young Cho and Dr. Weon Jin Ko was changed to <Digestive Disease Center, CHA Bundang Medical Center, CHA University, Seongnam, Korea> from November 1.
UGI-53

Clinical Outcomes of Peroral Endoscopic Myotomy for Achalasia Depend on Manometric Subtype
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Background/Aims: Peroral endoscopic myotomy (POEM) is known to be safe and effective endoscopic surgery compared with surgical myotomy for achalasia patients. A higher percentage of patients with type II achalasia successfully treated with laparoscopic Heller myotomy than patients with types I and III achalasia. We evaluated whether manometric subtype was associated with response to treatment in a patients treated with POEM.

Methods: Esophageal pre-treatment manometry data were collected from 53 cases that was performed POEM from November 2011 to August 2014 at two tertiary referral centers. Manometric tracings were classified according to the 3 Chicago subtypes.

Results: Among 53 cases, 35 type 1, 8 type 2 and 10 type 3 achalasia were included. There was no difference in pre-POEM Eckardt score, basal LES pressure, and integrated relaxation pressure (IRP) between type 1, type 2 and type 3 group (6.1±3.9 vs. 8.4±3.6 vs. 6.6±3.4; p=0.215, 27.3±29.8 vs. 39.7±12.3 vs. 34.1±32.8 mmHg; p=0.089, and 23.4±29.6 vs. 30.1±14.9 vs. 19.2±28.8 mmHg; p=0.709). All patients showed a significant improvement in Eckardt score after POEM during median follow-up of 16 months (6.1±3.9 vs. 0.6±2.4; p<0.001, 8.4±3.6 vs. 0.6±1.4; p=0.008, 6.6±3.4 vs. 1.0±2.0; p<0.001). But there was difference in decreased degree of Eckardt score between type 1, type 2 and type 3 group (p=0.637), LES pressure was significant decrease only for type 2 group (23.5±16.3 vs. 16.1±12.4; p=0.113, 39.7±12.3 vs. 19.5±4.4; p=0.02, 34.1±32.8 vs. 16.8±17.2; p=0.421). IRP score was significant decrease only for type 1 group (23.4±18.3 vs. 11.0±9.5; p=0.014, 30.1±14.9 vs. 12.5±7.5; p=0.057, 19.0±29.0 vs. 11.6±12.3; p=0.886).

Conclusion: POEM showed good clinical outcomes in any manometric subtype. In the future, large prospective study is needed to confirm that POEM can be considered as standard treatment in any subtype of achalasia patients.

Key Words: Peroral endoscopic myotomy, Clinical outcome, Manometric subtype

The affiliation of Dr. Joo Young Cho and Dr. Weon Jin Ko was changed to Digestive Disease Center, CHA Bundang Medical Center, CHA University, Seongnam, Korea from November 1.

UGI-54

Peroral Endoscopic Myotomy (POEM) for Esophageal Achalasia: Report of Short Term Outcomes in Initial 6 Cases
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Background/Aims: A novel endoscopic technique, peroral endoscopic myotomy (POEM), was introduced as an alternative treatment for achalasia. We report early experience of POEM.

Methods: Six achalasia patients who underwent POEM between July 2013 and July 2014 in Gangnam Severance Hospital were enrolled. We followed the technical method of POEM, which was originally suggested by Inoue. The high resolution manometry, timed barium esophagogram (TBE) and esophageal transit scintigraphy (ETS) were conducted, and a clinical symptom score (Eckardt score) also was assessed before and after procedure to evaluate the outcomes.

Table 1. Characteristics of Patients

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Esophagus type</th>
<th>Achalasia subtype</th>
<th>LES width (mm)</th>
<th>Past history</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>63</td>
<td>F</td>
<td>straight</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>2</td>
<td>58</td>
<td>F</td>
<td>straight</td>
<td>3</td>
<td>8.1</td>
</tr>
<tr>
<td>3</td>
<td>39</td>
<td>F</td>
<td>straight</td>
<td>HRM fail</td>
<td>11.6</td>
</tr>
<tr>
<td>4</td>
<td>52</td>
<td>M</td>
<td>sigmoid</td>
<td>HRM fail</td>
<td>9.3</td>
</tr>
<tr>
<td>5</td>
<td>80</td>
<td>M</td>
<td>straight</td>
<td>3</td>
<td>8.0</td>
</tr>
<tr>
<td>6</td>
<td>44</td>
<td>F</td>
<td>sigmoid</td>
<td>1</td>
<td>7.4</td>
</tr>
</tbody>
</table>

HRM, high resolution manometry; LES, lower esophageal sphincter; EPD, endoscopic pneumatic dilatation; HM, Heller’s myotomy.

Table 2. Parameters Before and After POEM Procedure

<table>
<thead>
<tr>
<th>Operation Myotomy length (cm)</th>
<th>Eckardt score before After</th>
<th>4 sessions</th>
<th>IRP (mmHg)</th>
<th>Hospital stay (days)</th>
<th>Complications*</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>10</td>
<td>19.7</td>
<td>5.9</td>
<td>6</td>
<td>Pneumoperitoneum (minimal)</td>
</tr>
<tr>
<td>92</td>
<td>20</td>
<td>31.2</td>
<td>19.8</td>
<td>6</td>
<td>Pneumoperitoneum (minimal)</td>
</tr>
<tr>
<td>64</td>
<td>10</td>
<td>5</td>
<td>HEM fail</td>
<td>6</td>
<td>none</td>
</tr>
<tr>
<td>92</td>
<td>7</td>
<td>5</td>
<td>HEM fail</td>
<td>6</td>
<td>none</td>
</tr>
<tr>
<td>92</td>
<td>17</td>
<td>24.1</td>
<td>11.9</td>
<td>7</td>
<td>none</td>
</tr>
<tr>
<td>86</td>
<td>10</td>
<td>9</td>
<td>3.3</td>
<td>2.5</td>
<td>none</td>
</tr>
</tbody>
</table>

HRM, high resolution manometry; LES, lower esophageal sphincter; IRP, integrated relaxation pressure. *recovered after conservative care

Results: Four patients received prior treatment, 2 had sigmoid- type esophagus and 2 was type III of achalasia. All cases was successfully done without serious complications. Mean procedure time was 88.2 min (range 64-103) and mean myotomy length was 12 cm (7-20). Mean IRP was decreased from 19.6 (3.3-31.2) to 10.0 mmHg (2.5-19.8). Mean Eckardt score was improved from 6 (4-9) to 1 (0-3) before and after POEM. Also, the parameters of TBE and ETS were improved.

Conclusions: POEM is an effective, safe therapeutic option as rescue for achalasia patients who have failed to prior therapy. Short-term outcome is excellent despite sigmoid, spastic esophagus, or refractory achalasia.

Key Words: Achalasia, Peroral endoscopic myotomy, High resolution manometry
UGI-55

Long Term Outcome of Peroral Endoscopic Myotomy (POEM) in Achalasia Patients
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Background/Aims: Peroral endoscopic myotomy (POEM) was introduced as an alternative treatment for achalasia patients. The aim of this study was to evaluate the long term outcomes of POEM in achalasia patients.

Methods: This is a retrospective analysis at two tertiary referral centers. A total of 12 achalasia patients underwent POEM between November 2011 and September 2012. Then the patients received periodic follow-up over 2 years. The main outcomes were Eckardt score, basal lower esophageal sphincter (LES) pressure, integrated relaxation pressure (IRP) score, and procedure-related complications before and after POEM.

Results: The length of myotomy was 8.6±5.4 cm. All patients showed a significant improvement in Eckardt score before and after POEM during median follow-up of 27.8 months (6.4±3.6 vs. 0.4±1.6; p<0.001). Also, significant decrease in LES pressure and IRP was found (30.87±26.23 vs. 16.40±6.80; p=0.003 and 26.20±21.10 vs. 10.50±9.00; p=0.007). Over 2 years, no symptom recurrence occurred.

Conclusion: Long term outcome of POEM for achalasia are excellent. In the future, large scale studies are needed to confirm this result.

Key Words: Achalasia, POEM, Long-term outcome

UGI-56

A Novel Method of Percutaneous Endoscopic Gastrostomy Using a Portable Endoscope
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Background and Aims: Percutaneous gastrostomy (PEG) is the standard method for enteral feeding in patients with swallowing disorders. However, PEG requires a hospital capable of endoscopy with intraprocedural monitoring. Therefore, we aimed to find out if PEG was possible by using a portable ultrathin disposable endoscope.

Patients and Methods: Subjects who underwent PEG and had given their written consent from Aug 2013-Aug 2014 at a tertiary university hospital were prospectively enrolled. PEG was performed via the introducer method by using a portable ultrathin transnasal disposable endoscope (E.G.Scan, Intromedic Co. Ltd., Seoul, Korea). E.G.Scan was inserted into the stomach through the nasal cavity. After air inflation, the puncture site was identified through the E.G.Scan. PEG was performed via the introducer method with a balloon catheter. Complications such as bleeding, fever, PEG-site infection and aspiration pneumonia were checked for 1 week after the procedure.

Results: A total of 18 (Male:13, 71.1±11.2 yrs ) subjects were enrolled in this study. PEG indications were ten cases of aspiration due to cerebrovascular accident or Parkinsonism, four cases of post-operative aspiration from head & neck cancers, two cases of passage blockage due to esophageal cancer, one case of odynophagia from radiotherapy of head & neck cancer and one case of botulinum-refractory secondary achalasia. PEG was successfully inserted in 83.3% (15/18). The mean insertion time was 22.8±8.1 min. The three failed cases were due to poor visualization of the anterior gastric wall. There were two complications: one case of bleeding and one of pneumoperitoneum. Both complications were transient and conservatively managed.

Conclusions: PEG through a portable endoscope is feasible with minimal risk. This method provides the possibility of bedside PEG insertion at an institution without a conventional endoscopy system.

Key Words: Percutaneous endoscopic gastrostomy, Introducer method, Ultrathin transnasal endoscopy, Endoscopy
A Nationwide Web-Based Survey of Practice Patterns for Endoscopic Sedation and Monitoring in Korea

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Background/Aims: This study aimed to investigate practice patterns for endoscopic sedation and monitoring in Korea through a first nationwide survey.

Methods: A 35-item anonymous questionnaire was developed and then e-mailed all active members of the KSGE. Survey data was collected electronically.

Results: During the 1-month survey period, 1,332 out of the 5,860 endoscopists invited (22.7%) completed the questionnaire. The mean age of respondents was 43.4 years; 80.2% were men, and 82.4% were gastroenterologists. A majority of respondents (98.5%, 1,318/1,332) currently perform endoscopic sedation for routine EGD (99.1%) and colonoscopy (91.4%); the dominant sedation method was midazolam alone (37.0%) for EGD and combination of midazolam with propofol for colonoscopy (33.8%), respectively. Sixty three percent of respondents (57.5%) rarely or never administer routine supplemental oxygen; 5.9% rarely or never monitor oxygen saturation. Experiences of sedation-related complications requiring emergent interventions were reported by 61.8% for mask ventilation, 16.2% for endotracheal intubation, 1.4% for neurologic injuries, and 1.8% for deaths. Most respondents (91.4%) have an opinion that the national practice guidelines for routine EGD and colonoscopy are required.

Conclusions: This nationwide survey shows that endoscopic sedation has become a standard practice in Korea, but it reveals many important sedation issues impacting patient care, the quality improvements, and potentially policy making.

Key Words: Endoscopy, Sedation, Monitoring, Survey, Endoscopist

Outcomes after Percutaneous Endoscopic Gastrostomy in High Risk Children

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Objectives: Percutaneous endoscopic gastrostomy (PEG) is widely accepted in children with severe underlying diseases. But in high risk patients there is an increase in the morbidity and mortality after PEG procedure. So we evaluated the characteristics, complications, and nutritional outcomes of high risk patients treated with PEG.

Methods: We retrospectively reviewed the records of 121 pediatric patients who underwent PEG insertion between March 2002 and March 2014 at Seoul National University Children’s Hospital. The body weight, height and body mass index (BMI) of the patients were recorded before PEG placement and at last follow up. The American Society of Anesthesiologists (ASA) physical classification was used to assess the disease severity of patients.

Results: The Z-score of BMI before and at last follow up after PEG placement were -0.9±2.0 and -0.4±1.9, respectively which was statistically significant (p=0.01). According to ASA classification, 50 patients (41.3%) were grade 3 and 71 patients (58.7%) were grade 4. The underlying diseases of the patients were neurologic impairment (n=71), muscular disorder (n=20), malignancy (n=18), metabolic disorder (n=5), gastrointestinal diseases (n=5), genetic syndrome (n=2). Complications of PEG in our patients during the study period included wound infection at PEG insertion site (n=25), granuloma (n=8), PEG balloon rupture (n=2), V-P shunt infection (n=3), buried bumper syndrome (n=2), PEG disposition (n=2), colonic perforation (n=1), PEG site fistula (n=1), peritonitis (n=1), aspiration pneumonia (n=1). Three patients died due to peritonitis (n=1) and V-P shunt infection (n=2). Forty three patients (35.5%) experienced ICU care during the study period. For preventive PEG procedure related ICU care was in 14 patients and other reasons in 29 patients.

Conclusion: Our experience confirmed that PEG placement is a good and safe route for nutritional supply in patients with high ASA physical grade status.

Key Words: PEG, Outcome, High risk, Children
UGI-59

Enhancement of Physical Properties of Duodenal Jejunal Bypass Liner for Weight Loss: In Vitro Gastric Environment Study

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¹Division of Gastroenterology and Hepatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, ²R&D center, MITech Co., Ltd., Pyeongtaek, Korea

Background: Obesity is a major health problem worldwide. The endoscopic bariatric approaches are gaining traction as possible treatment modalities for metabolic obesity disease. Especially, the endoscopically placed duodenal-jejunal bypass stent has been designed for the short-term treatment of morbid obesity. However, these duodenal-jejunal bypass liner has known for problem of durability in gastrointestinal environment. For this reason, we developed new duodenal-jejunal bypass stent containing long-tailed ePTFE (Polytetrafluoroethylene) liner and evaluated duodenal-jejunal bypass sleeve on the anti-corrosion.

Method: Duodenal-jejunal bypass stent and ePTFE liner for covering bare metal stent was prepared for this study. And we estimated the validity between before and after accelerated corrosion state of duodenal-jejunal bypass liner in the Simulated Gastric Fluid(SGF). SGF including sodium chloride and purified pepsin were prepared from various concentrations of hydrochloric acid and sufficient deionized (DI) water. And then put duodenal-jejunal bypass liner and SGF into the water bath and maintain with 60°C during 8~16 days (same as 3~6months).

Result: A corroded duodenal-jejunal bypass liner was characterized by FT-IR (Fourier Transform Infrared Spectroscopy), SEM (scanning electron microscope) and UTM(Universal Testing Machine). Results from FT-IR and tensile test showed that ePTFE liner was suitable for duodenal-jejunal bypass stent. There may be a slightly decrease in strength (<10%) as the acidity increases from pH 7.0 to pH 1.0. Therefore, we observed SEM images of incorroded ePTFE liner surface.

Conclusion: These duodenal jejunal bypass stent containing long-tailed ePTFE liner showed good anti-corrosion properties under in vitro gastrointestinal environment. ePTFE liner surface is not modified by SGF. Also these ePTFE liner are very slightly decrease in tensile strength.

Key Words: Duodenal jejunal bypass, Obesity

UGI-60

Lidocaine Sprayed-on the Endoscope Can Improve the Tolerance during Upper Gastrointestinal Endoscopy?

Byung Hyo Cha

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Backgrounds and Aims: Topical pharyngeal anesthesia has been the standard preparation for reducing the discomfort during upper gastrointestinal endoscopy (UGIE). But it is not clear whether this method effective in regard to the tolerance of procedure. The aim of this study is to assess the efficacies of the added lidocaine spray on the tip of endoscope in improving patient tolerance.

Methods: All the patients underwent upper gastrointestinal endoscopy were consecutively enrolled and assigned to case group with additional 2 puffs of the 10% lidocaine spray on the tip of endoscope before intubation or control group without additional spray. During the endoscopy, the main outcomes including frequency of retching and belching were measured by independent assistants.

Results: Among 497 eligible patients, 262 were assigned to case group and 235 to control. In univariated and multivariated analysis, there was significant difference between two groups in terms of belching (case vs. control, OR = 0.15, 95% CI = 0.09 - 0.24, p<0.01) and retching (case vs. control, OR = 0.22, 95% CI = 0.15 - 0.34, p=0.01). Elderly showed less probability of belching events (age, OR = 0.96, 95% CI = 0.94 - 0.98, p<0.01), female sex was found as another predictive value of the presence of belching (female vs. male, OR = 2.16, 95% CI = 1.40 - 3.33, p=0.01). The sedation and patients with GERD were revealed as the factors correlated to the presence of retching (sedated vs. nonsedated, OR = 0.39, 95% CI = 0.25-0.61, p=0.01; GERD vs. none, OR = 1.48, 95% CI = 1.00 - 2.21, p=0.06).

Conclusions: The new methods adding lidocaine spray on the endoscope can improve the patient tolerance during UGIE.

Key Words: Lidocaine spray, Endoscopy, Tolerance, Belching, Retching
The Efficacy of Carbon Dioxide Insufflation in Upper Gastrointestinal Tract Endoscopic Submucosal Dissection

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Background/Aims: Endoscopic submucosal dissection (ESD) is performed with using air insufflation, and is associated with abdominal discomfort. It is well recognized that carbon dioxide (CO2) is absorbed quickly in the body than air. CO2 insufflation is expected to reduce abdominal discomfort and pain after ESD. This prospective, randomized, double-blind study was designed to assess the efficacy of CO2 insufflation instead of air insufflation during upper gastrointestinal tract ESD.

Methods: From May 2012 to August 2014, a total of 102 consecutive patients were randomly assigned to CO2 insufflation (CO2 group, n=50) or air insufflation (Air group, n=52). Abdominal pain after ESD was chronologically recorded on visual analogue system (VAS) score. Also, we recorded of both group that change of abdominal circumference, the amounts of sedatives, the use of analgesics, and complication rates.

Results and Conclusions: Baseline patient characteristics (age, gender, tumor size, tumor location, tumor histology) were not different in both groups. The mean procedure time was no statistically significant difference between both groups. Abdominal pain on VAS in the CO2 group vs. Air group was 3.5 vs. 4.9 one hour after the ESD (p=0.026), 2.8 vs. 4.3 three hours after the ESD (p=0.007) 1.8 vs. 3.6 five hours after the ESD (p=0.001), and 0.9 vs. 2.2 one day after the ESD (p<0.001). In the CO2 group, the abdominal pain on VAS was significantly lower than that of the Air group. Abdominal circumference change, amounts of sedatives or complication rates, were no differences in the two groups. However, CO2 insufflation during upper gastrointestinal tract ESD is less painful for patients than air insufflation.

Key Words: Carbon dioxide, Insufflation, ESD, Upper gastrointestinal tract, Efficacy

Comparison of Dexmedetomidine with Midazolam versus Midazolam Alone during Gastric Endoscopic Submucosal Dissection

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Background and Aims: Endoscopic submucosal dissection (ESD) is nowadays commonly performed as a treatment for gastric tumor. However, the sedation with midazolam (MDZ) often did not reach a satisfactory sedation during the procedure and the drug could suppress respiration and blood pressure also. The aim was to investigate the safety and efficacy of dexmedetomidine with on-demand MDZ (DEX group) in comparison with MDZ alone (MDZ group) as a sedative during an ESD of gastric tumor.

Patients and Methods: Eighty patients undergoing ESD of gastric tumor were randomly assigned to one of two treatment regimens (40 patients of each). We investigated the depth of sedation by using a MOAA/S score (Modified Observers Assessment alertness/sedation), interfering actions of patients, sedation related-adverse events, and the satisfaction degree of the patients and doctors.

Results: Eighty patients were randomly assigned to one of two treatment regimens (40 patients of each). There was no statistically significant difference between the two groups regarding age, sex, body mass index, ASA classification, and tumor characteristics. Appropriate sedation rate and the satisfaction degree of the doctors were significantly high in the DEX group. There were more interfering actions of patients in the MDZ group than in the DEX group. There was no difference in the adverse events between the two groups.

Conclusions: DEX with on-demand MDZ for the sedation during gastric ESD is as safe as MDZ alone and the sedation effect of DEX with MDZ is superior to that of MDZ alone.

Key Words: Procedural sedation, Endoscopic submucosal dissection, Sedative agents, Dexmedetomidine, Midazolam
UGI-63

Characteristics of Patients with Pain after Endoscopic Submucosal Dissection for Gastric Epithelial Neoplasm

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Background/Aims: Endoscopic submucosal dissection (ESD) has become a widely accepted for the en bloc resection of large superficial tumors in the gastrointestinal tract. Pain is one of the frequently noticed ESD-related complications. However, little is known about its prevalence and associated factors. The aim of this study was to evaluate the clinicopathological characteristics of patients with pain after ESD for gastric epithelial neoplasm.

Methods: We conducted a retrospective analysis of a prospectively collected registry (KHU-ESD registry) of clinical, endoscopic, and pathologic results from July 2007 to August 2014. We included the patients who underwent ESD for gastric adenoma or cancer. The patients with multiple lesions, taking a painkiller, and major complications such as perforation and bleeding were excluded. A visual analogue scale (VAS) score was used to assess pain during the immediate and 2, 12, and 24 h post-procedural period. The primary outcome was the use of painkillers such as tramadol and pethidine.

Results: Finally, we evaluated 1,226 eligible patients. Among these patients, 461 patients (37.6%) needed a painkiller at least once after ESD (Pain group). Compared with the patients who did not need a painkiller, Pain group had more female (37.1% vs. 27.6%, \(p<0.001\)), less alcohol consumption (40.3% vs. 47.8%, \(p=0.010\)), and larger tumor (17.1±14.8 mm vs. 15.5±11.6 mm, \(p=0.041\)) and specimen (41.3±16.0 mm vs. 39.0±13.8 mm, \(p=0.010\)) size. But, there was no significant difference in terms of age, BMI, histology, depth of invasion, and procedure time.

Conclusions: This study showed that more than one thirds of patients who underwent ESD needed a painkiller during hospitalization. Furthermore, female, alcohol history, and larger tumor or specimen size were predictive factors for the post-ESD pain.

Key Words: Pain, Endoscopic submucosal dissection, Gastric epithelial neoplasm

UGI-64

Can Contrast Enhanced Harmonic Endoscopic Ultrasound Differentiate the Risk of Malignancy in GI Stromal Tumors?

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Background and Aims: Although endoscopic ultrasound (EUS) has become a standard procedure for the evaluation of gastrointestinal stromal tumor(GIST), it could not appropriately estimate the malignancy risk of GIST. The aim of this study was to evaluate whether contrast enhanced harmonic EUS (CEH-EUS) can help to discriminate malignant potential of GIST.

Patients and Methods: A data set of 24 patients with suspicious subepithelial lesions of the GISTs who underwent CEH-EUS, was analyzed. Perfusion characteristics were classified and statistically analyzed after examination. Samples from EUS-fine needle aspirates, biopsy samples after needle cut or surgical specimen served as gold standard.

Results: CEH-EUS detected intratumoral vessels in all GISTs and 3 benign lesions(50%). The irregular vessels was more common in high-grade GISTs(4 out of 8) than low-grade GISTs(2 out of 10). The high-grade GISTs tend to show strong enhancement(6 out of 8) while the low-grade GISTs and benign lesions showed less or no contrast enhancement (10 out of 16). Also all leiomyomas showed less or no contrast enhancement.

Table 1. Comparison of CEH-EUS Findings between High-Grade Malignant GISTs and Benign Tumor in Terms of CEH-EUS

<table>
<thead>
<tr>
<th>Variable</th>
<th>High-grade malignant GISTs</th>
<th>Low-grade malignant GISTs</th>
<th>Benign lesion</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microvessels</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.012</td>
</tr>
<tr>
<td>Regular</td>
<td>4.5%</td>
<td>0.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>Irregular</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Perfusion</td>
<td>67.5%</td>
<td>50.0%</td>
<td>12.5%</td>
<td></td>
</tr>
<tr>
<td>Hypo-enhancement</td>
<td>20.0%</td>
<td>20.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>No enhancement</td>
<td>0.0%</td>
<td>0.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: This study showed that CEH-EUS may help to discriminate high grade GIST from low grade GIST and benign lesion with good accuracy.

Key Words: Endoscopic ultrasound, Subepithelial lesion, GIST, Malignancy, Contrast
UGI-65

Can We Predict the Risk of Postoperative Bleeding after Endoscopic Submucosal Dissection for Gastric Neoplasm?

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Methods: We investigated 1020 neoplastic lesions in 977 consecutive patients undergoing ESD from November 2010 to August 2014. Postoperative bleeding within 24 hours after ESD was defined as early phase bleeding, whereas bleeding after 24 hours was defined as delayed phase bleeding.

Results: Among 1020 ESD-induced ulcer lesions, early and delayed postoperative bleeding occurred in 21 (2.1%) and 17 (1.7%) lesions, respectively. Hypertension was the only risk factor associated with early phase bleeding, whereas, use of antithrombotic medication, larger specimen size, and high-risk of ulcer stigma at 2nd look endoscopy were significantly related to delayed phase bleeding. The incidence of delayed phase bleeding after ESD increased with the number of risk factors involved: (1) use of antithrombotic agents, (2) specimen diameter > 50 mm, and (3) high risk of ulcer stigma at 2nd look endoscopy. The odds ratio for incidence of delayed bleeding in patients with 2 or more risk factors was 6.75 (95% confidence interval 2.43-18.76), compared with those with single or no risk factors.

Conclusions: Risk factors for postoperative bleeding differed depending on the time interval between ESD and the bleeding episode. Patients with multiple risk factors for delayed phase bleeding should be followed carefully after ESD.

Key Words: ESD, Gastric neoplasm, Bleeding, Risk factors

UGI-66

Effects of Administration of PPI before Endoscopic Submucosal Dissection for Differentiated EGC with Ulcer

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Objectives: Ulcerative early gastric cancer (EGC) repeats improvement and exacerbation of ulceration during its natural course. However, the improvement of ulceration is known to be associated with the usage of antisecretory medication and the depth of invasion. The aim of this study was to evaluate the effect of administration of proton pump inhibitor (PPI) before endoscopic submucosal dissection (ESD) and clinical outcomes in ulcerative EGC.

Methods: A total of 136 differentiated EGCs with ulcer which had met the expanded indication for ESD were reviewed between June 2005 and June 2014 retrospectively. Eighty-one patients were administered PPI before ESD and 55 patients were not administered PPI. We compared the rate of ulcer healing and clinical outcomes of ESD including en bloc resection, complete resection, complication and procedure time between two groups.

Results: There were no significant differences in patient demographics were observed between the PPI group and non-PPI group. The complete healing rate of ulcer was significantly different between two groups (59.3% vs 23.6%, p < 0.001). The procedure time was 38.1±4.0 and 50.8±6.8 minutes, respectively (p = 0.047). However, no significant differences were detected in en bloc resection rate, complete resection rate, and complications including bleeding and perforation between two groups. Of the 81 patients who administered PPI, rate of complete healing was 71.9% (46/64) in mucosal cancer and 11.8% (2/17) in submucosal cancer, respectively (p < 0.001). The multivariated analysis showed that administration of PPI (OR = 7.3, p < 0.001) and mucosal invasion (OR = 22.8, p < 0.001) were the independent factors to predict complete healing of ulceration.

Conclusions: Administration of PPI for differentiated EGC with ulcer which meet the expanded criteria is effective to reduce the procedure time and heal the ulcer lesion. In differentiated EGC meeting the expanded criteria for ESD, complete healing of ulcer after PPI administration suggests mucosal cancer.

Key Words: Early gastric cancer, Ulcer, Endoscopic submucosal dissection, Proton pump inhibitor
UGI-67

EUS-Guided Tissue Sampling Using Aspiration Needle and Core Biopsy Needle for Subepithelial Tumor in Upper GI Tract

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Background/Aims: Adequate tissue sample for immunohistochemical (IHC) staining is very important in differential diagnosis of subepithelial tumor (SET). Endoscopic ultrasound-guided fine needle biopsy (EUS-FNB) using core biopsy needle with reverse bevel was developed to increase the diagnostic yield from trap more core tissue. We aimed to compare the diagnostic yield between EUS-guided fine needle aspiration (EUS-FNA) and EUS-FNB in SET of upper gastrointestinal (GI) tract under precedent on-site cytological examination.

Methods: Between 2012 and 2014, 22 patients with SET in upper GI tract were enrolled prospectively. For the same lesion, EUS-FNA using a 22-gauge aspiration needle (Echotip; Wilson-Cook Medical, USA) and EUS-FNB using a 22-gauge core biopsy needle (Echotip ProCore; Wilson-Cook Medical, USA) were performed respectively. With evaluation of on-site cytology, cytology using Papanicolaou staining and histology with IHC staining were evaluated in specimens of each procedure.

Results: Of 22 SETs, 16 (72.7%) were diagnosed as GISTs, 3 (13.6%) as leiomyomas, 1 (4.5%) as schwannoma, 1 (4.5%) as neuroendocrine tumor, and 1 (4.5%) as ectopic pancreas. Diagnosis from the histology with IHC staining was established in 15 (68.2%) and 18 (81.8%) in EUS-FNA and EUS-FNB, respectively (p=0.514). There was significant difference in median number of needle passes to obtain adequate cellularity in on-site cytological evaluation (2.0 in EUS-FNA vs. 1.0 in EUS-FNB, p=0.008).

Conclusions: The diagnostic yield is not significantly different between EUS-FNA and EUS-FNB under precedent on-site cytological evaluation. However, number of needle passes for adequate tissue can be decreased in EUS-FNB than in EUS-FNA.

Key Words: Endoscopic ultrasound, EUS-guided fine needle aspiration, EUS-guided fine needle biopsy, Subepithelial tumor

UGI-68

ESTD for Esophagogastric SETs: Flap Necrosis or Flap Detachment, Another Complication Not Fully Evaluated Yet

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Objective: Recently, endoscopic resection of esophageal or gastric subepithelial tumors (SETs) originating from the muscularis propria (MP) by endoscopic submucosal tunnel dissection (ESTD) method has been introduced for maintenance of the GI tract mucosal integrity. We aimed to evaluate the incidence of flap necrosis or incomplete sealing of flap after ESTD method for resection of upper gastrointestinal (UGI) SETs originating from MP layer.

Patients and Methods: Between January 2012 and August 2014, 17 patients who presented with UGI SETs located in the stomach (n=15) and esophagus (n=2) were treated by ESTD method. A submucosal tunnel was endoscopically created by dissecting 4cm from the lesion. After careful dissection of the tumor from the surrounding submucosal tissue and the unaffected MP layer, the SETs were completely removed using insulated tip (IT) knife. The mucosal entrance of the tunnel was closed using endoclips after removal of tumor.

Results: En bloc resection rate was 100% (17/17). The mean tumor size was 17.2 mm (range 7-35 mm). The mean procedure time was 71.4 minutes (range 33-239 minutes). The histopathologic diagnoses were 8 gastrointestinal stromal tumors (GISTs) with low risk, 2 schwannomas, 2 leiomyomas, 1 angiodysplasia, 1 benign collagenous nodule, and 3 ectopic pancreas. A total of 10/17 cases (58.8%) had incomplete sealing of flap after ESTD. Among them, 2 SETs were located in the esophagus, and 8 in the stomach (4: antrum, 3: body, 1: cardia). On cross-sectional location, 1 SET was located in anterior wall, 2 in posterior wall, 1 in greater curve, and 4 in lesser curve.

Conclusion: ESTD for esophagogastric SETs could avoid the stricture of ESD site, but not always reduce the risk of postoperative GI tract leakage and secondary infection. Because flap necrosis or flap detachment could occurred not so infrequently especially after procedure for gastric lesion. Further multicenter larger scale studies are necessary.

Key Words: Endoscopic resection, ESTD, Subepithelial tumor (SET)
Endoscopic Resection versus Laparoscopic Wedge Resection for Small-Size Gastrointestinal Stromal Tumors of the Stomach

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Introduction: Small-size subepithelial tumors (SETs) of stomach are occasionally found during routine upper gastrointestinal endoscopy and the most common neoplastic lesion which needs treatment is gastrointestinal stromal tumors (GISTs). Endoscopic resection has been attempted for diagnosis and treatment of the small-size SETs which suspected GISTs recently. We compared the outcomes of endoscopic resection and laparoscopic wedge resection (LWR) for small-size GISTs (<20 mm).

Methods: Thirty patients with small-size SETs pathologically diagnosed as GISTs after endoscopic or surgical resection were analyzed retrospectively from July 2003 to September 2013. They divided into two groups as follows; 16 for endoscopic resection (Group 1) and 14 for LWR (Group 2).

Results: There were no significant differences in clinical characteristics, features of masses, pathologic results and risk according to the NIH GISTs classification after resection between two groups. The risk was revealed 13.3 % (4/30) as intermediate, 3.3 % (1/30) as low and 83.3 % (25/30) as very low. 1/16 (68.8 %) masses were suspected located in proper muscle layer by EUS in group 1. There were two perforations in group 1 and successfully treated using hemoclips. One post-operative bleeding and one gastroparesis occurred in group 2. Bleeding was treated with hemobag insertion and gastroparesis were improved after conservative treatment in group 2. Hospitalization after treatment was significantly shorter in group 2. Resection margin was clear in all patients in group 2 and there was no relapsing. Two cases in group 1 were resected incompletely; one patient treated LWR immediately. Another patient underwent close observation and relapsing was detected 6 months later then it was treated by LWR.

Conclusions: Our results suggest that endoscopic resection can be considered as a feasible and relatively safe procedure for diagnosis and treatment for the small-size SETs (<20 mm) suspected GISTs.

Key Words: Gastrointestinal stromal tumor, Endoscopic submucosal dissection, Laparoscopy, Wedge resection
Long Term Follow up Results of Endoscopic Resection Using ESD Techniques for Treatment of GIST in Upper GI Tract

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Background: Gastrointestinal stromal tumors (GISTs) is the most common mesenchymal tumor in the upper gastrointestinal tract (UGIT). Up to present time, surgical resection has been considered as the mainstay of treatment for GIST. However, there is some debate about the role of endoscopic treatment mainly because of the lack of long term follow up data. We conducted a retrospective study to evaluate the efficacy of ESD for the GIST in the UGIT.

Patients and Methods: There were 130 patients diagnosed with GIST in UGIT between March 2005 and August 2014. We compared clinical characteristics and treatment outcomes between ESD group (90 patients) and surgery group (40 patients).

Results: Most of 130 patients were asymptomatic (82.3%). The most common location of GIST was stomach body (38.5%). The mean size was significantly larger in surgery group (5.1 cm, range 1~19.5cm) than in ESD group (2.3 cm, range 0.7~8.0cm). In ESD group, 45 patients (50%) belonged to very low risk, followed by 29 (32.2%) to low risk, whereas 35% belonged to low risk followed by 30% to high risk in surgery group (p=0.001). 3 cases (3.3%) of macroperforation who needed laparoscopic surgery occurred in ESD group. R0 resection was done for 23, R1 for 63, and R2 for 2 patients in ESD group (R0 and R1 resection was done for 34 and 6 patients respectively in surgery group). Overall mean follow up period was 39.4 months. There was no recurrence case in ESD group, and 3 cases in surgery group by endoscopy or CT (p=0.093).

Conclusion: ESD might be a convenient and feasible procedure for the treatment of GIST in the UGIT. We expect ESD would be an alternative therapeutic modality for lower risk GIST in UGIT.

Key Words: GIST, Upper GI tract, ESD