LGI-1

**Child–Pugh Score Is an Independent Risk Factor for Immediate Bleeding after Colonoscopic Polypectomy in Patients with Liver Cirrhosis**

**Sangheun Lee, Soo Jung Park, Jae Hee cheon, Tae Il Kim, Won Ho Kim and Sung Pil Hong**

Department of Gastroenterology in Internal Medicine Yonsei University College of Medicine, Seoul, Korea

**Background/Aims:** Post-polypectomy bleeding (PPB) is the most common complication of colonoscopic polypectomy, accounting for 0.3 to 6.1 percent of polypectomy. However, the risk of PPB in patients with liver cirrhosis which has bleeding tendency has not been known. The aim of the present study was to evaluate the risk of PPB after colonoscopic polypectomy in patients with liver cirrhosis compared to control.

**Methods:** From January 2007 to October 2012, a total 92 patients with liver cirrhosis who received colonoscopic polypectomy were included in the present study. Three hundred fifty-six age- and sex-matched patients who did not have liver cirrhosis and underwent colonoscopic polypectomy were selected as control groups. PPB was subclassified into two groups: immediate and delayed bleeding. Immediate bleeding was defined as the bleeding to occur just after polypectomy and the status to require bleeding control. We defined delayed bleeding as the status to occur within 30 days and require treatment. Risk factors of immediate bleedings and delayed bleedings were analyzed according to patient related factors and polyp related factors with univariate and multivariate approach.

**Results:** There were not significantly different between two groups about age, sex, underlying disease including medication history, and bowel preparation. The incidence of immediate bleeding was not significantly different between the 2 groups (cirrhosis vs. control; 13.0% vs. 8.4%; P value 0.176). Multivariate analysis showed that the following factors were independent risk factors for immediate bleeding after colonoscopic polypectomy: cardiovascular disease (10.3% vs. 21.4%; OR 3.361; P value 0.011), total procedure time (min: 25.1 ± 14.9 vs. 34.6 ± 15.4; OR 1.034; P value < 0.001), size (mm: 6.7 ± 3.7 vs. 11.9 ± 9.4; P value < 0.001), right side colon polyp (69.6% vs. 54.9%; OR 2.479, P value = 0.004), and methods of polypectomy (Snare polypectomy vs. endoscopic mucosal resection: 54.9% vs. 45.1%; OR 2.479; P value < 0.001). When immediate bleeding risk was analyzed in cirrhotic patients, the Child Pugh score B or C is an independent risk factor after colonoscopic polypectomy compared to Child Pugh score A (36.4% vs. 2.6%; OR 10.615; P value = 0.021). The incidence of delayed bleeding was not different between the two groups (cirrhosis vs. control; 2.0% vs 0.3%; P value = 0.114).

**Conclusion:** Liver cirrhosis is not a reluctant factor to avoid colonoscopic polypectomy. However, the cirrhotic patients with Child Pugh score B or C have high risk of immediate PPB, thus the endoscopists should be careful of colonoscopic polypectomy in those patients.

**Key Words:** Polypectomy, Postpolypectomy bleeding, Liver cirrhosis

LGI-2

**Size of Resected Poly Is an Independent Risk Factor for Post-Polypectomy Hemorrhage : 10-Years Case-Control Study**

**Dong Hwan Kim, Sun Hyung Kang, Hee Seok Moon, Eawm Seok Lee, Seok Hyun Kim, Je Kyu Sung, Byung Seok Lee and Hyun Yong Jeong**

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Chungnam National University Hospital, Daejeon, Korea

**Objective:** Colonoscopic polypectomy is an important procedure for preventing colorectal cancer, but is not free from complications. Delayed hemorrhage after colonoscopic polypectomy is an infrequent, but serious complication. So the aim of this study was to identify risk factors of delayed hemorrhage after colonoscopic polypectomy.

**Methods:** This was a retrospective case-control study based on medical records from a single gastroenterology center. The records of 7,217 patients who conducted colonoscopic polypectomy between March 2002 and March 2012 were reviewed, and 92 patients and 276 controls were selected. Data collected included comorbidity, use of antiplatelet agents, size and number of resected polyps, histology and gross morphology of resected polyps, resection method, and use of prophylactic hemostasis.

**Results:** The average time between the procedure and hemorrhage was 2.71 ± 1.55 days. In univariate analysis, hypertension, size and number of resected polyps, resection method and use of prophylactic hemostasis, right sided location of resected polyp were significant risk factors for delayed hemorrhage after colonoscopic polypectomy. But multivariate analysis revealed that size of resected polyps was the only and most important predictor of delayed hemorrhage after colonoscopic polypectomy (OR 2.06, p<0.05).

**Conclusions:** Size of resected polyps was the only independent risk factor for delayed bleeding after colonoscopic polypectomy. So a size of polyp on colonoscopic procedure may aid in decision-making such as conducting a prophylactic hemostatic procedure.

**Key Words:** Hemorrhage, Polypectomy, Colonoscopy, Complication
LGI-3

Which Factors are Determining Delayed Bleeding Rate in Right Side Colonic Polypectomy?

Bum Su Choung, Dae Seon Ahn, Seong Hun Kim, In Hee Kim, Seung Ok Lee, Soo Teik Lee, Dae-Ghon Kim and Sang Wook Kim

Department of Internal Medicine, Research Institute of Clinical Medicine, Chonbuk National University Medical School and Hospital, Jeonju, Korea

Background: Delayed bleeding is one of the serious complications that can occur after polypectomy. Many risk factors for delayed bleeding have been suggested including the location of the polyp in the right hemicolectomy, but few analyses of the procedure-related risk factors have been conducted. Therefore, the purpose of this research is to identify risk factors for delayed post-polypectomy bleeding (PPB) and investigate the relationship between procedure-related factors and bleeding rate according to polyp position.

Methods: In this retrospective study, 5,981 polypectomies in 3,788 patients were evaluated in order to identify bleeding risk factors. Bleeding cases were separately classified according to bleeding location, and analyses were conducted with respect to procedure-related factors such as endoscopist experience, lesion lifting properties, and the use of a prophylactic endoclip.

Results: Delayed bleeding occurred in 42 patients (1.1%). Polyp-based multivariate analysis revealed that polyp size greater than 10 mm (OR, 2.785; 95% CI, 1.406 to 5.513; p =0.003) and location in the right hemicolectomy (OR, 2.289; 95% CI, 1.117 to 4.693; p =0.024) were significant risk factors for delayed PPB. Procedure-based multivariate analysis revealed that endoscopist experience (<300 colonoscopies performed; OR, 5.193; 95% CI, 2.855 to 9.464; p <0.001) and the lesion lifting properties (OR, 4.380; 95% CI, 3.363 to 5.705; p <0.001) were significant risk factors for delayed PPB. Analysis based on bleeding location showed that an interval from polypectomy to bleeding was significantly longer on the right side than the left side (3.90 days vs. 2.67 days; p =0.047). The right side was more prone to delayed PPB due to insufficient endoscopist experience and low-level lesion lifting than the left side, especially in the cecum area (p =0.047; p =0.002). The use of a prophylactic endoclip did not seem to lower bleeding rates.

Conclusions: Insufficient endoscopist skill is the main cause of right-side delayed PPB. More care should be paid during right side polypectomy procedures, particularly when they are performed by an inexperienced endoscopist.

Key Words: Delayed post-polypectomy bleeding, Polyp location, Endoscopist experience

LGI-4

Feasibility of Surgicel® (Fibrillar) in Patient with Postcolonic Polypectomy Bleeding: A Pilot Study

Bong Min Ko, Jung Yeon Seo, Sung Woo Seo, Hyun Gun Kim, Su Jin Hong, Jong Ho Moon, Jin Oh Kim, Joo Young Cho, Moon Sung Lee

Digestive Disease Center, Department of Internal Medicine, Soon Chun Hyang University School of Medicine, Bucheon, Korea

Backgrounds: The various endoscopic procedures are performed for the treatment of postprocedural bleeding after polypectomy. The endoscopic hemoclipping is used most commonly but its cost is expensive. The purpose of this study is to evaluate the feasibility of Fibrillar as an alternative hemostatic agent which is inexpensive and easily used.

Methods: Between September 2011 and September 2012, 1682 consecutive patients who underwent the endoscopic polypectomy in colon were reviewed. The hemostatic procedures such as endoscopic hemoclipping or application of surgicel were performed in patient with post polypectomy bleeding. For the confirmation of hemostasis in cases of application of surgicel, the follow-up colonoscopies were carried out in some cases.

Results: There were 85 cases (2.61%) of postprocedural bleeding after polypectomy out of 3254 patients. Of these, 33 subjects (38.8%) underwent endoscopic hemoclipping, while 52 (61.2%) were treated with the application of surgicel. In 47(90.4%) cases from those of immediate bleeding, hemostasis was achieved successfully but delayed bleeding was occurred in one (2.12%) case out of these 47 cases and controlled with endoscopic hemoclipping. The follow-up colonoscopies were performed in 23 cases out of 47 patients who were treated with the surgicel.

Conclusions: Endoscopic management of postpolypectomy bleeding by surgicel provides hemostasis in the great majority of cases. Therefore surgicel may use for the hemostasis in patient with postcolonic polypectomy bleeding. For more accurate evaluation of the hemostatic effect of surgicel and comparison it to other hemostatic procedures, a prospective study and a larger series of cases are required.

Key Words: Postprocedural bleeding, Polypectomy, Fibrillar

LGI-5

Decreased Incidence of Advanced Colorectal Adenoma with Metformin Use in Diabetic Patients without Previous Colorectal Cancer

Ran Noh, Yong Hyun Kim, Byoung Woon Kwon, Ha Yan Kang, Soung Min Jeon, Hyun Deok Shin, Suk Bae Kim, Hong Ja Kim, II Han Song, Jung Eun Shin

62nd Congress of the Korean Society of Gastrointestinal Endoscopy S143
Background: Metformin use has been associated with colorectal cancer risk and mortality among diabetic patients. And recent study suggests that metformin use may decrease the incidence of colorectal adenoma in diabetic patients with previous colorectal cancer. But the potential effect of metformin on development of colorectal adenoma in diabetic patients especially without previous colorectal cancer remain to be elucidated. Aim: This study aimed to assess the clinical impact of metformin use on the development of colorectal adenomas in diabetic patients without previous colorectal cancer.

Methods: Among 344 consecutive diabetic patients who underwent colonoscopic surveillance after index colonoscopy between 2003 and 2012, 240 patients without previous colorectal cancer were enrolled in this study and were compared in two groups: 151 patients taking metformin (group A) and 89 patients not taking metformin (group B). Patient’s demographic, clinical characteristics, and colorectal adenoma incidence rate were analyzed, retrospectively.

Results: Incidence of total colorectal adenoma was not significantly different between group A and group B (53.0% vs 53 patients (59.6%), p = 0.323). However, group B was more frequently found advanced colorectal adenoma than group A (6.7% vs 0.7%, odds ratio: 10.180, p = 0.007). After adjustment for clinically relevant factors, metformin use was independently associated with a decreased incidence of advanced colorectal adenomas (odds ratio = 0.072, 95% confidence interval = 0.008-0.610, p = 0.016) in diabetic patients without previous colorectal cancer. And cumulative development rate of advanced adenoma during follow-up was significantly lower in group A than group B (p = 0.007).

Conclusion: Metformin use in diabetic patients without previous colorectal cancer is associated with a lower risk of advanced colorectal adenoma.

Key Words: Metformin, Advanced colorectal adenoma, Diabetes, Incidence

Characteristics of Missed Polyps in Patients Referred from Primary Clinics for Polypectomy after Undergoing Colonoscopy

Seong Chang Park, Kwang Jae Lee, Sun Gyo Lim, Hong Sub Lee, Jae Ho Jung, Byung Jo Yoon
Department of Gastroenterology, Ajou University School of Medicine, Suwon, Korea

Background/Aims: Colonoscopy is considered to be the gold standard for detecting polyps. Polyps are reported to be missed during colonoscopic examination at a rate that varies from 6% to 27%. We aimed to assess the characteristics of missed polyps in patients who were referred from primary clinics or hospitals for polypectomy after undergoing colonoscopy.

Patients and Methods: The medical records of patients who were referred from primary clinics or hospitals because of the removal of colorectal polyps found by colonoscopy and underwent colonoscopic polypectomy at Ajou university hospital during the period of 2010~2011 were reviewed. Polypectomy was performed by experienced endoscopists. Missing rates and characteristics of missed polyps were evaluated.

Results: A total of 240 patients were enrolled in the study. When compared with the colonoscopic findings of primary clinics or hospitals, missed polyps were found in 102 out of 240 patients (42.5%). A total of 171 polyps were missed in 102 patients. The smaller polyps were more likely to be missed; 66% of all missed polyps were smaller than 6 mm, 26% were 6 mm to 10 mm, and 8% were larger than 10 mm. The histologic findings of missed polyps were tubular adenoma of low grade dysplasia (n=138, 68%) and hyperplastic polyps (n=33, 32%). The shape of missed polyps were sessile (n=132, 77%), flat (n=30, 17%) and pedunculated (n=9, 6%). The missed polyps were mostly located in sigmoid colon (n=54, 31%), transverse colon (n=42, 24%) and hepatic flexure (n=30, 17%). The degree of bowel preparation did not affect the missing rates.

Conclusions: The missing rates of colorectal polyps in patients who were referred from primary clinics or hospitals for polypectomy after undergoing colonoscopy are not low. The small sized, sessile polyps, particularly located in the sigmoid colon, transverse colon and hepatic flexure are easily missed.

Key Words: Colonoscopy, Polyp, Missing Rate

Cap-Assisted Colonoscope Versus Cap-Assisted Upper Endoscope for Difficult Colonoscopy: A Prospective Randomized Study

Seon Young Park, Chung Hwan Jun, Ho Suk Ki, Chang Hwan Park, Hyun Soo Kim, Sung Kyu Choi, Jong Sun Rew
Department of Internal Medicine, Chonnam National University Hospital, Gwang-ju, Korea

Background/Aims: Studies have estimated that failure of cecal intubation occurs with conventional colonoscopy in up to 10% of cases. Various methods have been adopted to improve cecal intubation rates, including using various devices such as transparent cap and using special scopes, such as the variable-stiffness colonoscope, upper endoscope, pediatric endoscope and enteroscope. The objective of the study is to assess the efficacy
cap-assisted upper endoscope compared with a cap-assisted colonoscope for complete examination of the colon after technically difficult colonoscopy.  

**Methods:** A total 139 patients with technically difficult colonoscopy were randomly assigned to receive colonoscopy with either cap-assisted colonoscope (C-cap, n=70) or cap-assisted upper endoscope (E-cap, n=69). The primary endpoint was cecal intubation rate within 20 minutes. Secondary end points included cecal intubation time, self-assessed pain score and endoscopist-assessed pain score.  

**Results:** Clinical characteristics were not different between the two groups. Cecal intubation rate within 20 minutes was significantly higher for 'E-cap' (65/69, 94.2%) than for 'C-cap' (50/70, 71.4%, p<0.0001). No statistically significant difference was found between the two groups regarding cecal intubation time and total procedure time. Self-assessed pain (moderate to severe) was more frequently reported in the 'C-cap' (14/70, 20.0%) than in the 'E-cap' (5/69, 7.2%, p=0.029). Endoscopist-assessed pain (moderate to severe) was more frequently reported in the 'C-cap' (13/70, 18.6%) than in the 'E-cap' (3/69, 7.2%, p=0.009).  

**Conclusion:** A cap-assisted upper endoscope is more tolerable and effective than a cap-assisted colonoscope for complete examination of the colon in patients with technically difficult colonoscopy.  

**Key Words:** Colonoscopy, Cap, Endoscope, Colonoscope

---

**LGI-8**

**Do Whitish Spots around Colorectal Polyp Give Additional Information under Conventional Colonoscopy?**  
Yu mi Lee, Kyung Ho Song, Hyun Jung Song, Jeong Ah Hwang, Kyung Min Moon, Chang Gi Moon, Hoon Sup Koo, Yong Seok Kim, Tae Hee Le, Sun Moon Kim, Kyu Chan Huh, Young Woo Choi, Young Woo Kang  
Department of Internal Medicine, Konyang University College of Medicine, Daejeon, Korea

**Aim:** Narrow band imaging (NBI) and magnifying endoscopy provides more accurate diagnosis of colonic polyps. However these systems are not clinically used as standard endoscopic equipment in most institutions. The aim of this study was to determine if the white spots around colon polypos give additional information about colorectal polyps under conventional white light colonoscopic observation, including histology and lymphovascular invasion and even differentiating neoplastic polyp from nonneoplastic one.  

**Methods:** We retrospectively reviewed the clinical data and pathologic reports of 381 polyps (consecutive 143 patients who underwent endoscopic polypectomy) of the colon at a tertiary care hospital between January 1, 2011 and June 30, 2011. Two endoscopist judge whitish spots. We analyze association between whitish spots of the colonic mucosa around polyps with histology.  

**Results:** The interobserver variability was moderate degree. (kappa 0.555, p<0.01) Majority (95.7%) of whitish spots-positive polyps were neoplastic. (p=0.001, sensitivity 15.2%, specificity 97.8%). Age, sex, gross shape, location were not associated with cancer change. But, the large size(≥10mm) of the polyp (odds ratio 35.1, 95% CI 7.91 - 155.6), presence of white spots (odds ratio 8.5, 95% CI 2.8 - 26.0) were associated with malignant risk. Even if we combined the pit pattern with the status of whitish spot, there were not increased accuracy to differentiate non-neoplastic from neoplastic polyp.  

**Conclusion:** Whitish-spotted neoplastic polyp is more likely malignant. Detecting whitish-spotted mucosa may lead to detecting neoplastic polyp nearby, by making the boundary of polyp wider and this can decrease the missing rate of it.  

**Key Words:** Whitish spot, Neoplastic colon polyp

---

**LGI PL-9**

**A Novel Marking Technique with Magnetic Clip on Laparoscopic Colon Tumor Operation: A Pilot Study**  
Min Ho Seo¹, Sun Young Kim¹, Ye Ji Kim¹, Woo Jin Lee¹, Hyuk Soon Choi¹, Eun Sun Kim¹, Bora Keum¹, Yoon Tae Jeen¹, Hong Sik Lee¹, Hoon Jai Chun¹, Chang Duck Kim¹, Jin Kim²  
¹Division of Gastroenterology and Hepatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, ²Division of Colorectal Surgery, Department of Surgery, Korea University College of Medicine, Seoul, Korea

**Background:** It is difficult to locate correctly and safely a colorectal tumor for laparoscopic surgery. Tattooing is generally used for localization of colorectal tumor during laparoscopic surgery. Tattooing is simple and inexpensive method. However there are limitations of this methods, such as incorrect tumor localization due to spread of ink and complication like perforation and peritonitis. To overcome these limitations, we devised a simple magnetic marking technique to locate a tumor. We conducted pilot study and report results of the study.  

**Method:** This study enrolled 12 patients undergoing laparoscopic surgery for early colorectal cancer. We devised 10mm sized ring type magnet (outdiameter:10mm, indiameter:4mm, thickness:3mm, maximal magnetic force:2660G) which was coated with silicon, and we tied loop using 3-0 nylon. We inserted the marking magnet near lesion with biopsy forcep, and then we clipped magnet on target through loop of magnet. A
magnetic marking clip was applied on the distal side of lesion during preoperative colonoscopy. During surgery, another magnetic body hanged with long thread which was inserted through laparoscopic trocar, was used to find out the lesion that was marked by magnetic clipping. We analyzed detection rate, detection time, resection margin length from lesion and complication associated with method.

**Result:** 7 of 12 patients’ tumor locations were on the rectum, 5 were on sigmoid colon. Tumor size ranged from 10 to 18mm. Magnetic marking clips were successfully detected in all 12 patients. The time required for detection ranged from 10 to 35 sec. The resection margin from lesion ranged from 40 to 50mm. None of our patients experienced complications from this marking technique.

**Conclusion:** Magnetic marking technique was simple and convenient for surgeon, and showed good result for accuracy of tumor localization without complication associated with method. Therefore, the magnetic marking clip method may be useful for colorectal tumor detection during laparoscopic surgery. And we expect that correct and simple method results in minimizing extent of colon resection.

**Key Words:** Colon Tumor, Endoclip, Laparoscopic Surgery, Magnet

**LGI PL-10**

The Evaluation of Portal Hypertensive Enteropathy Using Capsule Endoscopy in Cirrhotic Patients: A Multicenter Study

Seong Ran Jeon¹, Jin-Oh Kim¹, Ji-Beom Kim¹, Dong Kyung Chang², Ki-Nam Shim³, Dae Young Cheung⁴, Jin Soo Kim⁵, Myung Gyu Choi⁴, Hyung Joo Song⁴, Yun Jeong Lim⁶, Soo Jung Park⁷, Ji Hyun Kim⁷, Jeong Seop Moon⁸, Yoon Tae Jeen¹ and The Korean Gut Image Study Group

¹Departments of Internal Medicine, Soonchunhyang University College of Medicine, Seoul, ²University of Ulsan College of Medicine, Seoul, ³Sungkyunkwan University School of Medicine, Seoul, ⁴Ewha Womans University School of Medicine, Seoul, ⁵The Catholic University College of Medicine, Seoul, ⁶Jeju National University, Jeju, ⁷Dongguk University College of Medicine, Goyang, ⁸Yonsei University College of Medicine, Seoul, ⁹Inje University College of Medicine, Busan, ¹⁰Inje University College of Medicine, Seoul, ¹¹Korea University College of Medicine, Seoul, Korea

**Background/Aims:** Portal hypertensive enteropathy (PHE) in cirrhotic patient with portal hypertension (PH) isn’t well known, and there is a limited data available on PHE. The aim of study was to evaluate the clinical characteristics, incidence of PHE by capsule endoscopy (CE) and PHE-related factors.

**Methods:** We used the Capsule Endoscopy Nationwide Database Registry to identify cirrhotic patients with PH who underwent CE from October 2002 to May 2012. A total of 45 CE examinations were performed for cirrhotic patients with PH. PH was diagnosed by endoscopic or radiographic evidence. In CT finding, the secondary change due to PH was scored and then summed up the scores (range 0-7). PHE was defined as mucosal inflammatory-like abnormalities (grade I), and/or vascular lesions (grade II). We retrospectively compared 18 patients with PHE and 27 without PHE.

**Results:** Of 45 patients (33 men; mean age 56.7 years), obscure gastrointestinal bleeding was the most common indication (overt vs. occult = 80% vs. 15.6%). PHE was identified in 60% (18/45) and grade II was detected in 77.7% (14/18). The lesions included angiodysplasias in 55.5% (10/18) and varices in 38.8% (7/18). Active bleeding was seen during CE in 16.6% (3/18). In patients with PHE, the mean Hb level was 7.45±1.8 g/dL and Child-Pugh class C was 33.3% (6/18). Portal hypertensive gastropathy (PHG) and portal hypertensive colopathy (PHC) were detected in 50% (9/18) and 27.8% (5/18), respectively. The treatment such as radiologic, endoscopic and surgery was conducted in 38.9% (7/18). A comparison of patients with and those without PHE showed that Child-Pugh class C cirrhosis (p = 0.002) and high CT score (1.0±0.8 vs. 1.8±1.4, p=0.027) were significantly associated with PHE. The presence of PHE was not related gender, the etiology of cirrhosis, previous bleeding history, larger esophageal varices, PHG and PHC.

**Conclusions:** PHE may be more prevalent in cirrhotic patients with PH, especially when Child-Pugh class C or high CT score are accompanied. Although additional prospective and larger studies are needed, CE could be useful diagnostic tool to evaluate PHE.

**Key Words:** Capsule endoscopy, Enteropathy, Portal hypertension, Liver cirrhosis

**LGI PL-11**

Long Term Outcome of Patients with Nsaid-Induced Small Bowel Injury Assessed by Capsule Endoscopy in Korea: Nationwide Multi-Center Retrospective Study

Eun Mi Song¹, Ki-Nam Shim¹, Yoon Tae Jeen², Ji Hyun Kim³, Jin-Soo Kim⁴, Jin Oh Kim⁵, Cheol Hee Park⁶, Hyun Joo Song⁷, Yun Jeong Lim⁷, Kwang Jae Lee⁸, Dong Kyung Chang⁹, Byung Ik Jang⁹, Seong Woong Jeon¹², Seong Ran Jeon⁶, Hyun Joo Jang⁹, Jae Hee Cheon¹³¹

¹Ewha Womans University School of Medicine, Korea University College of Medicine, ²Inje University College of Medicine, ³The Catholic University of Korea College of Medicine, ⁴Soonchunhyang University College of Medicine, ⁵Hallym University college of Medicine, ⁶Jeju National University School of Medicine, ⁷Dongguk University College of Medicine, ⁸Korea University College of Medicine, ⁹Yeungnam University College of Medicine, ¹⁰Sungkyunkwan University School of Medicine, ¹¹Yeungnam National University School of Medicine, ¹²Yonsei University College of Medicine, Korea

**Background/Aim:** To evaluate the long-term outcomes of patients with non-steroidal anti-inflammatory drugs (NSAID)-induced small bowel injury in Korea. We retrospectively reviewed clinical records of consecutive patients with NSAID-induced small bowel injury who were treated during the period of June 2006 to May 2011 in medical centers in Korea with focus on clinical presentation, endoscopic findings, and treatment outcomes.

**Methods:** A total of 143 patients were enrolled in the study. The median age of patients was 56 years (range 19-82). NSAID-induced small bowel injury was defined as a lower gastrointestinal hemorrhage, requiring hospitalization, and/or a radiographic finding of an NSAID-related lesion on computed tomography or capsule endoscopy.

**Results:** The median duration of follow-up was 20 months (range 1-72). Among the 143 patients, 62 patients (43.3%) underwent endoscopy at least once during the follow-up period. The median number of endoscopic procedures was 1 (range 1-9). The median duration of hospitalization was 3 days (range 1-18). The median time to radiographic or endoscopic resolution was 11 days (range 3-56). The median time to resolution of upper gastrointestinal symptoms was 14 days (range 7-56). The median time to resolution of lower gastrointestinal symptoms was 18 days (range 7-56). The median time to resolution of both upper and lower gastrointestinal symptoms was 19 days (range 7-56).

**Conclusion:** The long-term outcomes of patients with NSAID-induced small bowel injury in Korea were similar to those reported in other studies. Endoscopy and radiographic follow-up were important in assessing the clinical course of patients with NSAID-induced small bowel injury.
Background/Aims: Recently, the non-steroidal anti-inflammatory drugs (NSAIDs)-induced small bowel injury have become a topic of great interest. Previous studies have been mainly focused on the incidence of small bowel injury or the protective effect of drugs. The aim of this study was to evaluate the long term outcome and clinical course of patients who were diagnosed as NSAID-enteritis by capsule endoscopy (CE).

Methods: A multicenter retrospective study was conducted using collected data from nationwide registry of CE since 2002. Patients who underwent CE and diagnosed as NSAID enteritis were enrolled. We collected indication for CE, indication for CE, treatment method, the presence of recurrence and the changes of diagnosis during follow-up period.

Results: From data base of capsule endoscopy registry (n=2885), total 106 patients of 13 center (65 male; mean age, 59.83 ± 15.43 year) diagnosed as NSAID-enteritis were enrolled. 28 patients (26.4%) had history of taking aspirin and 41 patients (38.7%) were taking NSAIDs without aspirin. The most common clinical indication for CE was overt obscure gastrointestinal (GI) bleeding (n=49, 46.2%) and the most prominent findings on CE were ulceration (66%) and erosions (59.8%). The majority (93.4%) of patients were taking conservative treatment. 16% of patients continued taking NSAIDs after the diagnosis. Between the patients and the patients who didn’t take NSAIDs, the indication of CE, the discontinuance of NSAIDs, the treatment method were not different significantly. The change of diagnosis were found in 10 (9.4%) patients but, 4 out of 10 patients were revealed that initially misdiagnosed.

Conclusion: These results suggest that the recurrence of NSAID induced small bowel injury was not frequent despite of conservative treatment. And the change of diagnosis was rare. Initial diagnosis using capsule endoscopy and history of medication is important.

Key Words: Nonsteroidal anti-inflammatory drug, Small intestine, Enteropathy

High Level Quality Colonoscopy Identifies Unique Characteristics of Colorectal Adenomas in Asymptomatic Older Female

Hong Jun Park1, Hyun Soo Kim1, Chan Sik Won1, Hyo Keun Jeon1, Dong Il Park2, Jae Myung Cha3, Seun-Ja Park4, Hwang Choi5, Jeong Eun Shin6, Chang Soo Eun7, Jin Oh Kim8, Hyun Gun Kim8, Seong- Hun Kim9, Cheol Hee Park10, Tae Il Kim11, Sung Noh Hong12, Dong Hoon Yang13, Byung Chang Kim14, Byung Ho Nam14

Department of Internal Medicine, 1Yonsei University Wonju College of Medicine, Wonju, 2Sungkyunkwan University College of Medicine, Seoul, 3Kyung Hee University College of Medicine, Hanam, 4KoWin University College of Medicine, Busan, 5The Catholic University of Korea College of Medicine, Incheon, 6Dankook University College of Medicine, Cheonan, 7Hanyang University College of Medicine, Guri, 8Seonchunhyang University College of Medicine, Seoul, 9Ewha Womans University School of Medicine, Seoul, 10Hallym University College of Medicine, Anyang, 11Yonsei University College of Medicine, Seoul, 12Koruk University School of Medicine, Seoul, 13University of Ulsan College of Medicine, Seoul, 14National Cancer Center, Goyang, Korea

Background/Aim: Recent studies have raised concerns that screening colonoscopy may not decrease CRC incidence and mortality in the proximal colon. The aims of the present study were to determine if high level quality colonoscopy using cap-assisted chroendoendoscopy (CAP-ACE) would enhance the detection rates of right colorectal neoplasia and to examine which age and gender population are most beneficial by this technology.

Methods: From March 2010 to March 2012, asymptomatic average risk subjects in the aged 45 to 75 who underwent the first screening colonoscopy were prospectively enrolled at 14 tertiary hospitals. Eighteen expert colonoscopists have performed procedures. Subjects were randomly allocated to CAP-ACE and regular colonoscopy (RC) group. Through analysis to find which age and gender subgroups were most beneficial by this CAP-ACE.

Results: A total of 1884 subjects were enrolled; CAP-ACE : 935 (49.6%), RC : 949 (50.4%). Male and female were 907 (48.1%), 977 (51.9%) respectively. Overall ADR, Rt ADR, AADR, PSSPDR were 49.6%, 34.9%, 3.2%, 9.0% respectively. A total of 2297 adenoma were removed by CAP-ACE (1273, 55.4%) and by RC (1024, 44.6%) (p<0.001). The characteristics of adenomas removed by CAP-ACE were non-pedunculated (p = 0.016) and smaller size (< 5 mm, p = 0.003) than those by RC.

Compared to RC, in particular, CAP-ACE markedly enhanced the ADR, Rt ADR, PSSPDR in female older (over 60 years) group. We found the unique adenoma characteristics in the female older subgroup who underwent CAP-ACE vs. RC; higher
ADR (from 40% to 61.0%, p<0.001), higher Rt ADR (from 25.1% to 45.8%, p<0.001) and proximal location (p = 0.057). In addition, female older subgroup has smaller but more advanced adenoma (p = 0.012, p = 0.004, respectively), and more adenomas found by CAP-ACE (p = 0.001) compared to other groups.

**Conclusion:** High level quality colonoscopy using CAP-ACE is most beneficial for female older population who has high ADR, more frequent in the right colon and advanced adenomas, suggesting the necessity of high level quality colonoscopy for the better prevention of right colorectal cancer.

**Key Words:** Adenoma, Colonoscopy, Quality Control, Colonic  

LGI PL-13

**A Randomized Prospective Trial Comparing Different Regimens of Oral Picosulphate and PEG in the Colon Preparation**

Woo Jin Lee, Yoon Tae Jeen, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun, Soon Ho Um, Chang Duck Kim, Ho Sang Ryu  

Division of Gastroenterology, Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

**Background/Aims:** Adequate bowel cleansing is essential for a high-quality, effective, and safe colonoscopy. There are rare reports that compare directly conventional polyethylene glycol (PEG) intake and picosulphate. The aim of this study is to compare the efficacy, safety, and tolerability of different regimens of oral picosulphate and PEG.

**Methods:** This study involved 200 adult patients undergoing elective colonoscopy and was single-blinded prospective randomized design in tertiary-care institutions of South Korea. Patients were randomized into four groups with endoscopist was blinded to the regimen. Group A: PEG 4L at 4-6 hours before procedure on the day of the colonoscopy. Group B: PEG 2L at 6:00 PM the day before and at 4-6 hours before procedure. Group C: One of 2 sachets of sodium picosulphate at 6:00 PM the day before and 4 hours before procedure. Group D: One of 3 sachets of sodium picosulphate given at 6:00 and 09:00 PM the day before and at 4 hours before procedure.

**Results:** PEG 4L group (both split and non-split dosage) and 3 sachets of picosulphate produced better mucosal cleansing than 2 sachets of picosulphate. Side effects were more frequent in PEG 4L than picosulphate. Patients’ preferences were most high in picosulphate than other goups.

**Conclusion:** Picosulphate is as effective as high-volume PEG-electrolyte solution but has superior tolerance. It has fewer adverse events and is preferred by patients. However, 2 sachets of picosulphate, which is recommend dosage in Korea, is less effective to bowel cleansing for colonoscopy.

**Key Words:** Colon, Preparation, Polyethylene glycol, Picosulphate

LGI PL-14

**Recurrence of Colon Neoplasm after Polypectomy: A Comparison between One-Stage And Two-Stage Polypectomy**

Soo-Kyung Park, Sang Hyung Park, Jong Wook Kim, Dong-Hoon Yang, Kee Wook Jung, Kyung-Jo Kim, Byong Duk Ye, Seung-Jae Myung, Suk-Kyun Yang, Jin-Ho Kim and Jeong-Sik Byeon  

Department of Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea

**Background/Aim:** The impact of one-stage (removal of all neoplasms during diagnostic colonoscopy) vs. two-stage polypectomy (removal of all neoplasms during therapeutic colonoscopy following the initial diagnostic colonoscopy) on neoplasm recurrence is poorly understood. We aimed to compare one-stage and two-stage polypectomy in neoplasm recurrence.

**Method:** We reviewed the medical records of patients with colon neoplasms for whom one-stage polypectomy was done between January 2006 and December 2008 followed by at least 1 follow-up colonoscopy. The recurrence of any neoplasm and advanced neoplasm (>1cm or villous histology or high grade dysplasia or cancer) were compared with age and sex matched (1:1) two-stage polypectomy group. Cox proportional hazard model was used to identify the risk factors of neoplasm recurrence.

**Result:** A total of 412 patients underwent polypectomy; 206 patients each in one-stage and in two-stage. Patients with neoplasms ≥3 were more common at the initial colonoscopy in two-stage polypectomy group than in one-stage polypectomy group (51.5% vs. 27.2%, p<0.001). There was no difference in the presence of villous neoplasm between two groups (11.7% vs. 5.8%, p=0.07). Although patients with recurrent neoplasms ≥3 were more common in one-stage polypectomy group than in two-stage polypectomy group (26.6% vs. 14.0%, p=0.01), recurrence of any neoplasm (45.6% vs. 48.5%, p=0.54) and advanced neoplasm (4.9% vs. 3.4%, p=0.46) were comparable between two groups for mean follow-up period of 2.2±1.1 years and 1.9±1.0 years. Furthermore, there was no difference in cumulative probability of recurrence of any neoplasms (p=0.38) and of advanced neoplasms (p=0.50) between one-stage and two-stage polypectomy groups. The only significant risk factor in the recurrence of any neoplasms was more than 3 neoplasms at the initial polypectomy (hazard ra-
There were no significant risk factors related to recurrence of advanced neoplasms by multivariate analysis. One-stage vs. two-stage polypectomy did not affect the recurrence of any and advanced neoplasms.

**Conclusion:** One-stage polypectomy may show a similar neoplasm recurrence compared with two-stage polypectomy. One-stage polypectomy can be recommended for efficient distribution of colonoscopy procedures in more patients.

**Key Words:** Polypectomy, Colon, Neoplasm

---

**LGI-15**

**The Time Interval of Bowel Preparation Is More Important in Determining the Quality of Bowel Cleansing**

Tae Kyung Kim, Cheol Woong Choi, Hyung Wook Kim, Dae Hwan Kang, Su Bum Park

Department of Internal Medicine, Pusan National University Yangsan Hospital, Yangsan, Korea

**Background and Aims:** Inadequate bowel preparation can lead to increased colonoscopy procedural time, decreased diagnostic yield, and an increased complication rate. Several factors influence bowel preparation quality. Recent studies have indicated that the time interval between bowel preparation and the start of colonoscopy is also important in determining bowel preparation quality. We aimed to determine the interval of time between the last polyethylene glycol (PEG) dose ingestion and start of the colonoscopy.

**Patients and Methods:** One hundred twenty-three patients who underwent colonoscopy during June 2012 to July 2012 were prospectively identified. Patients used the standard preparation of 4L polyethylene glycol solution. The quality of bowel preparation was assessed by using the Ottawa Bowel Preparation Scale according to the time interval, and other factors that might influence bowel preparation quality were analyzed.

**Results:** Colonoscopies with a time interval of 5 to 6 hours had the best bowel preparation quality score in the whole, right, mid, and rectosigmoid colon according to the Ottawa Bowel Preparation Scale. Patients with intervals of 6 hours or less between the initiation of polyethylene glycolintake and the start of colonoscopy had a better quality of bowel preparation than those with intervals of more than 6 hours ($p=0.040$). No significant difference was found for the factors of sex, age, body mass index, hypertension, diabetes, liver cirrhosis, previous colorectal operation, previous obstetrics and gynecology operation. In multivariate analysis, the time interval (odds ratio 2.184; 95% CI, 1.031-4.627, $p=0.041$) was a significant contributor to satisfactory bowel preparation.

**Conclusions:** The time interval of 6 hours or less between the initiation of PEG intake and the start of colonoscopy is the important factor to determine satisfactory bowel preparation quality.

**Key Words:** Bowel preparation, Polyethylene glycol, PEG

---

**LGI-16**

**Validation of the Boston Bowel Preparation Scale for the Bowel Preparation in Screening Colonoscopy**

Eun Jin Kim, You Sun Kim, Won Wo Park, Sun Ok Kwon, Moun Gi Oh, Sung Young Kim, In Hye Cha, Kyung Sik Park, Cheol Hun Kwak, Jin Nam Kim, Jeong Seop Moon

Department of Internal Medicine, Seoul Paik Hospital, Inje University College of Medicine, Seoul, Korea

**Background:** Few bowel preparation scales have been validated. The Boston Bowel Preparation Scale (BBPS) is a novel bowel preparation scale. We validated the BBPS in Korean patients and assessed the relation between colon polyp detection rate and BBPS score.

**Method:** The BBPS is a 10-point scale that assesses bowel preparation after all cleansing maneuvers. We assessed interobserver and intraobserver reliability of BBPS and assessed segment (cecum, ascending colon vs. hepatic flexure, transverse colon, splenic flexure vs. descending colon, sigmoid colon and rectum) and total BBPS scores. In addition, we compared BBPS scores with clinically meaningful outcomes such as, polyp detection rate and procedure times, during screening colonoscopy.

**Results:** This was a prospective, single-center trial. We enrolled 485 screening colonoscopies between January 2011 and January 2012. The male patients were 337 (69.3%) and, the mean (±SD) age was 47 ± 0.4 (years). The mean (±SD) BBPS score was 8.1 ± 1.1. Higher BBPS scores ($\geq 8$ vs. $< 8$) were associated with a higher polyp detection rate (44.8% vs. 33.6%), ($p<0.049$). BBPS scores were inversely correlated with colonoscope withdrawal times ($r=-0.167, p<0.001$).

**Conclusions:** The BBPS is a valid and reliable measure for assessing bowel preparation during colonoscopy in Korean patients.

**Key Words:** BBPS (boston Bowel Preparation Scale), Bowel Preparation, Polyp Detection Rate
LGI-17

Effect of Constipation and Food Taken before Colonoscopy on Bowel Cleansing Quality

Yeo-jin Yoon¹, Min Young Choi¹, Hyoun Woo Kang¹, Ji Won Kim², Kook Lae Lee³
¹Gastroenterology and Hepatology, Internal Medicine, Dongguk University Ilsan Hospital, Goyang, ²Department of Internal Medicine, Seoul National University Boramae Hospital, Seoul, Korea

Background and Aims: The relationship between constipation or bowel preparation method and bowel cleansing before colonoscopy is not yet conclusive until now. The aim of this study was to characterize the relationship between features of constipation including bowel movement and the quality of bowel preparation during colonoscopy. In addition, we compared the efficacy of bowel preparation methods before colonoscopy.

Methods: From July through December in 2011, 131 patients who underwent colonoscopy were enrolled. Patients were asked to complete a questionnaire which included demographics, type of stool forms and features of bowel movements, food taken the day before colonoscopy, dose and time of polyethylene glycol (PEG) administration. Bowel-cleansing quality was reported as excellent, good, fair, or poor. By using univariate and multivariate logistic regression analysis, we evaluated the association between quality of bowel cleansing and constipation or bowel preparation method.

Results: Bowel movement frequency was inversely correlated with bowel cleansing quality (p=0.003). But there was no significant difference between straining or hardness of stool and bowel cleansing quality (p=0.081 and 0.561, respectively). There was a statistically significant association between solid food taken before colonoscopy and poor bowel cleansing (p=0.001). But dose or time of PEG administration was not correlated with bowel cleansing quality (p=0.834 and 0.561).

Conclusions: Decreased bowel movement frequency may predict those at risk for poor bowel preparations. In addition, avoidance of solid food the day before colonoscopy seems to be important in regard of bowel cleansing quality.

Key Words: Colonoscopy, Bowel preparation, Constipation

LGI-18

Predictive Risk of Adenomas with High-Risk Characteristics Based on Two Previous Colonoscopic Findings

Jin Yong Park, Ja Seol Koo, Hye Sung Kang, Jong Gyu Song, Seung Young Kim, Jong Jin Hyun, Sung Woo Jung, Bum Jae Lee, Rok Seon Choung, Yoon Tae Jin, Sang Woo Lee, Jae Hyun Choi
Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Background/Aims: Suggested intervals for postpolypectomy surveillance colonoscopy are currently based on the findings of most recent exam (=index colonoscopy). We evaluated the risk of advanced/multiple adenomas and cancer on third colonoscopy based upon the results of two previous colonoscopies.

Methods: Retrospective study was conducted. Baseline characteristics and three colonoscopic findings of subjects were analyzed. No adenoma was defined as hyperplastic poly or no adenoma. Low-risk findings were defined as one or two small (<1 cm) tubular adenomas. High-risk findings were defined as advanced adenoma or cancer or any sized multiple (≥3) adenomas.

Results: Seventy-four of 1066 subjects (6.9%) had high-risk findings at the third colonoscopy. If the second colonoscopy showed high-risk findings, then the results from the first colonoscopy added no significant information about the probability of detecting high-risk findings on the third colonoscopy (p=0.964). If the second colonoscopy showed low-risk findings or no adenoma, then the results from the first exam added significant information about the probability of detecting high-risk findings on the third colonoscopy (p=0.001, 0.012). In multivariate analysis, high-risk findings on first colonoscopy was a significant predictor of high-risk findings on third colonoscopy. And high-risk and low-risk findings on second colonoscopy was a significant predictor of high risk findings on third colonoscopy.

Conclusions: Considering two previous colonoscopic findings, surveillance interval of colonoscopy must be decided.

Key Words: Index colonoscopy, High-risk findings

LGI-19

Previous Colon Polypectomy Can Prevent the Occurrence of Advanced Colorectal Lesion

Byung Hoo Lee, Hyun Gun Kim, Seong Ran Jeon, Wan Jung Kim, Bong Min Ko, Tae Hee Lee, Jin-Oh Kim, Joo Young Cho, Joon Seong Lee
Institute for Digestive Research, Digestive Disease Center, Soonchunhyang University, College of Medicine, Seoul, Korea

Backgrounds: Colon polypectomy has been known as the best method to prevent and decrease mortality from colorectal cancer. However, the incidence of advanced adenoma at surveillance colonoscopy has been reported as 3.0% to 3.8% for low-risk patients and 8.3% to 34.5% for high-risk patients after previous polypectomy. We investigated that the association between previous colon polypectomy and the recurrence of advanced lesions (AL) such as advanced adenoma and cancer during surveillance colonoscopy.
Methods: We retrospectively analyzed data of patients who underwent endoscopic mucosal resection for colorectal polyps during one year in tertiary academic hospital. Patients were classified into two groups: the patients received the previous polypectomy group (group 1) and not received (group 2). We compared various factors between the two groups.

Results: Overall 984 patients (male: female = 7:3) were enrolled. Mean age was older in female than male (59 vs. 57 years, p=0.022) patients. About 29.4% (289/984) of patients were included in group 1 and the others were included in group 2. Detection of AL was 6.2% (18/289) in group 1 and 14.2% (99/695) in group 2 (p<0.01). In group 1, AL was more detected in patients with previous AL than patients without AL (11% vs. 3.3%, p=0.008). Mean number of previous polypectomy in newly AL detected patients was more than patients without newly AL in group 1 (8.1 vs. 5.7, p=0.087). In group 2, mean age of the patients with AL was older than patients without AL (61.3 vs. 55.4, p<0.01) and mean number of adenoma in patients with AL was more than patients without AL (3.4 vs. 1.4, p<0.01). No history of previous polypectomy (Odds ratio, OR 2.69, 95% confidence interval, CI 1.550-4.658), older age (OR 1.03, 95% CI 1.010-1.053), the mean number of adenoma (OR 1.46, 95% CI 1.335-1.608) were affected the detection of AL. In group 1, short surveillance interval (OR 0.938, 95% CI 0.884-0.996), no history of colon cancer (OR 0.14, 95% CI 0.033-0.567) were negatively affected the detection of AL.

Conclusions: Previous colon polypectomy can prevent the occurrence of advanced colorectal lesions. Especially, high risk patients with multiple polyps or previous AL should undergo careful surveillance colonoscopy for recurrence of AL.

Key Words: Colon polypectomy, Advanced adenoma, Colorectal cancer

LGI-20

The Surveillance Strategy of Rectal Neuroendocrine Tumors According to the Recurrence Risk Stratification

Dong Hyun Kim, Soo Jung Park, Jae Hee Cheon, Tae Il Kim, Won Ho Kim and Sung Pil Hong

Division of Gastroenterology, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Korea

Aims: Rectal neuroendocrine tumors (NETs) have been increasing in incidence, typically presenting as small and localized tumors which are good candidate for endoscopic treatment. However, recommendations for surveillance after the tumor resection have not been well established. We evaluated the long-term outcomes of rectal NETs and surveillance strategy according to recurrence risk stratifications.

Methods: From January 2000 to July 2011, a total of 192 patients who were diagnosed with rectal NETs were included in the present study. Patient characteristics, recurrence rates, risk factors of recurrence and surveillance schedules were analyzed. The mean follow-up duration was 41.4 months (range: 13-151).

Results: The male-to-female ratio was 1:2 to 1, and mean age at diagnosis was 50.7 years. Mean tumor size was 6.8 mm (range: 1-30). One hundred twenty-nine patients were treated with endoscopic resection (67.2%) and 63 patients were treated with surgical resection (32.8%). One hundred fifty-three patients were stage IA tumors (79.7%) and 19 patients were stage IB tumors (9.9%). Fourteen patients (7.3%) had regional lymph node metastasis and 4 patients (2.1%) had distant metastases at initial presentation. Ten patients (5.3%) showed recurrence during the follow-up period, including one case of local recurrence and nine cases of recurrence at a distant site. Tumor size greater than 10mm, invasion of muscularis propria, lymphovascular invasion and regional lymph node metastasis were statistically significant predictors of recurrence by univariate analysis. Among 164 patients with no risk factor of recurrence, only one who received transanal resection had a local recurrence at 15 months after resection. There was no distant recurrence in patients with no risk factor of recurrence during follow-up period. The initial post-resection surveillance endoscopy and imaging study was held 13.6 months (range: 2-73) and 12.8 months (range: 3-79), respectively. During the overall follow-up period, endoscopy and imaging study was performed every 26.4 months and 16.9 months, respectively.

Conclusions: Patients with rectal NETs showed favorable clinical outcomes and had a low recurrent rate. We suggested that intensive surveillance with endoscopy or imaging study is not required in the patients with no risk factors for recurrence.

Key Words: Rectal neuroendocrine tumor, Recurrence, Surveillance

LGI-21

Endoscopic Submucosal Dissection of Sessile Colorectal Tumors: Comparison with Laterally Spreading Tumors

Dong-Hoon Yang, Jong Wook Kim, Sang Hyoung Park, Soo-Kyung Park, Kee Wook Jung, Kyung-Jo Kim, Byong Duk Ye, Jeong-Sik Byeon, Seung-Jae Myung, Suk-Kyun Yang, Jin-Ho Kim

Department of Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea

Background/Aim: Although endoscopic submucosal dissection
(ESD) is thought as an effective treatment for large laterally spreading tumors (LSTs) of the colon and rectum, the therapeutic effectiveness of ESD for large sessile colorectal tumors has not been evaluated. So we aimed to evaluate the outcomes of ESD for the large sessile colorectal tumors.

**Methods:** We reviewed the patients who underwent ESD for their large (at least 30 mm or larger in diameter) LSTs and sessile tumors of the colorectum. An En-bloc resection rate, a histologically complete resection rate, procedure time and complications were compared between two groups.

**Results:** From Nov. 2010 to Sept. 2012, ESD was attempted for a total of 72 patients with large colorectal tumors (14 with sessile colorectal tumors and 58 with LSTs) by a single endoscopist. In the sessile colorectal tumors, the endoscopic en bloc resection rate and the histologically complete resection rate were 71.4% (n=10) and 78.6% (n=11) respectively. In the LSTs, they were 91.4% (n=53) and 81.0% (n=47) respectively. The median procedure time was 77.0 minutes (range 22.0-213.2 minutes) for sessile tumors and 82.6 minutes (range 24.6-392.5 minutes) for LSTs (p=0.292). Although endoscopic findings suggesting submucosal (sm) invasion such as Vi or Vn pit pattern and type IIIB Sano’s capillary pattern classification were not different between the two groups (p=0.229 and p=0.579 respectively), higher sm invasion rate was noted in the sessile tumors than the LSTs (28.6% [n=4] vs 8.62% [n=5], p=0.043). There were no significant differences of complications such as bleeding and perforation. Overall operation rate was higher in sessile tumors (28.6% [n=4] vs 5.2% [n=3], p=0.008). The causes of operation in the sessile tumors and the LSTs were failure of resection (n=3 vs n=2) and deep sm invasion (one in each group).

**Conclusions:** Although the en bloc resection rate of sessile tumors was lower compared with LSTs, approximately 70 percent of the large sessile colorectal tumors were treated successfully by ESD. With careful selection, ESD can be a therapeutic option for large sessile colorectal tumors.

**Key Words:** Large sessile colorectal mass, Laterally spreading tumor, Colorectal neoplasm

**Background/Aims:** Majority of laterally spreading tumor is histologically benign, therefore this lesion is suitable for endoscopic treatment. Conventional endoscopic mucosal resection is frequent result in piecemeal resection, lead to incomplete histological diagnosis and increase risk of local recurrences. The aim of this study is to evaluate efficacy of resection techniques, endoscopic mucosal resection with circumferential incision and endoscopic mucosal dissection. Patients and Methods: Between February 2009 to May 2012, we enrolled 71 patient who underwent EMR-CI or ESD to remove laterally spreading tumor (M: F = 45: 26, age: 61.8±7.9). To determine clinical outcomes of resection techniques, we analyse several indicator retrospectively such as en bloc resection rate, complete resection rate, perforation rate, local recurrence rate.

**Results:** The size of laterally spreading tumor was 2.3±0.96 cm (range : 1 cm - 7 cm). Lesions are mostly found in the rectum (26 cases) and ascending colon (21 cases). Morphologically, granular homogeneous type (22 cases) and granular mixed nodular type (23 cases) were common. On histopathologic examination, 36 lesions were low grade dysplasia, 18 lesions were high grade dysplasia and 15 lesions were adenocarcinoma. Mixed nodular type showed higher incidence of adenocarcinoma than other types of laterally spreading tumor. By the tumor size, en bloc resection rates were as in the followings. In cases of tumor size under 2 cm, both EMR-CI (17/17) and ESD (7/7) were 100%. In cases of size 2 cm to 3 cm, EMR-CI was 70% (22/31), ESD was 88% (8/9). Size exceed 3 cm, EMR-CI was 50% (2/4), ESD was 80% (4/5).

**Conclusion:** The overall en bloc resection rate of EMR-CI (78%, 41/52) and ESD (89%, 17/19) were higher than that of conventional endoscopic mucosal resection. The en bloc resection rates were not statistically different between the two resection techniques (p=0.305). Compared with ESD, EMR-CI is technically simple. Therefore, EMR-CI may be effective modality in cases with hard to perform ESD.

**Key Words:** ESD, Circumferential incision, LST

**LGI-23**

**Outcome Report and Learning Curve Analysis of Colorectal Endoscopic Submucosal Dissection for Laterally Spreading Tumor**

Han Ho Jeon, Kwangwon Rhee, Jie-Hyun Kim, Hyojin Park, Sang in Lee, Young Hoon Youn
Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

**Background/Aims:** Endoscopic submucosal dissection (ESD) has currently been applied to the treatment of various color-
ectal neoplasm. However, few studies have previously described the learning curve for colorectal ESD. The aim of this study was to evaluate the treatment outcomes and learning curve for colorectal ESD of laterally spreading tumor (LST) based on the experience of single endoscopist.

**Methods:** The 93 colorectal ESD (47 male, median age 65 years) procedures for colorectal LST between March 2009 and June 2012, performed by a single experienced endoscopist who previously performed more than hundreds cases of gastric ESD, were eligible for this analysis. The cases were grouped chronologically into three periods by multi-dimensional analyses. Results were compared among three periods in order to determine learning curve. We also compared the result according to the subtype of LST (granular type and non granular type).

**Results:** In general, median procedure time was 45 minutes, and the rate of en bloc resection and R0 resection was 89.25% and 83.87%, respectively. Six cases of perforation (6.45%, 2 overt perforation and 4 micro perforation) were developed as complications, but all cases could be managed conservatively by clipping and intravenous antibiotics. The procedure time and en bloc resection rate were not significantly different among the period. However, the pathologic diameter and the procedure speed (the area of resected specimen divided by procedure time, cm2/min) was significantly faster since second period. By comparison according to LST subtype, although the pathologic diameter (30mm) of LST-granular type (LST-G) was bigger than that (23mm) of LST- non granular (LST-NG), the procedure speed (0.157 cm2/min) of LST-G was significantly faster than that (0.072 cm2/min) of LST-NG.

**Conclusion:** Based on our results, the endoscopist, who are fully experienced in gastric ESD, needs little learning period for colorectal ESD in terms of en bloc resection and complication. However, the procedure speed could be significantly improved after about 25 cases of colorectal ESD. So approximately, 25 cases might be needed to level up the technical skill of colorectal ESD for LST in experienced gastric ESD endoscopist. Also ESD for LST-NG should be performed by endoscopist with significant experience of colorectal ESD.

**Key Words:** Colorectal tumor, ESD, Learning curve

---

**LGI-24**

**Analysis of the Perforation Induced by Endoscopic Submucosal Dissection for Colorectal Neoplasm**

Young Jae Lee, Mi Young Jang, Sung Jun Ko, Shang Hoon Han, Hoon Ki Baek, Wang Guk Oh, Geum Mo Jung, Ji Woong Kim, Yong Keun Cho, Jin Woong Cho

Department of Internal Medicine, Presbyterian Medical Center, Jeonju, Korea

**Aims:** Endoscopic submucosal dissection (ESD) is the useful and effective method for large colorectal sessile tumor. But colorectal ESD is associated with a higher risk of perforation, it has been performed limitedly. The aim of this study is to evaluate the perforation occurred during colorectal ESD.

**Method:** Between February 2004 and August 2012, 292 colorectal ESD cases were performed by one endoscopist in our hospital. We analyzed the risk factors associated with perforation, retrospectively.

**Result:** Mean age was 62.5 years old and male to female ratio was 1.7:1. Pathologic result was low_grade:high_grade:Carcinoma = 94:72:84. En bloc resection rate was 82.5%. Pathologic complete resection rate was 67.9% and endoscopic complete resection rate was 82.2%. Mean specimen size was 36.3X29.4mm and location ratio was R:S:D:T:A:C=129:32:9:37:70:15. Perforations (Ps) were occurred in 25 (8.6%) cases and 18 cases (6.2%) among them were microperforations (MPs) which were detected by post-ESD imaging study and asymptomatic pneumoperitoneum. There were no clinical differences between P and MP group and all cases were managed by medical therapy successfully. Two cases were treated by EUS drainage and chest tube additionally. When the lesion’s location was classified by 4 region according to clockwise direction in the view of colonoscope, the ratio was 0~3 o’clock:~6:~9:~12=7:1:9:9.

There were more risk of perforation when the lesion was on the opposite side of colonoscopy electrosurgical knife port.

**Conclusion:** ESD is useful for colorectal neoplasm management but there is substantial risk of perforation. According to the initial lesion site, the risk of perforation can be increase. So, when we resect the tumor which is on the opposite side of knife, we must perfomed ESD more carefully to avoid perforation.

**Key Words:** Colorectal Neoplasm, Endoscopic Submucosal Dissection, Perforation

---

**LGI-25**

**Analysis of the Incidence and Risk Factors Associated with Colorectal Post-ESD Electrocoagulation Syndrome**

Da Hyun Jung¹, Young Hoon Youn¹, Jaeheon Jahng², Jie-Hyun Kim¹, Hyojin Park²

¹Department of Internal Medicine, Gangnam Severance Hospital, ²Yongin Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

**Background/Aims:** The incidence of postpolypectomy electrocoagulation syndrome, which refers to the development of abdominal pain, rebound tenderness, fever, leukocytosis, and peritoneal inflammation after colonic polypectomy, is reported as 0.5-1.2% in conventional polypectomy and EMR.
However, post-ESD electrocoagulation syndrome (PEECS) was quite more often, but there was no previous report about incidence and risk factors of PEECS. So we aimed to investigate the incidence and clinicopathologic risk factors associated with PEECS.

**Patients and Methods:** 89 patients received colorectal ESD between 2009 and 2011 by a single expert ESD-endoscopist at Gangnam Severance Hospital. 6 patients with micro-perforation and 1 patient with overt perforation were excluded. So, 82 cases of colorectal ESD without perforation were analyzed. Patients who had fever, regional rebound tenderness, marked leukocytosis after ESD, and had been treated with intravenous antibiotics, were categorized as the PEECS group. The incidence and risk factors of PEECS were analyzed retrospectively.

**Results:** Overall incidence of PEECS was 40.2%. In PEECS group, the mean size of resected specimen was larger (31.3 vs 24.6 mm, p<0.05) and mean procedure time was longer (67.8 vs 41.4 minutes, p=0.01). The incidence of PEECS was lower in cases of ESD for carcinoid tumor (2/16, 12.5%), and ESD in recto-sigmoid area (11/54, 20.4%) than the others (p<0.01). The enbloc resection rate was 91.5% (75/82) and the piecemeal resection was significantly associated with the development of PEECS (36% vs 85.7%, p<0.05). In multivariate analysis, size larger than 3 cm (OR=5.0, 95% CI=1.2 - 21.7, p=0.03) and sites other than recto-sigmoid (OR=7.6, 95% CI=2.1 - 27.9, p<0.01) were independent risk factors of PEECS. The duration of hospitalization in PEECS group was longer than the others (6.2 ± 3.0 vs 3.4 ± 1.8 days).

**Conclusions:** Thus, patients who have tumors larger than 3 cm, in colon other than recto-sigmoid area should be observed carefully after colorectal ESD.

**Key Words:** Endoscopic submucosal dissection, Colorectal neoplasms, Electrocoagulation syndrome
ing to randomization. Data on the polyp location, size, shape, and pathology findings were recorded. The primary endpoint was the number and total area of blood vessels of resected polyp. Secondary endpoint was postpolypectomy bleeding for each resected polyp.

**Results:** Twenty-seven colorectal polyps receive submucosal injection with large volume (3-5 ml) or submucosal injection with small volume (1-2 ml). There was no significant difference in the shape and diameter of polyps. The microscopic analysis revealed that the median number of supplying vessels was greater in ‘S’ group (22 vs. 14, \( p=0.031 \)). The median area of total supply vessels was 130633.2 in ‘S’ group and 96781.6 in ‘L’ group \( (p=0.517) \). There were a total of 4 postpolypectomy bleeding, three in ‘S’ group and one in ‘L’ group \( (3/13 \text{ vs. } 1/14, \ p=0.244) \).  

**Conclusion:** We suggest that submucosal injection with large volume may decrease the number and area of supplying vessels. Submucosal injection with large volume during EMR may decrease postpolypectomy bleeding. This should be confirmed in large scale, prospective, controlled studies.

**Key Words:** Colon, Submucosal Injection, Postpolypectomy Bleeding

---

**LGI-28**

**Which Is the Most Efficient and Time Saving Capsule Endoscopy Reading Mode?**

Ye Ji Kim, Bora Keum, Sun Young Kim, Min Ho Seo, Woo Jin Lee, Hyuk Soon Choi, Eun Sun Kim, Yoon Tae Jeen, Hong Sik Lee, Hoon Jai Chun, Soon Ho Um, Chang Duck Kim, Ho Sang Ryu

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

**Background/Aims:** Capsule endoscopy is a useful test for evaluation of the small bowel. However, capsule endoscopy is needed the substantial time for capsule reading. Although many attempts have been made to reduce the reading time, there was no definite conclusion about the best reading mode to save the time and have a diagnostic accuracy. The aim of this study was to investigate evaluation times and detection rates in three different reading modes to find the most appropriate mode for evaluation of capsule endoscopy.

**Methods:** Three trainee endoscopists reviewed capsule endoscopy studies performed at our institution from 5/2007 to 6/2012. Each trainee endoscopist read a total of 30 capsule endoscopy videos. Three endoscopists compared three different capsule endoscopic software modes: automatic view at a speed of 20 frames per second (fps) and automatic quadview at a speed of 20 fps, quickview at a speed of 4 fps. Each endoscopist read the same capsule endoscopic record by using one of three different software modes. Capsule endoscopic reading time was recorded, and the number of detected lesions was counted.

**Results:** The mean evaluation time using quickview was significantly shorter than with automatic view (automatic single view: 18 min 48 sec, quadview: 19 min, quickview: 2 min 7 sec). The diagnostic miss rates of ulcers, erosions were higher when reading in quickview compared with reading in automatic view. However, the detection rate of bleeding was similar when reading in quickview compared with automatic view. The detection rates of ulcers, hemorrhagic spots, angiodysplasias, polyps and bleeding were similar when reading in automatic single view 20 fps compared with reading in quadview 20 fps.

**Conclusions:** Quickview can be used confidently in small bowel bleeding and can be performed in a short time. However, quickview mode has a high diagnostic miss rate for the other lesions, such as ulcers or erosions. There was no significant difference between the automatic single view and quadview.

**Key Words:** Capsule endoscopy, Reading mode, Detection rate, Evaluation time

---

**LGI-29**

**Long Term Clinical Outcome of Capsule Endoscopy in Patients of Obscure GI Bleeding**

Jin Su Kim, Myung-Gyu Choi, Chul-Hyun Lim, Yu Kyung Cho, In Seok Lee, Kyu Young Choi

Department of Internal Medicine, the Catholic University of Korea, Seoul, Korea

**Purpose:** There have been several reports of outcome of capsule endoscopy (CE) in obscure GI bleeding (OGIB), but the follow-up duration is just below 1 or 2 years. This study was performed to investigate over 2 years clinical outcomes of CE in OGIB and what would be happen in patient of negative CE after 2 years. Subject: From January 2003 to June 2010, a total of 83 consecutive patients who underwent CE for OGIB and followed-up for at least 2 years were studied.

**Method:** Clinical and follow-up data were obtained by reviewing the medical records from our prospectively enrolled registry database of CE and also by interviewing the patients. The primary outcome was recurrent bleeding rate, and the 2nd outcomes were investigation of factors that affect recurrent bleeding and the newly found small bowel disease after rebleeding.

**Results:** The median follow-up period was 48 months (range 24-107 months). Of the 83 patients, significant lesions (positive CE) were found in 53 (63.9%). Recurrent bleeding
occurred in 12 patients (22.6%) of positive CE and 6 patients (20%) of negative CE cases (Figure 1). There was no differences in rebleeding rate between patients with positive and negative CE during more than 2 years follow-up (p=0.779). As to factors related to rebleeding, there was no difference in drug history, hemoglobin level before CE and the result of CE, but significant lower rebleeding rate was observed in patients received specific treatment after CE (p=0.013). Among 30 patients of negative CE, 6 cases of rebleeding occurred at 3, 6, 17, 20, 21 and 90 months after CE (median time 18.5 months). After further examination 3 of 6 patients were diagnosed as submucosal tumor, myelodysplastic syndrome, and duodenal cancer at 3, 6, 17 months respectively.

Fig. 1. Clinical outcome according to treatment type in patient of OGIB

Conclusions: Patients with OGIB with a negative CE had similar rebleeding rate compared to positive CE during over 2 years follow-up and majority of rebleeding was occurred within 2 years. This result suggests at least 2 years follow-up maybe need in patients of negative CE.

Key Words: Obscure GI bleeding, Capsule endoscopy, Negative Capsule

LGI-30

Colonoscopy with Biopsy Is Beneficial for the Early and Accurate Diagnosis of Ischemic Colitis

Eui Joong Kim1, Soon Man Yoon1, Ki Bae Kim1, Joo Young Lee1, Jeong Tae Kim1, Hyun Kim1, Hee Seok Jeong1, Jeoung Ho Han1, Hee Bok Chae1, Seon Mee Park1, Sei Jin Youn1, Ro Hyun Sung2

1Department of Internal Medicine, 2Department of Pathology, Chungbuk National University Hospital, Chungbuk National University College of Medicine, Cheongju, Korea

Background/Aims: Ischemic colitis has a clinical spectrum that ranges from mild colitis to acute fulminant course. Early and accurate diagnosis, therefore, is mandatory for good clinical outcome. However, ischemic colitis still remains largely misdiagnosis based on clinical symptoms only. The aim of this study was to evaluate the efficacy of endoscopic and histologic examination with biopsy for the early and accurate diagnosis of ischemic colitis.

Methods: We investigated clinical characteristics and endoscopic findings with histopathology of 86 cases of ischemic colitis from October 2002 to August 2012 in a tertiary-care hospital. All cases underwent colonoscopy with biopsy within a few days of the onset of symptoms, and the histologic features from biopsy specimens were reviewed by experienced pathologist. In addition, the occurrence of complication by colonoscopy with biopsy was evaluated.

Results: The mean age of patients was 65.9±13.0 (range of 28-93, male to female ratio of 1:2.07). Major combined disorders were hypertension (52.3%), diabetes (32.6%), and arrhythmia including atrial fibrillation (18.6%). The clinical features usually presented with hematochezia (82.6%), abdominal pain (76.7%), diarrhea (60.5%), and nausea or vomiting (23.3%). Based on the significant histologic features including hemorrhage (61.6%), glandular atrophy (66.3%), thrombus in capillary (43.0%), and coagulative necrosis of mucosa (30.2%), 65 of 86 cases (75.6%) could be confirmed with ischemic colitis. There were no serious complications such as bowel perforation or major bleeding after colonoscopy with biopsy.

Conclusions: Colonoscopy with biopsy is beneficial and safe for the early and precise diagnosis of ischemic colitis. We suggested that early colonoscopy with biopsy might be performed for the patients with clinically suspected ischemic colitis.

Key Words: Ischemic colitis, Colonoscopy, Biopsy, Histology, Diagnosis

LGI-31

Atypical Distribution of Inflammatory Lesions in Ulcerative Colitis: Is It Really Rare?

Sang Hyoung Park, Suk-Kyun Yang, Soo-Kyung Park, Jong Wook Kim, Dong-Hoon Yang, Kee Wook Jung, Kyung-Jo Kim, Byong Duk Ye, Jeong-Sik Byeon, Seung-Jae Myung, Jin-Ho Kim

Department of Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea

Background & Aim: Although continuous inflammation in the colon is a hallmark of Ulcerative colitis (UC), several studies have reported the frequent observation of endoscopic “skip” lesions in the colon including appendix. But the clinical implication of this finding is unclear. Therefore, the aim of this study was to evaluate the endoscopic findings and patterns of distribution of lesions in patients with newly diagnosed, untreated UC.

Methods: We retrospectively analyzed colonoscopic findings and clinical courses of 240 patients with UC first diagnosed at
the Asan Medical Center between January 2001 and December 2009.

**Results:** Of the 240 included patients, 194 patients (80.8%) showed typical distribution of lesions and 46 patients (19.2%) showed atypical distribution of lesions such as segmental, patchy inflammatory lesions except appendiceal orifice inflammation (AOI). They were detected more frequently in the proximal portions of colon than in the distal portions of colon \((p<0.05)\). Of eight patients who had segmental-colitis type of UC (i.e. without rectal involvement), six patients developed typical rectal inflammatory lesions on follow-up colonoscopy.

**Conclusions:** Endoscopic “skip” lesions in proximal parts of the colon may not be a rare finding in patients with initial, active UC. Clinicians need to be aware that skip lesions in addition to AOI may occur in untreated patients with UC for appropriate diagnosis and management. * This study was supported by a grant of the Korean Health Technology R&D Project, Ministry of Health & Welfare, Republic of Korea (A120171).

**Key Words:** Ulcerative colitis, Colonoscopy, Diagnosis

**LGI-32**

**Does a Colonoscopy after Acute Diverticulitis Affect Its Management?**

Min Jung Kim, Dong Kyung Chang, Poong-Lyul Rhee, Jae J. Kim, Jong Chul Rhees, Soon Jin Lee, Young-Ho Kim

Division of Gastroenterology and Radiology, Department of Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

**Background and Study Aims:** The diagnosis of acute diverticulitis is based on abdominal computed tomography (CT) currently. Common practice has been to perform a colonoscopy after the acute event to exclude other diagnoses, mainly underlying malignancy. Our aim was to determine whether colonoscopy is necessary and what additional information is gained from this procedure.

**Patients and Methods:** Between November 1994 and December 2011, medical records of 291 patients with acute diverticulitis diagnosed by clinical criteria and CT findings were reviewed. Patients who had colonoscopy within 1 year before the CT scan or were excluded and only included colonoscopy reports within 1 year from the date of CT scan. Clinical parameters, laboratory results, CT findings, colonoscopic findings of polyps and other disease, and histopathological reports were analyzed.

**Results:** A total of 177 patients (aged 43.3 ± 15.3 y, male:female=97:80) were included in the study and 61 patients underwent colonoscopy within 1 year after acute attack. The ratio of right and left diverticulitis with colonoscopy was 41:4. There were no significant differences in patients’ characteristics between those with or without colonoscopy. Neither advanced adenomatous lesion nor colonic malignancy was detected. In 19 patients (31.1%) at least one polyp was found and 11 patients (18.0%) had adenomatous polyp. No new or different diagnosis was made after colonoscopy.

**Conclusions:** Our reports support that routine colonoscopy following acute event of diverticulitis does not affect the management nor alter the diagnosis. The current practice of colonoscopy after an attack diagnosed by typical clinical symptoms and CT needs to be reevaluated.

**Key Words:** Acute Diverticulitis, Colon Polyps, Colorectal Cancer, Colonoscopy

**LGI-33**

**Clinical Outcomes of the Primary Obstructive Colorectal Cancer Which Cannot Be Passed by the Scope**

Jae Kwang Lee¹, Dong-Hoon Yang², Soo-Kyung Park³, Sang Hyoung Park², Jong Wook Kim², Kee Wook Jung³, Kyung-Jo Kim³, Byong Duk Ye³, Jeong-Sik Byeon³, Seung-Jae Myung³, Suk-Kyun Yang³, Jin-Ho Kim²

Department of *Internal Medicine and *Gastroenterology Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

**Objective:** Either self-expandable metal stent (SEMS) and primary operation can be therapeutic options for the primary obstructive colorectal cancer (CRC). We aimed to demonstrate the factors related to the management strategy for the patients with primary obstructive CRC.

**Method:** We reviewed the medical records of the patients who visited emergency room (ER) with primary obstructive CRC, which was unable to be passed through by the scope. We defined clinical variables related to bowel obstruction as abdominal pain, abdominal distension, no gas passage, and radiologic findings suggesting bowel obstruction.

**Result:** A total of 135 patients with primary obstructive CRC visited ER. Median age was 64 years and 81 (60%) patients were male. Based on computed tomography (CT) scan, 95 patients were suitable for curative surgery. SEMS insertion was attempted in 94 (69.6%) patients and 41 patients underwent elective surgery without SEMS insertion. In SEMS trial group, technical success and clinical success rate was 100% and 91.5%. Among the patients with left-sided CRC, abdominal pain and radiologic findings were more frequent in the SEMS trial group than in the primary surgery group. SEMS insertion was attempted more frequently in those with 3 or more clinical varia-
bles than in those with 2 or less clinical variables (odd ratio=9.158, 95% confidence interval; 3.175-26.414, p<0.001). In the right-sided CRC group, there was no difference in the clinical variables between SEMS trial group and primary surgery group. Stomy creation rate in the resectable, left-sided CRC was not different between two groups (15.1% in the SEMS trial group vs. 5.6% in the primary surgery group, p=0.432). Eight stomies in the SEMS group were related to the preoperative underestimation of the tumor extent (n=2), decompression failure (n=1), perforation (n=1), anastomosis site instability (n=2), and other postoperative complications (n=2). Stomy creation rate was higher in those with leukocytosis (39.3%) at initial presentation than in those without leukocytosis (13.6%, p=0.003).

**Conclusion:** The number of symptoms and signs suggesting bowel obstruction can probably be a useful index to decide either SEMS insertion or primary operation for the management of the primary obstructive CRC. Leukocytosis in those with obstructive CRC may predict stomy creation regardless of initial treatment strategy.

**Key Words:** Colorectal Neoplasm, Intestinal Obstruction, Stents

---

**LGI-34**

**Preoperative Colonoscopy for Synchronous Neoplasm Detection after Metal Stent Insertion in Occlusive Colorectal Cancer**

**Sun Gyo Lim, Kwang Jae Lee, Jun Hwan Yoo, Jeong Ook Wi**  
Department of Gastroenterology, Ajou University School of Medicine, Suwon, Korea

**Background/Aims:** In patients with occlusive colorectal cancers, a preoperative complete colonoscopic evaluation is often impossible. We aimed to evaluate the feasibility of preoperative colonoscopy after stent placement and to determine whether the success rate of colonoscopy in patients with acute malignant colonic obstruction differed by the type of stent, covered versus uncovered.

**Methods:** Seventy-three patients with acute malignant colonic obstruction were enrolled prospectively. In patients with a resectable cancer, a preoperative colonoscopy was performed after stent insertion. We compared the success rate of complete preoperative colonoscopy between covered and uncovered stent groups.

**Results:** Forty-five of 73 patients who underwent stent placement had a resectable cancer (61.6%). A complete preoperative colonoscopy was possible in 40 of 45 patients (88.9%). The success rate of complete preoperative colonoscopy was lower in covered stent group when the obstructing mass lesion was located in sigmoid colon (p=0.024). The synchronous cancer detected in 1 patient (2.2%). Stent migration was observed in 4 patients with a covered stent.

**Table.** Comparison of Success Rates of Complete Colonoscopy and Complications of Stent Insertion between the Covered SEMS Group and the Uncovered SEMS Group

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Covered SEMS group (n=20)</th>
<th>Uncovered SEMS group (n=25)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success rates according to tumor location, n/N (%)</td>
<td>Rectum 5/5 (100.0)</td>
<td>5/6 (83.3)</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sigmoid colon 8/12 (66.7)</td>
<td>16/16 (100.0)</td>
<td>0.023</td>
</tr>
<tr>
<td></td>
<td>Descending colon 2/2 (100.0)</td>
<td>2/2 (100.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transverse colon 1/1(100.0)</td>
<td>1/1 (100.0)</td>
<td></td>
</tr>
<tr>
<td>In total, %</td>
<td>16/20 (80.0)</td>
<td>24/25 (96.0)</td>
<td>0.152</td>
</tr>
<tr>
<td>Complications, n/N (%)</td>
<td>Perforation 0/20 (0)</td>
<td>0/25 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Migration 4/20 (20.0)</td>
<td>0/25 (0)</td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td>Bleeding 0/20 (0)</td>
<td>0/25 (0)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Data are presented as number (%). All data were analyzed by Fisher’s exact test. SEMS, self-expandable metal stent.

**Conclusion:** A preoperative complete colonoscopy after stent placement was feasible and safe in a majority of patients with acute malignant colonic obstruction. Uncovered stents seem to have more advantages than covered stents for performing preoperative colonoscopy after stent placement.

**Key Words:** Colorectal cancer, Stent, Colonoscopy, Synchronous neoplasm

---

**LGI-35**

**Outcomes of Patients Who Received Chemotherapy or Radiotherapy Following Sems for Colorectal Cancer with Stenosis**

**Jae Ho Jung, Kwang Jae Lee, Sun Gyo Lim, Hong Sub Lee, Sung Chang Park**  
Department of Gastroenterology, Ajou University School of Medicine, Suwon, Korea

**Objective:** The placement of self-expanding metallic stents (SEMSs) is a useful option for malignant colorectal obstruction. However, there are some worries about the safety and complications of SEMSs in patients who received chemotherapy or radiotherapy after the stent insertion. The aim of this study was to evaluate the clinical outcomes of patients who received chemotherapy or radiotherapy following SEMS placement for colorectal cancer with stenosis.

**Methods:** Patients with malignant colorectal obstruction who have been treated with either chemotherapy or radiotherapy after undergoing SEMS insertion at Ajou University Hospital,
from April 2002 to April 2012 were enrolled in the study. Stents were placed under endoscopic and radiologic monitoring. Patients’ clinical characteristics, outcomes and complications after SEMS insertion were retrospectively analyzed.

**Results:** A total of 34 patients (23 men and 11 women) were enrolled in the study. SEMSs served as a bridge to surgery in 8 patients who received neoadjuvant concurrent chemoradiotherapy, and as a palliative treatment in 26 patients (Oral chemotherapy in 4 patients, radiotherapy in 1 patient and intravenous chemotherapy in 21 patients). Twenty six patients underwent uncovered stent insertion and the others received covered stent insertion. The stents were placed in the distal rectum (n=5, 14.7%), proximal rectum (n=16, 47%), sigmoid (n=10, 29%), descending (n=1, 2.9%), transverse (n=1, 2.9%), and ascending (n=1, 2.9%) colon. The technical and clinical success rates were 100% (34/34). Nine complications (6 occlusion, 2 migration and 1 perforation) occurred during the follow-up period (median time 188 (14~516) days). Re-occlusion rate was higher in uncovered stents than in covered stents. Five out of 6 re-occlusion cases and 2 out of 2 migration cases were successfully managed with reinsertion of stents. Perforation occurred at 100 days after stent insertion in a patient who received palliative chemotherapy (regimen: FOLFIRI).

**Conclusions:** SEMS placement in patients who received chemotherapy or radiotherapy for colorectal cancer with stenosis shows favorable results but may be associated with some complications that are usually manageable with reinsertion of stents. Chemotherapy and radiotherapy after SEMS insertion does not seem to significantly increase perforation or mortality rates.

**Key Words:** Self expanding metallic stents, Colorectal cancer, Obstruction, Chemotherapy, Complication