EE-0162 (PE-0477) Adipose-derived stem cells ameliorate colitis by suppression of inflammasome formation and regulation of M1-macrophage population through prostaglandin E2

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Background and Aim: Inflammatory bowel disease (IBD) is an idiopathic disease caused by a dysregulated immune response to intestinal microbes in an individual with a genetic predisposition. Therefore, alleviation of inflammation is very important to treat IBD. Mesenchymal stem cells (MSCs) have been highlighted as new candidates for treating autoimmune disease based on their immunomodulatory properties. In this study, we investigated the anti-inflammatory mechanism and therapeutic effects of adipose tissue-derived MSCs (ASCs) using THP-1 macrophages and dextran sodium sulfate (DSS)-induced mice with chronic colitis. The researchers used THP-1 cells as an in vitro model of macrophages and DSS-induced mice as an in vivo model of colitis. The researchers observed that ASCs decreased the production of inflammatory cytokines in THP-1 cells and the severity of colitis in DSS-induced mice. The researchers also observed that ASCs could suppress inflammasome formation and regulate the expression of pro-inflammatory genes in THP-1 cells. The results of this study suggest that ASCs can be used as a potential therapeutic agent for the treatment of IBD.

EE-0193 (PE-0478) Metformin inhibits MDSC and M2 macrophage via AMPK-induced inhibition of HMG-CoA reductase in tumor microenvironment

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Background and Aim: MDSC (myeloid-derived suppressor cell) and M2 macrophage in tumor microenvironment contribute to tumor progression by inducing immune tolerance to tumor antigens and cancer cells. It has been reported that metformin has anti-inflammatory and anti-tumor effects. However, there is no report on the effect of metformin on inflammatory cells of tumor microenvironment and its mechanism. Methods: THP-1 cells were used and treated with metformin 0.25, 0.5, 1, 2.5, 5 mM for 48 h. We performed a flow cytometry analysis, utilizing surface markers, such as CD33, arginase, CD206, CD163, and CD68, to estimate MDSC and M2 macrophage fraction of THP-1 cells. To investigate AMPK-mTOR and cholesterol pathway, we performed western blot analysis for p-AMPK and p-S6 and treated AICAR (AMPK activator), compound C (AMPK inhibitor), rapamycin (mTOR inhibitor), simvastatin (HMG-CoA reductase inhibitor), and mevalonate (mediator of cholesterol metabolism). Results: The treatment of metformin on THP-1 cells decreased the fraction of MDSC (CD33, arginase) and M2 macrophage (CD206, CD163). In the western blot analysis, metformin treatment activated p-AMPK and inhibited p-S6. The fraction of MDSC and M2 macrophage was decreased by AICAR and increased by compound C treatment. The inhibitory effect of metformin on MDSC and M2 macrophage was reversed by compound C and mevalonate treatment. In addition, rapamycin or simvastatin treatment to THP-1 cells also decreased the fraction of MDSC and M2 macrophage, which was reversed by mevalonate treatment. In APCmin-DSS cancer model, metformin decreased the number and volume of tumor and MDSC and M2 macrophage in tumor. Conclusion: The inhibitory effect of metformin on MDSC and M2 macrophage in colitic cancer microenvironment is mediated by AMPK-activation induced inhibition of HMG-CoA reductase.

Keywords: microenvironment, metformin, M2, MDSC
EE-0212 (PE-0479) The effect of bone marrow-derived mesenchymal stem cells on expansion of colon organoids and organoid implantation

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Background and Aim: Mesenchymal stem cells (MSC) are involved in suppression or progression of intestinal diseases, such as inflammation and tumor. In addition, bone marrow (BM)-derived cells including bone marrow-derived mesenchymal stem cells (BM-MSCs) have important role in the process of mucosal repair in damaged intestine, and recently, intestinal organoid implantation has been considered as a novel tool to enhance the repair of mucosal defect. Therefore, we investigated the effect of BM-MSCs on expansion of colon organoid. Methods: Colon crypts were isolated from colon of EGFP-TG mouse, and isolated crypts or cryptal cells were embedded in collagen, seeded on plates, and then overlaid by basal culture medium for colon organoid. BM-MSCs were isolated from EGFP-TG mouse and then cocultured with colon organoids in separated collagen matrix or mixed with colon organoids. Hepatocyte growth factor (HGF) was added in organoid culture media. After 7 days, the number, size, and shape of colon organoids were measured and compared according to the culture condition with or without BM-MSCs or HGF. The mixture with colon organoids and BM-MSCs was implanted after mucosal abrasion in the rectum of C57BL/6 mouse. Results: The size and number of colon organoids were increased by addition of HGF or coculture with BM-MSCs. Compared to control, addition of HGF increased the number of organoid by two times, and coculture with BM-MSCs increased the organoid number by 4.5 times. In addition, coculture with BM-MSC induced the change of organoid shape with jagged edge in the half of colon organoids. The mixture with organoids and BM-MSCs were successfully implanted in the damaged rectum of C57BL/6 mouse. Conclusion: The coculture with colon organoids and BM-MSCs could be helpful to expand organoids, and the additional effect of BM-MSCs like anti-inflammation and niche for organoid growth could be beneficial effect in organoid implantation on damaged mucosa.

Keywords: colon, mesenchymal stem cells, organoid

EE-0231 (PE-0480) Lipocalin 2 negatively regulates TRAIL sensitivity through p38-mediated DR5 regulation in human colorectal cancer

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Background and Aim: TNF-related apoptosis-inducing ligand (TRAIL) induces apoptosis through the death receptors (DRs) 4 and/or 5 expressed on the cell surface. Multiple clinical trials are underway to evaluate the anti-tumor activity of recombinant human TRAIL and agonistic antibodies to DR4 or DR5. However, their therapeutic potential is limited by the high frequency of cancer resistance. Here, we provide evidence demonstrating the role of lipocalin 2 (LCN2) on TRAIL receptor mediated apoptosis in human colorectal cancer (CRC). Methods: Expressions of DR4, DR5, and LCN2 were evaluated by quantitative real-time PCR in tumor tissues from 70 patients. HT-29, DLD-1, HCT116, SW480, and SW620 cells were employed as representative human CRC cells. In this study, we used LCN2 siRNA to determine the role of LCN2 in TRAIL-induced apoptosis and TRAIL sensitivity in CRC cells. To elucidate the molecular mechanism, apoptotic (FLIPs, caspase 8, caspase 3, PARP) and TRAIL sensitivity-responsible proteins (p-ERK, p-p38, p-JNK, and CHOP) are detected by western blotting. Results: By analyzing the mRNA expression data of the 70 CRC tissues from patients, we found that DR5 was preferentially expressed in LCN2 low level compared to LCN2 high level CRC tissues. Moreover, we analyzed the association between DR5 and LCN2 expression, and it revealed that DR5 expression in CRC tended to inversely correlate with LCN2. By contrast, no correlation was found between DR4 and LCN2 expression levels. The expression patterns of LCN2 in human CRC cell lines also showed inverse correlation with DR5. Knockdown LCN2 by siRNA in LCN2 high and TRAIL resistant CRC cells significantly increased TRAIL-induced apoptosis through upregulation of DR5 protein and mRNA level. The mechanism by which LCN2 silencing sensitized CRC cells to TRAIL was dependent on extrinsic pathway. Conclusion: Our findings suggest that LCN2 is responsible for TRAIL sensitivity, and LCN2 could be a promising target protein in DR-targeting CRC therapy.

Keywords: trail, lipocalin, colon cancer
**EE-0232 (PE-0481) Interleukin-6 induced lipocalin 2 promotes tumorigenesis from colitis to colorectal cancer**

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**Background and Aim:** A number of inflammatory cytokines promote the development of cancer associated with chronic inflammation. Among them, interleukin-6 (IL-6) is identified as a key promoter of carcinogenesis. Lipocalin 2 (LCN2), a member of the lipocalin superfamily, plays an important role in oncogenesis and progression in various types of cancer. However, the role of LCN2 in colitis-associated colorectal cancer (CAC) remains unknown. Here, we explored the functional role and mechanisms of IL-6 mediated LCN2 in tumorigenesis using human colorectal cancer (CRC) cells and CAC animal model.  
**Methods:** DLD-1, HT-29, and SW480 cells were used as representatives of human CRC cells. Cell proliferation was determined by MTT and colony formation assay. Changes in signaling pathway were examined by western blot and RT-PCR. Luciferase reporter assay was used to validate the promoter activity of LCN2. Experimental colitis and CAC in murine models were induced by dextran sodium sulfate (DSS) and DSS with azoxymethane (AOM), respectively.  
**Results:** The levels of LCN2 mRNA and protein were markedly upregulated by IL-6 in human CRC cells without affecting cell proliferation. Importantly, we found LCN2 upregulation by IL-6 is diminished by NF-κB and STAT3 inhibition using specific inhibitors and siRNA. Reporter assay results determined that IL-6 induces the LCN2 gene promoter activity under control of NF-κB and STAT3 activation. IL-6-induced LCN2 regulated cell survival and development factors susceptibility to NF-κB/STAT3 pathway. In vivo study, we demonstrated that increased IL-6 and LCN2 in the tumulative stage of carcinogenesis were characterized by activation of NF-κB/STAT3 as well as regulation of several target genes that act as important effectors of colonic tumorigenesis.  
**Conclusion:** Our results highlight unknown role of LCN2 in progression of CAC and suggest that increased level of LCN2 may serve as an indicator of colon carcinoma progression in the setting of chronic inflammation.  
**Keywords:** interleukin 6, lipocalin 2, colon cancer, colitis

**EE-0235 (PE-0482) A disintegrin and metalloprotease 12 promotes tumor progression by the inhibition of apoptosis and angiogenesis in the human colorectal cancer**

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**Background and Aim:** A disintegrin and metalloprotease 12 (ADAM12) has been implicated in the pathogenesis of variable cancers. However, the distinct function of ADAM12 in colorectal cancer is still unknown. We determined whether ADAM12 affected the oncogenic behavior of colorectal cancer cells and investigated its prognostic value in patients with colorectal cancer.  
**Methods:** We investigated the impact of ADAM12 on tumor cell behavior by using the small interfering RNA and pcDNA-myc vector in SW480 and DKO1 colorectal cancer cell lines. The expression of ADAM12 was investigated by RT-PCR and immunohistochemistry in colorectal cancer tissues. Apoptosis, proliferation, and angiogenesis were determined by performing TUNEL assay and immunohistochemical staining for Ki-67 and CD34.  
**Results:** ADAM12 knockdown led to induced apoptosis and cell cycle arrest in colorectal cancer cells. In contrast, ADAM12 overexpression inhibited apoptosis and cell cycle arrest. ADAM12 knockdown suppressed angiogenesis, whereas ADAM12 overexpression led to increase angiogenesis. Phosphorylated Akt and GSK-3β levels decreased following ADAM12 knockdown, and they were reversed after ADAM12 overexpression. ADAM12 mRNA and protein expressions were significantly increased in colorectal cancer tissues compared to normal colorectal mucosa tissues. ADAM12 expression was associated with perineural invasion, stage, lymph node metastasis, and poor survival. The mean Ki-67 labeling index and microvesSEL density value of ADAM12-positive tumors were significantly lower than those of ADAM12-negative tumors. However, there was no significant difference between ADAM12 expression and apoptotic index.  
**Conclusion:** These results suggest that ADAM12 expression promotes tumor progression by increasing cell proliferation and angiogenesis in colorectal cancer.  
**Keywords:** colon cancer, cell survival, angiogenesis, prognosis
EE-0245 (PE-0483) Hirsutenone suppresses inflammation by upregulation of HO-1 and activation of AMPK in LPS-stimulated RAW264.7 cells

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Background and Aim: Hirsutenone (HIR) as a diarylheptanoid has been shown to have anti-inflammatory effect. Heme oxygenase-1 (HO-1) is a response to different inflammatory mediators and has protective effect in many inflammations. AMP-activated protein kinase (AMPK), as an energy sensor involved in energy homeostasis, regulates inflammatory responses. In this study, we investigated whether HIR exert anti-inflammatory effects on lipopolysaccharide (LPS)-induced inflammation and evaluated the relationship between HIR-mediated AMPK and HO-1 in RAW264.7 cells.

Methods: The protein expression was analyzed by western blot. NF-κB translocation was analyzed by immunofluorescence. Results: HIR prevented the LPS-induced NO release, iNOS, and ICAM-1 expressions. It also inhibits NF-κB translocation in LPS-stimulated RAW264.7 cells. HIR induced HO-1 expression, whereas the reduction by HIR was reversed in HO-1 deficient cells. HIR-induced AMPK activation involved in the anti-inflammatory effect of HIR in RAW264.7 cells. HO-1 induced by HIR was reduced in the AMPK-deficient cells. The AMPK activation is required for HIR-mediated HO-1. HIR increase the p-ERK and p-JNK and pretreatment with their inhibitors attenuate HIR-mediated HO-1 and p-AMPK. Conclusion: These results suggest that HIR suppress LPS-induced inflammatory responses. The anti-inflammatory effect of HIR is regulated by HO-1/AMPK activation and MAPK. HIR might be a beneficial agent for the treatment of inflammatory disease.

Keywords: hirsutenone, inflammation, HO-1, AMPK

EE-0246 (PE-0484) Oregonin inhibits inflammation and protects against barrier disruption in intestinal epithelial cells: Insights on the underlying mechanisms

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Background and Aim: Oregonin, a major diarylheptanoid derivative isolated from Alnus japonica, exerts anti-inflammatory effects. However, little is known about the effect of oregonin in intestinal inflammation. Methods: The current study investigated the potential of oregonin for clinical applications in the treatment of inflammatory bowel disease (IBD) and elucidated its underlying molecular mechanisms. We investigated the anti-inflammatory effect of oregonin in tumor necrosis factor-α (TNF-α)-stimulated human intestinal epithelium HT-29 cells. In addition, we also determined the protective effect of oregonin against disruption of the intestinal barrier in tert-butyl hydroperoxide (t-BH)-stimulated human intestinal epithelium Caco-2 cells. Results: Oregonin suppressed the expression of cyclooxygenase-2 (COX-2) and intercellular adhesion molecule-1 (ICAM-1) and inhibited nuclear factor kB activation in TNF-α-stimulated HT-29 cells. Oregonin increased heme oxygenase-1 (HO-1) expression through the ERK1/2 and JNK-dependent signaling pathway, which contributed to the oregonin-mediated suppression of COX-2 expression in TNF-α-stimulated HT-29 cells. Moreover, oregonin induced AMP-activated protein kinase (AMPK) activation. Knockdown of AMPK abolished the induction of HO-1 protein by oregonin and suppression of oregonin-mediated ICAM-1 and COX-2 expressions in TNF-α-stimulated HT-29 cells. Oregonin prevented the t-BH-induced increase in monolayer permeability by inhibiting the reduction in zonula occludens-1 and occludin expressions in Caco-2 cells. Targeting HO-1 by siRNA transfection attenuated the oregonin-mediated prevention of loss of tight junction proteins and increase in permeability. Conclusion: Our findings suggest that oregonin can be a potential candidate to treat IBD by preventing mucosal inflammation and barrier disruption, although further in vivo studies using experimental colitis models should be undertaken.

Keywords: oregonin, inflammation, barrier disruption, intestinal epithelial cells
EE-0248 (PE-0485) MicroRNA-9 inhibits EMT of colorectal cancer cells by downregulating anoctamin-1 (ANO1)

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Background and Aim: MicroRNA-9 (miR-9) has been reported to play a suppressive or promoting role according to cancer type. In this study, we investigated the effects of anoctamin-1 (ANO1) and miR-9 on colorectal cancer (CRC) cell proliferation, migration, and invasion and determined the underlying molecular mechanisms.

Methods: Thirty-two paired CRC tissues and adjacent normal tissues were analyzed for ANO1 expression using quantitative real-time PCR (qRT-PCR). HCT116 cells were transiently transfected with miR-9 mimic, miR-9 inhibitor, or si-ANO1. Cell proliferation was determined by MTT and flow cytometric analysis, while cell migration and invasion were assessed by transwell migration and invasion assays in HCT116 cells. ANO1 was validated as a target of miR-9 using luciferase reporter assay and bioinformatics algorithms.

Results: We found that ANO1 expression was upregulated in CRC tissues compared with adjacent normal tissues. ANO1 expression was associated with advanced tumor stage and lymph node metastasis, and there was an inverse relationship between miR-9 and ANO1 mRNA expression in CRC specimens. ANO1 is a direct target of miR-9, and miR-9 overexpression suppressed both mRNA and protein expressions of ANO1 and inhibited cell proliferation, migration, and invasion of HCT116 cells. We also showed that overexpression of miR-9 suppressed expression of p-AKT, cyclin D1, and p-ERK in HCT116 cells.

Conclusion: We conclude that miR-9 inhibits CRC cell proliferation, migration, and invasion by directly targeting ANO1, and miR-9/ANO1 could be a potential therapeutic target for CRC.

Keywords: miR-9, ANO1, EMT

EE-0249 (PE-0486) miR-124 and miR-154 inhibit colorectal cancer cell proliferation, migration, and invasion by suppressing TRAF6

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Background and Aim: Metastasis is a critical modulator for the high mortality and poor prognosis of colorectal cancer (CRC). MicroRNAs (miRNAs) are significant regulators of metastasis that act by modulating their target genes. In this study, we aimed to investigate the expression and the potential mechanisms of miR-124 and miR-154 in CRC.

Methods: Quantitative real-time polymerase chain reaction (qRT-PCR) was used to determine miR-124, miR-154, and TRAF6 expressions in both CRC cancer cell lines and human CRC tissues. The mechanistic functions of miR-124 and miR-154 were tested by proliferation, transwell migration and invasion, and flow cytometry assay in vitro. Predicted miR-124 and miR-154 target gene, TRAF6, was tested by dual-luciferase activity assay, qRT-PCR, and western blot analysis.

Results: We found that TRAF6 significantly was upregulated in CRC tissues and cell lines. The expression of TRAF6 was positively correlated with clinical advanced stage and lymph node metastasis. Moreover, a luciferase assay revealed that miR-124 and miR-154 directly targeted 3'-UTR TRAF6. Overexpression of miR-124 or miR-154 inhibited CRC cell proliferation, migration, and invasion abilities. Whereas overexpression of anti-miR-124 or anti-miR-154 inversely regulated its suppressive effects compared with control group. Furthermore, miR-124 or miR-154 suppressed not only expression of TRAF6 mRNA and protein but also p-AKT, cyclin D1, and p-p65 expressions in CRC cells. In clinical specimens, miR-124 or miR-154 was significantly downregulated in CRC tissues and negatively correlated with TRAF6 mRNA expression, respectively.

Conclusion: These results suggest that miR-124 and miR-154 function as a tumor-suppressor in CRC and that their suppressive effects mediate proliferation, migration, and invasion. Our results suggest that miR-124 and 154 might be an important target for the treatment of CRC proliferation, migration, and metastasis.

Keywords: miR-124, miR-154, TRAF6, colon cancer
EE-0257 (PE-0487) KB-34, a new chalcone derivative, inhibits metastatic potential of colorectal cancer cells through upregulation of heme oxygenase-1

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**Background and Aim:** Chalcone (1,3-diphenyl-2-propen-1-one) derivatives have anti-cancer activity by targeting key molecules that can lead to carcinogenesis. We synthesized the chalcone derivative 3-phenyl-1-(2,4,6-tris (methoxymethoxy)phenyl)prop-2-yn-1-one (KB-34) and previously reported its anti-inflammatory activity in macrophage. In this study, we examined the anti-metastatic activity of KB-34 against human colorectal cancer (CRC) and elucidated its underlying molecular mechanisms in HT-29 human CRC cells. **Methods:** Anti-metastatic activity of KB-34 was assessed by wound migration, Matrigel transwell invasion, and MTT assays. Semi-quantitative RT-PCR and western blotting were used to measure mRNA and protein levels, respectively. siRNA transfection was used to study molecular mechanisms of action. **Results:** KB-34 treatment significantly inhibited 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced migration and invasion of HT-29 cells. TPA-induced cell proliferation and activation of NF-κB were also markedly suppressed by KB-34. We also demonstrated that KB-34 induced heme oxygenase-1 (HO-1) expression, which is required for KB-34-mediated suppression of the expression of matrix metalloproteinase-7 (MMP-7) at both the mRNA and protein levels in TPA-stimulated HT-29 cells. Additionally, the cyclin-dependent kinase inhibitor p21 was significantly induced by treatment of KB-34. Knockdown of HO-1 abolished the induction of p21 expression by KB-34. Furthermore, we also demonstrated that 5-fluorouracil (5-FU) together with KB-34 produced a significantly greater inhibition of growth and stimulation of apoptosis of HT-29 cells in comparison with 5-FU alone. **Conclusion:** KB-34 inhibits the TPA-stimulated metastatic potential of HT-29 cells by induction of HO-1 and may be a promising anti-cancer agent in chemotherapy-apeutic strategies for CRC.

**Keywords:** KB-34, chalcone, colorectal cancer, heme oxygenase-1

EE-0283 (PE-0488) The protective effect of necrosis inhibition on acute colitis induced by dextran sulfate sodium

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**Background and Aim:** Inflammatory bowel diseases (IBD) were characterized by uncontrolled chronic inflammation, which lead to cell death and organ damage. Although necrosis is thought to be a main cell death mechanism of IBD, few attempts have been made to reduce necrosis in IBD. The aim of this study investigated the effect of necrosis inhibition using a novel necrosis inhibitor (NI, NecroX-7) in acute murine colitis model and in vitro study. **Methods:** Cleaved PARP-1 fragment band was analyzed using western blot assay in intestinal epithelial cell line (IEC-18, rat) in order to confirm the necrosis inhibition effect of NI, and acute dextran-sodium sulfate (DSS) induced colitis was generated in C57BL/6 mice. NI (30 mg/kg) was administered once a day via oral gavage for 8 days from the day before DSS administration. The severity of colitis was assessed by weight, colon length, and histologic score, and HMGB1 immunohistochemistry was performed on harvested intestine for evaluating necrotic cell death qualitatively. The inflammatory cytokines mRNA expressions were measured by quantitative RT-PCR. **Results:** The expression of cleaved PARP-1 (55kDa, necrosis marker) was reduced in the NI group, compared to the control group, whereas the cleaved PARP-1 fragment (89 kDa, apoptosis marker) was not different between groups. In vivo study, NI treatment significantly reduced colitis represented by colon length (DSS + NI group 68.0 ± 4.7 mm vs DSS group 62.6 ± 3.8 mm, P value = 0.011) and histologic score (DSS + NI group 11.4 ± 1.6 vs DSS group 7.9 ± 1.3, P value = 0.043). HMGB-1 expression was also significantly reduced in NI group. In addition, the expression of inflammatory cytokines was reduced in NI group, especially interleukin-1 beta was significantly lower (P value = 0.011). **Conclusion:** A necrosis inhibition effectively reduced DSS-induced colitis and inflammatory cytokines. Necrosis inhibition might be a new approach to treat inflammatory bowel disease.

**Keywords:** necrosis, colitis
**EP-0136 (PE-0489) The effect of DA-9701 on motility in isolated, vascularly perfused rat colon**

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**Background and Aim:** DA-9701 is a recently developed drug made from the vegetal extracts of Pharbitidis semen and Corydalis tuber. The aim of this study was to investigate the effect of DA-9701 on the isolated rat colon and to clarify whether the action of DA-9701 on colonic motility is mediated via the influence of autonomic nervous system. **Methods:** Effect of DA-9701 on colonic motility was studied in totally isolated rat colon vasculary perfused with Krebs solution containing 0.1% BSA and 3% dextran at 1.2 mL/min via SMA. Luminal pressure was monitored via microtip catheter pressure transducers from proximal and distal colon. After control, DA-9701 was administered at 0.03, 0.1, 0.3, 1 mg/kg in a stepwise increase fashion. Motility index was calculated for the last 5 min of each 15-min period and expressed as %change over basal level. **Results:** Both in the proximal and distal colons, motility indexes in response to 4 different doses of DA-9701 were 36.3 ± 9.9% and 47.8 ± 15.3%; 35.2 ± 21.1% and 22.5 ± 16.0%; 17.9 ± 10.0% and 67.5 ± 33.3%; 55.1 ± 27.9% and 151.8 ± 53.7%, respectively. The stimulating effect of DA-9701 was almost completely abolished by atropine and propranolol, respectively. But DA-9701 was not inhibited by hexamethonium, phentolamine, and tetrodotoxin. **Conclusion:** DA-9701 increased colonic motility in rats. The stimulatory action of DA-9701 requires local cholinergic input via muscarinic receptor or local adrenergic input via β-receptor rather than by tetrodotoxin sensitive nerve conduction. **Keywords:** DA-9701, colonic motility

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**EP-0164 (PE-0490) The relation of sphingolipid in the change of intestinal barrier as aging and irritable bowel syndrome: Preliminary study**

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**Background and Aim:** A loss of gut barrier integrity can lead to increased intestinal permeability causing leaky disease such as irritable bowel syndrome (IBS). However, disruption of the intestinal barrier associated with aging is uncertain. The overall goal of the current study was to investigate the role of aging on colonic permeability and the relation between the change of sphingolipid which was known to be related with epithelial permeability and gut tight junction. **Methods:** Colonic mucosal biopsies were acquired from old (≥ 65 years old) and young (20–40 years old) human, old IBS patients and young IBS patients (each group n = 8). The change of inflammation (TNF-α, IL-1β, and IL-10) and tight junction (claudin2, occluding, and ZO-1) was measured by real-time PCR. Sphingolipid was measured by using a UPLC system. **Results:** The statistical difference was shown in IL-10 and claudin2 mRNA between old and young control group (P < 0.05). The IL-1β, IL-10, occludin, and ZO-1 mRNA shown significant difference between young control and young IBS groups (P < 0.05). The IL-1β, IL-10, claudin2, occludin, and ZO-1 mRNA shown significant difference between old control and old IBS groups (P < 0.05) (Fig. 1). Acid sphingomyelinase (ASM) was significantly increased in colonic mucosa as aging and patients with IBS (P < 0.05). **Conclusion:** Overall, the data presented here show that increased ASM activity in aging and IBS patients might be related with the disruption of intestinal barrier. Further studies are needed to clarify the relation between sphingolipid and gut tight junction. **Keywords:** aging, tight junction, colon

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**Figure 1** Relative transcript level of Inflammatory cytokine-related genes and Epithelial gut tight junction-related genes according to age in two tissue groups. Transcript levels were normalized to GAPDH. Bars represent the mean ± SE, n=7 YC, young control; OC, old control; YID, Young irritable bowel syndrome patient; OID, old irritable bowel syndrome patient.
OE-0525 (PE-0491) Regulation of cancer stem cell population by SOX2 through miR29a, HDAC4 pathway in colorectal cancer

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Background and Aim: SOX2 has a key role in the maintenance of pluripotent and stem cells, and high SOX2 expression is associated with a poor prognosis of colorectal cancer (CRC). We investigated the role of SOX2 on cancer stem cell (CSC) of CRC, using CRC cell lines SW480 and SW620. In addition, we examined microRNA29a (miR29a) that reduces histone deacetylase 4 (HDAC4) and SOX2 expression level and regulates cancer stem cells.

Methods: mRNA expression and CSC markers were compared between SW480 and SW620, using mRNA microarray and real-time PCR, respectively. In these cell lines, overexpression and knockdown of SOX2 were done using transfection of GFP-SOX2, pcDNA-SOX2 and shSOX2, and SOX2 RNAi, and we used miR29a mimic and inhibitor. After overexpression or knockdown, beta-catenin and mTOR pathway were examined by western blot, and CSC markers were evaluated with real-time PCR and flow cytometry analysis.

Results: SOX2 expression of SW620 was significantly higher than SW480. These cell lines showed different expressions of CSC markers, including Lgr5, CD133, CD44, CD166, SOX2, BMI1, EphB2, CD24, and DCLK1. Overexpression and knockdown of SOX2 induced the change of beta-catenin and mTOR signal in different ways between SW480 and SW620 cells. In addition, overexpression of SOX2 increased dormant CSC markers, and SOX2 knockdown led to increased active CSC markers. miR29a inhibited HDAC4 and confirmed that SOX2 was degraded by acetylation of SOX2.

Conclusion: SOX2 through miR29a, HDAC4 pathway have important role in regulation of CSC of CRC, especially between dormant and active CSC.

Keywords: cancer stem cell, colorectal cancer, cancer stem cell, SOX2, HDAC4
OE-0665 (PE-0493) Electrical stimulation via chronically implanted electrodes at acupoints improves TNBS-induced colonic inflammation via autonomic mechanism in rats

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Background and Aim: The purpose of this study was to determine possible effects and mechanisms of electroacupuncture (EA) via chronically implanted electrodes at acupoints on TNBS-induced colonic inflammation.

Methods: Colitis in rats was induced by intrarectal administration of 2,4,6-trinitrobenzenesulfonic acid (TNBS). The rats were treated with sham-EA, EA1 (EA using parameters of 25 Hz, 2 s on, 3 s off, 0.5 ms, 4.0 mA) or EA2 (EA using parameters of 5 Hz, 10 s on, 90 s off, 0.5 ms, 4.0 mA) for 3 weeks. A control group (received rectal injection of saline) was also followed for 3 weeks. Disease activity index (DAI), macroscopic and microscopic lesions, plasma levels of inflammatory cytokines (TNF-α, IL-1β, and IL-6), and myeloperoxidase (MPO) activity of colonic tissues were assessed. The autonomic function was assessed by the spectral analysis of the heart rate variability (HRV) derived from the electrocardiogram.

Results: (i) The vagal activity was significantly increased with acute EA1 and EA2 both during and after 30-min EA; (ii) DAI in the TNBS-treated rats was significantly decreased by EA1 and EA2 compared to the sham-EA group (P < 0.05 and P < 0.01, respectively), and EA2 was more effective than EA1 (P < 0.05); (iii) the macroscopic score was 6.43 ± 0.61 in the sham-EA group and reduced to 4.86 ± 0.14 with EA1 (P < 0.05) and 4.0 ± 0.22 with EA2 (P < 0.001); EA2 was more effective than EA1 (P = 0.017). The similar result was found in the histological score. (iv) The plasma levels of TNF-α, IL-1β, and IL-6 were all significantly decreased with EA1 and EA2 compared to the sham-EA group; (v) autonomically, both chronic EA1 and EA2 significantly increased vagal activity and decreased sympathetic activity in comparison with sham-EA group.

Conclusion: Chronic EA using chronically implanted electrodes improves colonic inflammation in TNBS-treated rats by inhibiting pro-inflammatory cytokines via the autonomic mechanism.

Keywords: inflammatory bowel disease, electrical acupuncture, inflammatory cytokines

OE-0670 (PE-0494) High-fat diet induced-gut microbiota dysbiosis accelerates intestinal adenoma–adenocarcinoma sequence via activation of MCP-1/CCR2 axis

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Background and Aim: High-fat diet (HFD) is one of the important risk factors for colorectal cancer (CRC). Dysbiosis is associated with intestinal carcinogenesis, and little is known about the crosstalk between HFD and gut microbiota in intestinal carcinogenesis. We investigated the effects of HFD on the composition of gut microbiota and tumor development.

Methods: Four-week-old Apcmin−/− mice were randomly divided into two groups: HFD group (60% fat content) and control group (regular diet). Fecal pellets and cecal contents were collected for microbiota 16S rRNA sequencing and short-chain fatty acids (SCFAs) analysis. A cocktail of antibiotics was administered with HFD for microbiota depletion to investigate the effect of crosstalk between the HFD and the gut microbiota. Parameters of intestinal tumor development, cell proliferation, cell apoptosis, inflammation, and monocyte chemoattractant protein-1 (MCP-1)/chemokine receptor 2 (CCR2) signaling axis were also determined. Intestinal tumor associated macrophages (TAMs) were measured by immunofluorescence double staining. Fecal microbiota transplantation (FMT) was used in another batch of Apcmin−/− mice to determine the causality between HFD-induced dysbiosis and carcinogenesis. In addition, according to the colonoscopy data, we evaluated the effect of HFD on intestinal tumor development and examined the expression levels of MCP-1, CCR2, and M2 TAMs in tumor tissue.

Results: Administration of HFD increased the number and malignancy of intestinal tumors in Apcmin−/− mice, while these effects can be inhibited by antibiotics cocktail. Promotion of intestinal tumor formation was accompanied by increased tumor cell proliferation and decreased apoptosis. Moreover, HFD administration altered and simplified the composition of gut microbiota, with increased opportunistic pathogens and decreased SCFAs producing bacteria. Concomitantly, SCFAs concentrations in cecal contents of HFD group were decreased comparing with control group. The alteration of gut microbiota was correlated with activation of MCP-1/CCR2 axis that recruit and polarize M2 TAMs. Interestingly, the transfer of fecal microbiota from HFD-fed mice also increased the tumor multiplicity, activated the MCP-1/CCR2 signaling axis, and promoted carcinogenesis. By analyzing clinical data, we also found that HFD was closely related to advanced colorectal neoplasia. Immunohistochemistry results showed that the expression levels of MCP-1, CCR2, and M2 TAMs polarization in tumor tissues of HFD patients were significantly higher than those in regular diet.

Conclusion: HFD-induced gut microbiota dysbiosis could activate MCP-1/CCR2 axis, accordingly recruiting and polarizing M2 TAMs to accelerate intestinal adenoma–adenocarcinoma sequence.

Keywords: high-fat diet, gut microbiota, Apcmin−/− mice, intestinal carcinogenesis, MCP-1/CCR2 axis
OE-0719 (PE-0495) Microbial changes and host response in F344 rat colon depending on sex and age following a high-fat diet
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Background and Aim: The aim of this study is to investigate microbial changes and host response in colon occurring in rats of different sex and age following a high-fat diet (HFD), in 6-week-old (young age) and 2-year-old (old age) Fisher-344 rats of either sex. Methods: After feeding rats (n = 4–6 per group) with HFD for 8 weeks, fecal microbiome was analyzed with 16S rRNA metagenome sequencing. We performed hematoxylin and eosin (H&E) staining, immunohistochemistry (IHC) for Ki67, and ELISA or western blot (for myeloperoxidase, COX2, caspase-1, and cyclin D1) to evaluate the fat proportion in colon muscle layers and the levels of inflammation and cell proliferation in colon mucosa. Correlations between microbial factors and the Ki67 index were analyzed with statistical methods. Results: The HFD induced a decreased species richness of microbiota (Chao1) and increased Firmicutes/Bacteroidetes ratio only in aged rats, not in young rats. Sex differences in the alteration by HFD were observed in the microbiome of aged rats, for example, A. muciniphila and Desulfovibrio spp. Histological inflammation and cell proliferation of colon mucosa (Ki67) were significantly increased by HFD even in young rats, with more severity of cell proliferation in aged males. The HFD-induced decrease of species richness and the increase of some species (Desulfovibrio spp. and Clostridium lavalense), which produce carcinogenic compounds, was significantly correlated with Ki67 index. In colon mucosa, the concentration of myeloperoxidase increased by HFD only in young males, not in females. Conclusion: In conclusion, the results suggest a link between HFD-induced gut dysbiosis (particularly the low species richness and high abundance ratios of Desulfovibrio spp. and C. lavalense) and cell proliferation of colon mucosa (indicated by Ki67 IHC). Sex differences influence on the response of gut microbiome to HFD particularly in old age, and this might be linked to the sex differences of inflammation in the colon mucosa.
Keywords: aging, high-fat diet, gut microbiota, rats, Ki67

 OE-0753 (PE-0496) Deoxycholic acid disrupts intestinal mucosal barrier and promotes intestinal carcinogenesis
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Background and Aim: High-fat diet, which leads to an increased level of intestinal deoxycholic acid (DCA), is a major environmental factor in the development of colorectal cancer (CRC). High-fat diet can destroy the intestinal mucosal barrier. However, evidence relating to bile acids, mucosal barrier, and intestinal tumorigenesis is limited. Methods: The barrier function and expression of inflammatory cytokines of DCA in colorectal tumor cells (Caco-2 and IMCE cells) were examined by TEER values and real-time PCR. Apc\textsuperscript{min/+} mice were distributed into two groups: control group and DCA group received 0.2% DCA in drinking water. After 12 weeks, mice were sacrificed for the pathological evaluation. FITC-D was used to detect intestinal permeability. The intestinal barrier function was identified by real-time PCR, immunohistochemistry, and immunofluorescence. Results: DCA disrupted cell monolayer integrity and promoted the pro-inflammatory cytokines production in Caco-2 and IMCE cells. DCA administration increased the number and size of intestinal adenomas and promoted adenoma–adenocarcinoma sequence in Apc\textsuperscript{min/+} mice. DCA induced the activation of NLRP3 inflammasomes, increased the production of inflammatory cytokines and led to intestinal low grade inflammation. A reduction of tight junction protein zonula occludens 1 (ZO-1) and the number of intestinal cells including goblet and Paneth cells were also observed after DCA treatment. Moreover, DCA significantly reduced the level of secretory immunoglobulin A and promoted the polarization of M2 macrophages in the intestine of Apc\textsuperscript{min/+} mice. Conclusion: DCA induced intestinal low grade inflammation and disrupted the intestinal mucosal barrier, aggravating the intestinal tumorigenesis. Keywords: deoxycholic acid, intestinal mucosal barrier, inflammation, intestinal tumorigenesis
OE-0834 (PE-0497) Lactobacillus rhamnosus GG supernatant promotes defecation function by 5-HT4R in mice colon
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Background and Aim: Lactobacillus rhamnosus GG (LGG) plays a more and more important significant role in the treatment of constipation. However, the exact mechanism remains unclear. 5-Hydroxytryptamine 4 receptor (5-HT4R) is a critical receptor that related to the motility of intestine; activation of 5-HT4R could cause the release of mucin in goblet cells; in this study, we aimed to find whether LGG could modulate the defecation function in mice colon and the possible mechanism. Methods: Male C57BL/6 adult mice were randomly divided into 3 groups: MRS group (n = 10), tegasromide group (n = 15), and LGG group (n = 15). Gavage of MRS broth, distilled water solution of tegasromide, and LGG supernatant was respectively given to these 3 groups of mice for 7 days. Defecation parameters including number of pellets in 2 h, fecal weight, fecal dry weight, fecal water content, and gastrointestinal transit time (GITT) were detected. PAS staining was used to evaluate goblet cells number in mice colon. The mRNA and protein levels of 5-HT4R and mucin 2 (MUC2) were detected by real-time PCR and western blotting. Results: Weight and general situation of all mice have no significant difference. The number of defecation pellets in 2 h, fecal weight, fecal dry weight, fecal water content, and gastrointestinal transit time in the tegasromide group and LGG group are increased compared with MRS group. The mRNA and protein levels of 5-HT4R and MUC2 were increased in tegasromide group and LGG group compared with MRS group. Conclusion: LGG supernatant can upregulate 5-HT4R expression and MUC2 production and promote defecation function in mice. This study indicates that goblet cells can become a promising target in improving colon function and provide new window for prevention and treatment for constipation.
Keywords: LGG, 5-HT4R, defecation function

OE-0927 (PE-0498) Role of cytokeratin 8 on the changes of intestinal epithelial permeability induced by corticotropin releasing factor
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Background and Aim: To investigate the role of cytokeratin 8 (CK8) on the change of intercellular permeability of intestinal epithelial cells induced by corticotropin releasing factor (CRF). Methods: The expression levels of CRFR1 and CRFR2 on the HT29 cell surface were determined by immunofluorescence. After treatment with 100-nM CRF for 72 h, the translocation of FITC-labelled dextran was measured in a transwell chamber; the structural changes of tight junctions were observed under transmission electron microscopy; the expression levels of CK8 and tight junction proteins ZO-1 and occludin were detected by immunoblotting. The activity of PKC kinase was detected by ELISA. Furthermore, the effects of CRF on intestinal epithelial permeability were examined in CK8-silenced HT29 cells, which were constructed by shRNA interference. Results: CRF treatment increased FITC-labelled dextran permeability (P < 0.05), caused the opening of tight junctions, and induced increased fluorescence intensity of CK8. The expression levels of occludin and ZO-1 were downregulated (all P < 0.05). PKC kinase activity decreased at 1 h after CRF treatment (P < 0.05). CRF-induced increased permeability and downregulation of occludin were not blocked by CK8 silencing (all P > 0.05). Nevertheless, CK8 silencing blocked the effects of CRF regarding the decrease in the expression levels of ZO-1 and increase in PKC kinase activity (all P < 0.05). Conclusion: CK8 may increase of intestinal epithelial permeability induced by CR, inhibiting the activity of PKC kinase, and there may be other signaling pathways involved.
Keywords: intestinal epithelial permeability, cytokeratin 8, corticotropin-releasing factor, tight junction protein, PKC
OE-0163 (PE-0500)  
Withdrawn

OE-0305 (PE-0501)  
Withdrawn
EE-0007 (PE-0505) Nerolidol attenuates oxidative stress and inflammation in colonic mucosa of acetic acid-induced colitis in rat
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Background and Aim: Nerolidol, a naturally occurring sesquiterpene is predominantly synthesized in plants and responsible for the host defense as well as providing aroma. In many experimental studies, it has been shown to confer beneficial effects by mitigating oxidative stress and inflammation. Therefore, in the present study, we evaluated the effect of nerolidol in acetic acid-induced rat model of colitis Methods: Nerolidol (50 mg/kg/day) was administered for either 3 days before or 30 min after IBD for 7 days. The body weight, macroscopic, and microscopic analysis of the colon of nerolidol-treated IBD rats and that of control rats were performed on days 0, 2, 4, and 7. Results: Nerolidol was found to significantly improve IBD-induced reduction in mean body weight and mean macroscopic and microscopic ulcer scores. Nerolidol also reduced the MPO activity, a marker of inflammation mediating neutrophil adhesion and levels of MDA, a marker of lipid peroxidation concomitant to improved GSH activity. Furthermore, the levels of malondialdehyde and levels of pro-inflammatory cytokines such as IL-1, IL-6, IL-23, and TNF-α were also reduced significantly (P < 0.05) by nerolidol. Conclusion: The findings demonstrate that nerolidol improved mean macroscopic and microscopic ulcer scores, inhibited inflammation and oxidative stress, and mitigated the reduction in body weight in the IBD rats. Given the safety and efficacy of nerolidol, it could be a promising agent of natural origin in prevention and treatment of colitis. However, further studies are required to translate these findings clinically.

Keywords: nerolidol, inflammation, oxidative stress, acetic acid, colitis

EE-0069 (PE-0506) Characteristics of acute severe lower gastrointestinal bleeding in patients with Crohn’s disease
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Background and Aim: Acute severe lower gastrointestinal bleeding (LGIB) is a rare complication in Crohn’s disease, which is a therapeutic challenge due to variety of clinical manifestations and extents of disease. We aimed to compare the characteristics of the first bleeding and re-bleeding episodes in patients with Crohn’s disease. Methods: Between January 2012 and November 2015, 30 patients of severe LGIB of Crohn’s disease were retrospectively investigated. Acute LGIB was defined as acute massive rectal bleeding requiring 2 packs of blood transfusion within at least 24 h or a sudden decrease in hemoglobin level below 9 g/dL. Results: Mean age at the time of bleeding was 38.4 ± 10.9 years. Mean duration from diagnosis of Crohn’s disease to the first bleeding episode was 66.9 ± 63.7 months. Mean serum levels of hemoglobin and C-reactive protein were 8.6 ± 1.8 g/dL and 7.1 ± 7.9 mg/dL, respectively, and 19 (63.3%) patients had moderate-to-severe Crohn’s disease. The bleeding focus was identified in 56.7% of patients, by colonoscopy (46.7%). The bleeding lesion was an ulcer in 81.3% of the cases and left colon in 56.2%. The treatment of acute severe LGIB accounted for 50% of the medical treatments using systemic corticosteroids. The maintenance treatment were 16 (53.4%) using azathioprine and 4 (13.3%) using infliximab, respectively. In moderate-to-severe Crohn’s disease, re-bleeding episodes occurred more frequently than first bleeding episode but not statistically significant (P = 0.082). However, utilization of the total parenteral nutrition was statistically significantly higher in the re-bleeding episode group than in the first bleeding group (45.0% vs 90.0%, P = 0.048). Conclusion: Acute severe LGIB in Crohn’s disease is usually considered to be a conservative treatment with systemic corticosteroids, azathioprine, and infliximab. However, operative treatment may be needed for poorly controlled bleeding, and further studies including prevalence and re-bleeding risk factors are needed.

Keywords: Crohn’s disease, lower gastrointestinal bleeding, infliximab, conservative treatment
**EE-0083 (PE-0507) Correlation of serum procalcitonin for diagnosis of cytomegalovirus reactivation in exacerbation of ulcerative colitis patients**

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**Background and Aim:** Serum procalcitonin (PCT) is an excellent marker of infectious conditions. We evaluated serum PCT as diagnostic marker for cytomegalovirus (CMV) reactivation in exacerbation of ulcerative colitis patients.

**Methods:** We retrospectively analyzed clinical data from 47 patients with exacerbation in UC for whom serum procalcitonin and CMV study were measured between January 2017 and December 2017. Diagnosis of CMV reactivation was either CMV IgM, CMV antigenemia, blood CMV PCR, tissue CMV PCR, or CMV immunohistochemical stain, which were positive. Other infectious conditions were excluded.

**Results:**
Positive CMV reactivation among them were observed in 28 patients (59.6%). There was no difference in sex, steroid, immunomodulator, anti-TNF agents, and disease extension between the two groups. The mean serum PCT levels in positive CMV reactivation and negative CMV reactivation were 0.127 ± 0.29 mg/mL and 1.510 ± 3.53 ng/mL, respectively ($P = 0.10$). Also, there was no difference in the white blood cell, neutrophil, lymphocyte, hemoglobin, platelet, ESR, CRP, albumin, and fecal calprotectin between the two groups.

**Conclusion:** Serum PCT was not correlated with CMV reactivation in exacerbation of ulcerative colitis patients.

**Keywords:** procalcitonin, cytomegalovirus, ulcerative colitis

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**Table 1** Clinical difference between Patients with CMV and without CMV.

|                      | CMV (-) (n = 19) | CMV (+) (n = 28) | P     |
|----------------------|------------------|------------------|-------|
| Procalcitonin (SD)   | 1.510 (3.53)     | 0.127 (0.29)     | 0.10  |
| ESR (SD)             | 28.90 (18.28)    | 35.11 (24.77)    | 0.33  |
| Sex, male, n (%)     | 11 (57.9%)       | 16 (57.1%)       | 0.95  |
| Hemoglobin (SD)      | 12.39 (2.60)     | 11.95 (2.02)     | 0.51  |
| WBC (SD)             | 9049 (4338)      | 12978 (22227)    | 0.45  |
| Neutrophil (SD)      | 6335 (4033)      | 6156 (3217)      | 0.86  |
| Platelet (SD)        | 339 (141)        | 354 (114)        | 0.69  |
| Lymphocyte (SD)      | 1817 (781)       | 2158 (1241)      | 0.26  |
| CRP (SD)             | 4.54 (5.94)      | 2.92 (6.07)      | 0.32  |
| Albumin (SD)         | 3.90 (0.72)      | 3.56 (0.83)      | 0.16  |
| Calprotectin (SD)    | 719 (661)        | 1400 (1066)      | 0.08  |
| Steroid, n (%)       |                  |                  | 0.54  |
| (-)                  | 8 (42.1%)        | 9 (33.3%)        |       |
| (+)                  | 11 (57.7%)       | 18 (66.7%)       |       |
| Azathioprine, n (%)  |                  |                  | 0.44  |
| (-)                  | 14 (73.7%)       | 17 (63.0%)       |       |
| (+)                  | 5 (26.3%)        | 10 (37.0%)       |       |
| Anti-TNF, n (%)      |                  |                  | 0.12  |
| (-)                  | 17 (89.5%)       | 19 (70.4%)       |       |
| (+)                  | 2 (10.5%)        | 8 (29.6%)        |       |
| Disease Extent       |                  |                  | 0.38  |
| E2                   | 9 (47.4%)        | 9 (34.6%)        |       |
| E3                   | 10 (52.6%)       | 17 (65.4%)       |       |

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**EE-0092 (PE-0508) Fecal calprotectin and fecal immunochemical test have different associations with endoscopic activity in ulcerative colitis**

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**Background and Aim:** Fecal calprotectin (Fcal) and fecal immunochemical test (FIT) are known to be a useful predictor in endoscopic activity evaluation in ulcerative colitis (UC) patients. The aim of this study is to confirm the correlation between endoscopic activity and the two tests and to evaluate the difference between the two tests.

**Methods:** A total of 174 results, obtained in simultaneous examination with endoscopy and two tests, were retrospectively evaluated for 127 patients with UC. The efficacy of two tests for endoscopic activity evaluation was compared. Endoscopic activity were assessed using Ulcerative Colitis Endoscopic Index of Severity (UCEIS) or Mayo Endoscopic Subscore (MES).

**Results:** Both Fcal and FIT results were significantly correlated with MES and UCEIS ($P < 0.001$ and $P < 0.001$). But Fcal showed a more accurate statistical correlation than FIT in both MES ($r = 0.678$ versus $0.635$) and UCEIS ($r = 0.711$ versus 0.657). In the complete mucosal healing state, the sensitivity of FIT was more higher than that of Fcal (sensitivity to MES 0 versus Fcal 70%, sensitivity to UCEIS 0 or 1 versus Fcal 80%).

**Conclusion:** Both Fcal and FIT were well correlated with endoscopic activity in UC patients, but Fcal was more correlated with endoscopic activity. FIT was more sensitive to predict complete mucosal healing, but the specificity of Fcal was higher than that of FIT.

**Keywords:** ulcerative colitis, endoscopic activity, fecal calprotectin, fecal immunochemical test
Figure 1

- Spearman's rank correlation coefficient = 0.678, p < 0.001
  - Mayo endoscopic subscore

- Spearman's rank correlation coefficient = 0.635, p < 0.001
  - Mayo endoscopic subscore

- Spearman's rank correlation coefficient = 0.711, p < 0.001
  - Ulcerative colitis endoscopic index of severity

- Spearman's rank correlation coefficient = 0.657, p < 0.001
  - Ulcerative colitis endoscopic index of severity
**EE-0097 (PE-0509) Factors associated with positive fecal calprotectin in ulcerative colitis patients with mucosal healing**

**Authors:** DAE GON RYU; HYUNG WOOK KIM; SU BUM PARK; DAE HWAN KANG; CHEOL WOONG CHOI; SU JIN KIM; HYEONG SEOK NAM; BYUNG JIN KWON; KANG HOON LEE

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**Background and Aim:** Negative fecal calprotectin (Fcal) is known to be associated with complete mucosal healing in ulcerative colitis (UC). The aim of this study is to investigate the factors associated with positive Fcal in UC patients with complete mucosal healing (cMH) and clinical course in these patients.

**Methods:** A total of 51 UC patients with cMH confirmed by endoscopy (Mayo Endoscopic Subscore 0) were retrospectively. Fcal was examined on the day of endoscopy, and other tests (fecal immunochemical test; FIT, WBC, hemoglobin, CRP, ESR, and albumin) were evaluated.

**Results:** The cut-off value for Fcal in this study was set at 170 ug/g based on the result of a receiver operating characteristics curve analysis (area under curve, 0.863; sensitivity, 0.748; specificity, 0.804) to predict cMH. Among the 51 patients, 11 patients (29.4%) with cMH were positive Fcal. In univariate analysis, factors associated with positive Fcal in UC patients with cMH were old age ≥ 50 (OR 4.444, \(P = 0.047\)), anemia (OR 10.278, \(P = 0.006\)), elevated ESR (OR 9.917, \(P = 0.003\)), and positive FIT (OR 48.60, \(P = 0.012\)). In multivariate analysis, only elevated ESR (OR 5.250, \(P = 0.011\)) was significantly related with positive Fcal in UC patients with cMH. Among these patients, only one patient had worsening clinical course 3 months later.

**Conclusion:** Positive Fcal in UC patients with cMH was significantly associated with elevated ESR, and most of them had good clinical course.

**Keywords:** ulcerative colitis, fecal calprotectin, mucosal healing

| Table 1 | Factors associated with positive fecal calprotectin in mucosal healing state |
|---------|--------------------------------------------------------------------------------|
| Variables | Univariate analysis | Multivariate analysis |
| Age ≥ 50 | 4.444 | 1.031-10.393 | 2.247 | 0.234-15.996 | 0.037 |
| Gender Male | 0.403 | 0.208-1.401 | 0.523 | 0.017-6.111 | 0.453 |
| Extent Rectum | 0.090 | 0.129-0.397 | 0.199 | 0.036-1.089 | 0.052 |
| Right sided colon | 2.163 | 6.440-10.255 | 2.482 | 0.219-26.988 | 0.047 |
| WBC > 11,000 | 1.900 | 0.236-7393 | 2.064 | 0.095-118.48 | 0.079 |
| Anemia | | | | | |
| M < 13.5, F < 13.8 | 10.278 | 1.992-54864 | 6.850 | 0.980-45.138 | 0.052 |
| Albumin < 3.5 | 3.522 | 0.064-187.41 | 0.55 | Not applicable |
| CRP > 0.5 | 0.670 | 0.038-14.668 | 0.003 | Not applicable |
| ESR > 10 | 9.937 | 1.204-44828 | 5.250 | 1.297-21735 | 0.002 |
| FIT positive | 48.60 | 1.386-999.77 | 0.022 | Not applicable |
| SCCAI > 2 | 0.900 | 0.068-18.662 | 0.694 | 0.036-12.336 | 0.793 |
| Medication anti-TNF | 1.233 | 0.115-11.175 | 2.062 | 1.546 | 0.295-41.457 | 0.084 |
| Thiopurine | 0.785 | 0.169-4.000 | 0.539 | 0.062-2712 | 0.009 |

**EE-0105 (PE-0510) Efficacy of combination therapy with methotrexate and anti-TNF agents in inflammatory bowel disease**

**Authors:** JIHYE PARK; JAE HEE CHEON; JAE JUN PARK; YEHYUN PARK; SOO JUNG PARK; TAE IL KIM; WON HO KIM

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**Background and Aim:** The use as a combination of methotrexate (MTX) with anti-tumor necrosis factor (TNF)-α agent has been increasing interest. In this study, we assessed the efficacy and tolerability of MTX with anti-TNF-α agents in inflammatory bowel disease (IBD) patients.

**Methods:** We reviewed 70 IBD patients treated with MTX combination regimens at the IBD Clinic of Severance Hospital, Seoul, Korea. We evaluated the efficacy and tolerability of the MTX combination therapy at 3, 6, 12, 18, and 24 months.

**Results:** A total of 49 patients were selected for the induction therapy, and steroid-free clinical remission was achieved in 22 (44.9%) of the 49 patients at 3 months, 19 (47.5%) of the 40 patients at 6 months, 13 (50.0%) of the 26 patients at 12 months, 8 (53.3%) of 15 patients at 18 months, and 4 (44.4%) of the 9 patients at 24 months. Previous anti-TNF-α therapy was associated with a poor outcome of clinical remission at 3 months (odds ratio [OR]: 0.084, 95% confidence interval [CI]: 0.009-0.838). Sixty patients were selected for the maintenance therapy, and 17 (28.3%) patients presented a relapse. Anemia was positively related to relapse of IBD (hazard ratio [HR]: 3.847, 95% CI: 1.153-12.829).

Factors associated with failure to sustain clinical benefit were obesity (HR: 4.117, 95% CI: 1.380-12.296), concomitant adalimumab therapy compared to infliximab therapy (HR: 3.872, 95% CI: 1.419-10.571), and female sex (HR: 3.271, 95% CI: 1.119-9.561). Nine (12.9%) patients reported nausea, 6 (8.6%) patients had serum aminotransferase elevation, and one (1.4%) patient experienced asymptomatic neutropenia.

**Conclusion:** MTX therapy in combination with anti-TNF was relatively well tolerated.

**Keywords:** methotrexate, tumor necrosis factor, inflammatory bowel disease
EE-0107 (PE-0511) Is there any benefit of fasting prescription in patients with inflammatory bowel diseases?

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Background and Aim: Inflammatory bowel disease (IBD) patients are usually hospitalized due to symptoms of gastrointestinal bleeding or abdominal pain. Many clinicians empirically prescribe fasting prescriptions when IBD patients are admitted. However, recent studies have shown that there is no evidence that maintaining a complete bowel rest improves the course of severe ulcerative colitis (UC). Therefore, we aimed to investigate the effects of fasting prescription in the admitted patients with IBD.

Methods: A total of 222 patients with IBD who were admitted due to disease-related symptoms were retrospectively enrolled between March 2016 and February 2017 at Severance Hospital, Seoul, Korea. We divided into two groups: fasting group that received fasting or sips of water (SOW) prescriptions at the time of admission and dietary group that were prescribed liquid, soft, or general diet.

Results: At the time of admission, 124 patients (55.9%) received fasting prescription, and 98 patients (44.1%) started the diet immediately. Patients hospitalized through the emergency room had significantly higher proportion of fasting prescription (63.7% vs 21.4%; \( P < 0.001 \)), but 96.0% of the patients had dietary changes. Corticosteroid use (33.3 vs 27.7%; \( P < 0.001 \)) was associated with reducing disease activity score on multivariate analysis. Moreover, there is no significant difference between fasting group and dietary group in reducing disease activity unless such a diet is not tolerated.

Conclusion: There is no significant difference between fasting group and dietary group in reducing disease activity in admitted IBD patients. Indiscreet fasting prescription is not helpful at improving the patient’s disease activity. Therefore, diet peroral should not be avoided unless such a diet is not tolerated.

Keywords: fasting diet, IBD patients, disease activity score

EE-0108 (PE-0512) Risk factors and clinical courses of concomitant primary sclerosing cholangitis and ulcerative colitis: A Korean multicenter study

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Background and Aim: Primary sclerosing cholangitis (PSC) is a rare progressive cholestatic liver disease of unknown causes but is strongly associated with inflammatory bowel diseases (IBDs), particularly ulcerative colitis (UC). However, studies comparing risk factors and clinical courses of patients with concomitant UC and PSC with those of patients with PSC alone are lacking. Methods: We retrospectively reviewed patients with PSC diagnosed between 2005 and 2017 in 4 tertiary hospitals in Korea. We compared the risk factors and outcomes of concomitant UC and PSC (UC-PSC) and those of PSC alone. Results: PSC was diagnosed in 50 patients in 4 different tertiary hospitals in Korea. Of them, 18 patients (36.0%) had UC-PSC and 32 patients (64.0%) had PSC alone. The median age at PSC diagnosis was younger in the UC-PSC group than in the PSC alone group (37 vs 54 years; \( P = 0.002 \)). In multivariate analysis, older age at PSC diagnosis (\( P = 0.007 \); hazard ratio [HR], 0.884; 95% confidence interval [CI], 0.808–0.966) and current smoking habit (\( P = 0.033 \); HR, 0.026; 95% CI, 0.001–0.748) were determined to be independent factors for reducing the possibility of developing concomitant UC after PSC. Additionally, UC-PSC was shown to be an independent risk factor for the development of colorectal dysplasia (\( P = 0.044 \); HR, 10.829; 95% CI, 1.065–110.127). Conclusion: Our analysis showed that UC-PSC is more likely to be negatively associated with current smoking and older age at the time of PSC diagnosis. Moreover, UC-PSC increased the risk of colorectal dysplasia.

Keywords: primary sclerosing cholangitis, ulcerative colitis, inflammatory bowel disease, risk factor, outcome assessment
EE-0115 (PE-0513) Lactobacillus acidophilus suppresses intestinal inflammation by inhibiting endoplasmic reticulum stress

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Background and Aim: Nuclear factor kappa B (NF-κB) activation and endoplasmic reticulum (ER) stress signaling play significant roles in the pathogenesis of inflammatory bowel disease (IBD). Thus, we evaluated whether new therapeutic probiotics have anti-colitic effects, and we investigated their mechanisms related to NF-κB and ER-stress pathways.

Methods: Luciferase, nitric oxide (NO), and cytokine assays using HT-29 or RAW264.7 cells were conducted. Mouse colitis was induced using dextran sulfate sodium (DSS) and confirmed by disease activity index and histology. Macrophages and T-cell subsets in isolated peritoneal cavity cells (PCCs) and splenocytes were analyzed by flow cytometry. Gene expression and cytokine profiles were determined using RT-PCR.

Results: Lactobacillus acidophilus (LA1) and Pediococcus pentosaceus inhibited NO production in RAW264.7 cells, but only LA1 inhibited TNF-α and induced IL-10 expression. LA1 increased the lifespan of DSS-treated mice and attenuated the severity of colitis by inducing M2 macrophages in PCCs and Th2 and Treg cells in splenocytes. The restoration of goblet cells in the colon was accompanied by the induction of IL-10 expression and the suppression of pro-inflammatory cytokines. Additionally, we found that LA1 exerts an anti-colitic effect by improving ER stress in HT-29 cells as well as in vivo. Conclusion: We showed that LA1 selectively interferes with ER stress and suppresses NF-κB activation. Our findings suggest that LA1 can be used as a potent immunomodulator in IBD treatment, and the regulation of ER stress may have significant implications in treating IBD.

Keywords: endoplasmic reticulum stress, inflammatory bowel disease, Lactobacillus Acidophilus, nuclear factor kappa B, probiotics

EE-0116 (PE-0514) Lactobacillus plantarum regulates intestinal inflammation by inducing regulatory T cells and interleukin-10

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Background and Aim: Lactobacillus plantarum (LP3) has been identified as a probiotic bacterium owing to its role as an antioxidant and for the maintenance of the intestinal permeability. The ability of LP3 to survive in the human gastrointestinal tract makes it possible to deliver vehicles for therapeutic compounds or proteins in vivo. The aim of this study was to investigate anti-colitic effects of LP3 and its mechanism as new therapeutic probiotics for the treatment of inflammatory bowel diseases (IBD).

Methods: In vivo study was performed using mice with 2.5% (w/v) dextran sodium sulfate (DSS)-induced colitis model. Mice were randomly divided into three groups: control, DSS-treated group, and a group with a DSS treatment followed by the oral administration of LP3 (10⁸ cells). Mice in the third group were gavaged with LP3 daily for 7 days following the administration of DSS for 7 days. All mice were sacrificed at day 14. An analysis of macrophages and T-cell subsets was performed with harvested peritoneal cavity cells (PCCs) and splenocytes using a flow cytometric assay. The gene expression and the cytokine profiles were measured using quantitative reverse transcriptase polymerase chain reaction.

Results: The administration of LP3 effectively increased the lifespan of mice that suffered from the acute colitis and attenuated the disease activity. The increased induction of M2 macrophages in PCCs, type 2 helper T cells, and regulatory T cells (Treg) in splenocytes and the restoration of goblet cells in the colon were accompanied with the induction of IL-10 and suppression of pro-inflammatory cytokines. Conclusion: We showed that LP3 has anti-inflammatory effects with positive regulation of Treg as well as the induction of IL-10 expression. These findings suggest that LP3 can be used as a potent immunomodulator for IBD in the way that it regulates the number of Treg, which has significant implications in IBD.

Keywords: Lactobacillus plantarum, inflammatory bowel diseases, regulatory T cells, IL-10, probiotics
EE-0119 (PE-0515) Impact of smoking behavior on the incidence of ulcerative colitis: A nationwide population-based cohort study in Korea

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Background and Aim: Former smoking is associated with increased risk of ulcerative colitis (UC) while current smoking shows a protective effect on development of UC, compared to nonsmoking. However, the impact of smoking behavior on the occurrence of UC according to the amount and duration of smoking still remains unclear. We aimed to determine the association between smoking behavior and the incidence of UC in a nationwide population-based cohort study. Methods: We conducted a retrospective cohort study using data from the National Health Insurance (NHI) in Korea. From 2009 to 2012, a total of 23,235,771 subjects aged 20 or older who underwent health examination were included and followed until December 2015. Cox regression models were used to estimate the hazard ratio (HR) of UC with a 95% confidence interval (CI). Results: In terms of smoking behavior, nonsmokers, former, and current smokers were 14,384,329 (61.9%), 3,145,670 (13.5%), and 5,705,772 (24.6%), respectively. The risk of UC was significantly lower in current smokers, 2,503 (0.08%) of the former smokers, and 1,828 (0.03%) in current smokers. The incidence rate (per 1,000 person-years) of UC was 33 (0.003%), 42 (0.004%), 54 (0.005%), and 66 (0.007%) cases from highest to lowest HDL-C quartile groups, respectively. The incidence rate ratio of UC compared to the highest HDL-C quartile group was 1.34, 1.69, 2.26, and 2.74, respectively. The risk of UC was not associated with HDL-C or HDL-C VIM. Conclusion: Former smoking was at increased risk of UC, which correlated with the amount and duration of previous smoking. Keywords: claims data, incidence, smoking, ulcerative colitis

EE-0121 (PE-0516) The effect of high-density lipoprotein-cholesterol on development of inflammatory bowel diseases: A nationwide population-based study in Korea

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Background and Aim: High-density lipoprotein-cholesterol (HDL-C) may play a key role in immune responses, but its association with inflammatory bowel diseases (IBD) remains unclear. We conducted a nationwide population-based study to investigate the effect of HDL-C on the development of IBD. Methods: We conducted a retrospective study using claims data from the National Healthcare Insurance service in Korea. All subjects who received medical checkups at least 3 times between 2009 and 2012 were included and followed up until 2015. Serum HDL-C levels were collected, and the variability in HDL-C levels was measured by variability independent of mean (VIM). Patients who developed IBD including Crohn’s disease (CD) and ulcerative colitis (UC) were identified during the follow-up. Results: During the follow-up, CD was newly detected in 32 (0.003%), 42 (0.004%), 54 (0.005%), and 66 (0.007%) cases from highest to lowest HDL-C quartile groups, respectively. The incidence rate ratio of CD (per 100,000 person-years) was 1.34, 1.69, 2.26, and 2.74, respectively. The risk of UC was associated with HDL-C or HDL-C VIM. The lowest HDL-C quartile group showed a 3.30-fold increased risk of CD compared to the highest HDL-C quartile group (95% confidence interval [CI], 2.13–5.18). Considering mean values and variation in HDL-C levels together, a group with the lowest HDL-C and the highest HDL-C VIM showed a 3.00-fold increased risk of CD compared to a group with higher quartile (2nd to 4th) of HDL-C levels and lower quartile (1st to 3rd) of HDL-C VIM (95% CI, 2.02–4.46). Conclusion: Patients with low serum levels and high variation of HDL-C had increased risk of CD but not UC. Keywords: high-density lipoprotein-cholesterol, inflammatory bowel disease, Crohn’s disease, claims data
**EE-0122 (PE-0517) Long-term outcome of infliximab maintenance treatment for patients with Crohn’s disease: A Japanese single-center cohort study**

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**Background and Aim:** There are few reports on the long-term outcome of infliximab in patients with Crohn’s disease (CD). We evaluated the long-term outcomes and related prognostic factors of infliximab maintenance treatment in CD patients. **Methods:** Retrospective data were collected from luminal CD patients treated by infliximab for ≥ 14 weeks between January 2003 and March 2017 at our hospital. The effectiveness of infliximab maintenance treatment was evaluated using rate of sustained clinical benefit, which were estimated using the Kaplan–Meier method. Sustained clinical benefit was defined as a lack of treatment failure. Treatment failure was defined as follows: (i) the discontinuation of infliximab due to loss of response or side effects, (ii) the need for dose escalation, or (iii) the need for abdominal surgery. Prognostic factors related to sustained clinical benefit rate were evaluated using log–rank tests and a multivariate Cox regression analysis. **Results:** Of the 348 patients (median age, 29.4 years), 92 were females. Concomitant treatment with immunomodulators (azathioprine or 6-mercaptopurine) was administered to 254 patients. The 1-, 3-, 5-, and 10-year sustained clinical benefit rates were 77%, 57%, 48%, and 41%, respectively. In the univariate analyses, female sex, strictureing disease, and higher C-reactive protein (CRP) levels were significant prognostic factors for a lower rate of sustained clinical benefit. Conversely, concomitant treatment with immunomodulators was significant prognostic factors for a higher rate of sustained clinical benefit. In the multivariate Cox regression analysis, female sex, younger age, strictureing disease, higher CRP levels, and concomitant treatment with immunomodulators were identified as independent predictors of sustained clinical benefit. **Conclusion:** Treatment failure was experienced by approximately 60% of CD patients receiving infliximab maintenance treatment over a 10-year period but could be decreased by combination therapy of infliximab with immunomodulators. Conversely, female sex, younger age, strictureing disease, and higher CRP levels were prognostic factors for a poor long-term outcome. **Keywords:** infliximab, Crohn’s disease, anti-tumor necrosis factor agents

**EE-0123 (PE-0518) Long-term outcomes and related prognostic factors of adalimumab maintenance treatment for patients with Crohn’s disease: A Japanese single-center cohort study**

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**Background and Aim:** There are few reports on the long-term outcome of adalimumab in patients with Crohn’s disease (CD). We evaluated the long-term outcomes and related prognostic factors of adalimumab maintenance treatment in CD patients. **Methods:** Retrospective data were collected from luminal CD patients who received adalimumab for ≥ 4 weeks between October 2010 and December 2016 at our hospital. All patients received 160 mg of adalimumab on day 1, 80 mg at week 2, and 40 mg every other week from week 4. The effectiveness of adalimumab maintenance treatment was evaluated using rate of sustained clinical benefit—defined as lack of treatment failure—which was estimated using the Kaplan–Meier method. Treatment failure was defined as either discontinuation of adalimumab, dose escalation, or surgery for CD. Prognostic factors associated with the rate of sustained clinical benefit were evaluated using log–rank tests and multivariate Cox regression analysis. **Results:** Of the 184 patients included in this study (median age, 28.0 years), 66 were female. The median duration of disease was 4.7 years. Sixty-one patients had stricturing disease, 15 had intra-abdominal fistulas, and 104 had perianal disease. Before initiating adalimumab therapy, 58 patients had undergone at least one intestinal resection, and 72 had been previously exposed to infliximab. The 1-, 3-, and 5-year sustained clinical benefit rates were 66%, 46%, and 35%, respectively. In the univariate analysis, significant prognostic factors for lower rate of sustained clinical benefit were previous infliximab use, longer disease duration, stricturing disease, intra-abdominal fistulas, and previous bowel resection. In the multivariate Cox regression analysis, previous infliximab use and stricturing disease were identified as independent predictors of sustained clinical benefit. **Conclusion:** Treatment failure was experienced by approximately 70% of CD patients receiving adalimumab maintenance treatment over a 5-year period. Previous infliximab use and stricturing disease may be prognostic factors for a poor long-term outcome. **Keywords:** adalimumab, Crohn’s disease, anti-tumor necrosis factor agents
EE-0138 (PE-0519) Lymphoid follicular proctitis mimicking ulcerative colitis

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Background and Aim: Lymphoid follicular proctitis (LFP), also known as nodular proctitis, is an uncommon inflammatory condition confined to the rectal mucosa and its pathogenesis is unknown. LFP is often considered as a form of ulcerative colitis, but it’s a distinct entity with clinical, endoscopic, and histological features unrelated to other type of inflammatory bowel disease. In patients with LFP, intermittent rectal bleeding associated with defecation is the major presenting symptoms. We report a case of LFP in patient with rectal bleeding. Methods: A 50-year-old male visited our clinic with intermittent rectal bleeding with stool, without diarrhea, fever, weight loss, or other general symptoms. His past medical history and family history were unremarkable. The laboratory blood tests including a white blood cell count, hemoglobin, platelet, alanine aminotransferase, and aspartate transaminase were within normal limit. A viral marker for hepatitis B and a serologic investigation for the immunocompromised state (HIV antibody) were all negative. The rapid plasma reagin (RPR) test for syphilis is non-reactive. Results: Sigmoidoscopy showed the rectal mucosa to be finely granular pattern without erosion or ulceration, and no abnormal findings above the rectum (Fig. 1a). Histopathological examination revealed marked lymphoid follicular hyperplasia without crypt abscess or granuloma, and neutrophils, eosinophils and plasma cells are scant or absent (Fig. 1b). It was diagnosed as an LFP. The patient improved after using mesalazine suppository. Conclusion: LFP should be included in the differential diagnosis of proctitis, and mesalazine suppository may be useful for symptomatic patients with LFP.

Keywords: follicular proctitis, rectal bleeding, endoscopy, mesalazine

Figure 1. Endoscopic, microscopic finding

EE-0149 (PE-0520) Increased risk of herpes zoster in young and metabolically healthy patients with inflammatory bowel disease: A nationwide population-based study

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Background and Aim: The risk of herpes zoster (HZ) among patients with inflammatory bowel disease (IBD) remains unclear in terms of age and metabolic comorbidities. We conducted a nationwide population-based study to investigate the risk of HZ in patients with IBD. Methods: From 2010 to 2013, a retrospective study was performed using claims data from the National Healthcare Insurance service in Korea. We compared the incidence of HZ between 30,100 IBD patients (10,517 Crohn’s disease [CD] and 19,583 ulcerative colitis [UC] patients) and 150,500 controls matched by age and sex. The cumulative probability of HZ was estimated. Results: During the mean follow up of 5 years, HZ was newly detected in 676 (6.43%) CD patients, 1,395 (7.12%) UC patients, and 6,672 (4.43%) controls, respectively. The incidence rate of HZ (per 1,000 person-years) was 13.60, 15.00, and 9.19 in CD, UC patients, and controls, respectively. The impact of UC on the development of HZ also significantly increased the risk of HZ compared to controls. Conclusion: IBD was associated with an increased risk of HZ, especially in younger patients without metabolic comorbidities.

Keywords: claims data, Crohn’s disease, herpes zoster, ulcerative colitis
EE-0192 (PE-0521) The change of bone mineral density in patients with inflammatory bowel disease
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Background and Aim: There is limited data regarding the impact of treatment for IBD on the BMD status. Therefore, this study aimed to identify the change of BMD in patients with IBD after treatment including 5-aminosalicylic acid, thiopurine, and anti-TNF agents.

Methods: The cases were retrieved from 442 patients who were diagnosed with IBD in a single university hospital. Of those, 119 patients (CD 84, UC 35) had the follow-up BMD with at least 1-year interval. The associations between BMD, BMI, and disease activity parameters including CDAI, Mayo score, hemoglobin (Hb), C-reactive protein (CRP), serum albumin were evaluated as Pearson correlation analysis and partial correlation. BMD was measured as Z score and low BMD was defined as less than −1. Results: In enrolled 84 patients with inactive CD, the baseline mean of BMD Z score at the lumbar spine and femur neck were −0.44 ± 1.36, −0.13 ± 1.28. The follow-up mean of BMD Z score at the lumbar spine and femur neck were −0.47 ± 1.21 (P = 0.512), −0.18 ± 1.17 (P = 0.304). In enrolled 35 patients with inactive UC, the baseline mean of BMD Z score were −0.20 ± 1.04, −0.11 ± 1.06. The follow-up mean of BMD Z score at the lumbar spine and femur neck were −0.26 ± 1.05 (P = 0.145), −0.08 ± 1.06 (P = 0.633). The proportion of low BMD patients of CD and UC at the baseline were 30 (35.7%), 11 (30.6%); the number of low BMD patients with CD were 30 (35.7%), 11 (30.6%); the number of low BMD patients with UC were 30 (35.7%), 11 (30.6%); the number of low BMD patients with UC were 9 (25%), 9 (25%). P = 0.599), respectively. Only in the low BMD group of CD, the BMD of femur neck was correlated with BMI, Hb, CRP, and albumin (0.517: P = 0.003, 0.423: P = 0.02, −0.394: P = 0.031, 0.378: P = 0.039). However, there was no correlation with disease activity parameter and BMD status in partial correlation, using BMI as control variable. Conclusion: There is no correlation with the improvement of disease and BMD status after treatment in patients with IBD. However, in low BMD group of CD, treatment itself could improve the status of BMD of femur neck.

Keywords: bone mineral density, ulcerative colitis, Crohn’s disease

EE-0202 (PE-0522) Phenotypic and genetic features of mucosa-associated Escherichia coli in Korean inflammatory bowel disease patients
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Background and Aim: Adherent-invasive Escherichia coli (AIEC) has been reported to be implicated with the pathogenesis of inflammatory bowel disease (IBD). We isolated E. coli strains from the intestinal mucosa of Korean IBD patients and characterized their phenotypic and genetic features.

Methods: E. coli strains were isolated from mucosal biopsies of 18 Crohn’s disease (CD) patients, 24 ulcerative colitis (UC) patients, and 9 healthy controls (HC). They were phylogotyped into A, B1, B2, or D. Adhesion, invasion, and survival assays were performed to evaluate phenotypic features of E. coli strains and to identify AIEC. The presence of various virulence genes was examined using PCR analyses.

Results: A total of 59 E. coli strains were isolated from CD (25 isolates from 18 patients), UC (27 isolates from 24 patients), and HC (7 isolates from 9 subjects). Phylogotype B2 made up about 44% of E. coli strains from IBD patients. E. coli isolates from IBD patients showed higher levels of adhesion, invasion, and survival than those from HC. There were no significant differences in adhesion, invasion, and survival according to IBD subtypes, the presence of inflammation, and phylogotype. In virulence genotyping, the incidence of fyuA, ibeA, kpsMT II, and kpsMT1 genes were higher in strains from IBD patients showed higher levels of adhesion, invasion, and survival than those from HC, suggesting that AIEC may have an important role in Korean IBD patients.

Keywords: mucosa-associated Escherichia coli, adherent-invasive Escherichia coli, inflammatory bowel disease
**EE-0210 (PE-0523) Is sigmoidoscopy sufficient modality to followed ulcerative colitis patients?**

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**Background and Aim:** Ulcerative colitis (UC) is a chronic inflammatory bowel disease of unknown etiology and is a lifelong disease repeating clinical improvement and aggravation. Endoscopic severity assessment is very important, because the severity assessment is related to the prognosis of the UC patient. Colonoscopy is able to identify the entire field but is accompanied by complication, and the preparation process is difficult. The aim of this study is to evaluate the endoscopic tool to assess severity of ulcerative colitis during follow up UC patients. **Methods:** The subjects were 183 UC patients who were diagnosed and followed up at Chosun University Hospital from January 2013 to December 2017. Among them, 101 patients with follow-up colonoscopy were enrolled and retrospectively evaluated for endoscopic severity. The severity is assessed by colonoscopy alone; inspector determines endoscopic severity of follow up UC patients from rectosigmoid and proximal colon. The scale of endoscopic severity is endoscopic Mayo score and Ulcerative Colitis Endoscopic Index Scale (UCEIS). **Results:** Of the 101 patients, 40 has lesions limited to the rectosigmoid colon (39%). The average of endoscopic Mayo score of the entire colon is 1.21, and in case of rectosigmoid, the colon is 1.07. The average of UCEIS of the entire colon is 2.24, and in case of rectosigmoid, the colon is 1.94. The agreement endoscopic Mayo score between each site is observed with a kappa value of 0.83 (P = 0.00), and the agreement of UCEIS between each site is observed with a kappa value of 0.840 (P = 0.00). **Conclusion:** There is a very high level of agreement between the entire colon severity and the rectosigmoid colon severity in followed UC patients. Sigmoidoscopy is a good modality for evaluating the endoscopic severity of followed UC patients, considering complication and high cost. **Keywords:** ulcerative colitis, endoscopic activity, sigmoidoscopy

**EE-0216 (PE-0524) Genome-wide analysis of DNA methylation profiling of inflammatory mucosa in Crohn’s disease**

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**Background and Aim:** Inflammatory bowel disease (IBD) is known to be caused by a genetic predisposition involving multiple genes; however, there is growing evidence that abnormal interaction with environmental, particularly epigenetic, factors can have a significant contribution during the development of IBD. Although many studies, particularly genome-wide association studies (GWAS), have been performed to identify the genetic changes underlying the pathogenesis of Crohn’s disease (CD), the role of epigenetic changes in the development of complications arising from CD is poorly understood. **Methods:** We employed an unbiased approach to define DNA methylation alteration in CD patients using the HumanMethylation450K BeadChip platform. We validated the methylation levels of 19 genes that showed hypermethylation in CD patients compared with normal control. Technical validation was performed using quantitative MSP analysis. We performed functional implication of hypermethylated genes in CD analyzed by gene network. **Results:** Compared to normal controls, the majority of differential DNA methylation in CD patient samples was in the promoter, intergenic, and gene body regions. The DNA methylation profile in CD revealed 134 probes (23 hypermethylated and 111 hypomethylated probes) that were differentially methylated. We validated the methylation levels of 19 genes that showed hypermethylated in CD patients compared with normal control. **Conclusion:** Our DNA methylation profile identifies newly hypermethylated genes in CD, as well as the gene network associated with disease development, which can provide direction for future research in the diagnosis/prognosis or therapeutic treatments for CD. **Keywords:** genome-wide analysis, DNA methylation, inflammatory mucosa, Crohn’s disease
EE-0219 (PE-0525) Patients with Crohn’s disease with sepsis caused by Gemella morbillorum, which was suggested to be caused by infliximab: A case report

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Background and Aim: Gemella morbillorum, a microaerophilic Gram-positive coccus, is a natural inhabitant of the human oropharyngeal, gastrointestinal, and urogenital flora. Dental diseases and cardiac diseases are reported as background diseases, but there are few reports, and it is speculated that other infectious diseases are caused by other chronic diseases and immunocompromised patients. There are case reports of sepsis caused by Gemella morbillorum after treatment with anti-TNF-α antibody in patients with purulent perspiratory inflammation, which is suggested as one risk factor. Methods: A 39-year-old man diagnosed with Crohn’s disease (CD) started on anti-TNF therapy with infliximab (5 mg/kg/body) in 2008. Due to refractory anal fistula, therapy was changed on infliximab (10 mg/kg/body) in 2013. There was no problem in particular; he was in hospital treatment outpatient. Although on January 2, 2016, the patient was admitted to Hokkaido University Hospital with a high fever of 39 degrees. And once diagnosis sepsis, but there was nothing that could be an infection lesion with CT. There was also no finding that doubted the exacerbation of CD. Day 1: we started antibacterial therapy with cefmetazole (CFM). Day 3: Gemella species was detected from the result of blood culture, and after the antibiotic was changed to amoxicillin/ceftaxime (ABPC), the symptoms were improved, and the fever was lowered. Dental examination, cardiac ultrasound examination, and colonoscopy were performed during hospitalization, but there were no findings that could cause sepsis in particular. After changing to the appropriate antibiotic therapy, the patient was discharged with good passage on January 17. Results: There is no history of dental diseases and heart diseases in this case, and anti-TNF-α antibody therapy is assumed to be an incentive. Conclusion: Even though it is a rare complication, it should be recognized as a risk of severe sepsis because of its impact on life quality.

Keywords: Crohn’s disease, sepsis, anti-TNF-antibody therapy, Gemella morbillorum, antibacterial therapy

EE-0226 (PE-0526) Increased risk of Crohn’s disease in patients with anemia: A nationwide population-based study

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Background and Aim: Anemia is characterized by low hemoglobin levels due to a variety of causes. Anemia is known to be the main symptom of inflammatory bowel disease (IBD). Although anemia may occur in patients with IBD, it is unclear whether the incidence of IBD increases in anemic patients compared to the general population. The aim of this study was to assess the incidence of IBD in patients with anemia according to hemoglobin concentration. Methods: We conducted a nationwide, population-based study using claims data from the National Healthcare Insurance Service (NHIS)-National Health Screening Cohort in Korea. We included people aged 20 years or older between 2010 and 2012 (n = 2,148,417). Anemia was defined using World Health Organization criteria. We compared patients with anemia to persons without anemia matched by age, sex, and body mass index (BMI). We identified patients who were newly diagnosed with IBD that met both of ICD-10 codes (K50 for Crohn’s disease and K51 for ulcerative colitis) and V code for rare intractable diseases (V130 for Crohn’s disease and V131 for ulcerative colitis) until December 31, 2015. Results: During the mean follow-up duration of 3.72 ± 0.8 years, anemia patients experienced Crohn’s disease more frequently than healthy controls (Hazard ratio [HR], 2.844; Confidence interval [CI], 2.444–3.309; P < 0.0001). However, the incidence of ulcerative colitis in anemia patients did not differ compared to healthy controls (HR, 1.085; CI, 0.994–1.184; P < 0.07). According to the hemoglobin concentration, the higher the hemoglobin level, the lower the HR of IBD. In the upper 20% of the hemoglobin level, the HR of IBD was 0.326 compared to the lower 20% group (CI, 0.274–0.390; P < 0.0001). Conclusion: Anemia is an independent risk factor for IBD incidence, with a marked increase of risk associated with severe anemia.

Keywords: anemia, Crohn’s disease, colitis, ulcerative, epidemiology
EE-0247 (PE-0527) Cyr61 expression in inflammatory bowel disease
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Background and Aim: The pro-angiogenic cysteine-rich protein 61 (Cyr61) is a novel pro-inflammatory factor. Whether Cyr61 is involved in the development of inflammatory bowel disease (IBD) remains unknown. The purpose of this study is to investigate the expression of Cyr61 in patients with IBD.
Methods: We achieved the colonic mucosa from 23 patients with IBD who had undergone colonoscopy. We measured the expression of Cyr61 and inflammatory markers in the biopsy specimens using the real-time PCR, and we determined the expression of Cyr61 in LPS-treated colonic epithelial cells (CaCo-2 and HCT 116).
Results: The mean age of enrolled patients was 31.7 years, and 11 patients (47.8%) had ulcerative colitis and 12 patients (52.2%) had Crohn’s disease. Expression of Cyr61 in the inflamed mucosa was 2.5 times higher than that of the non-inflamed mucosa (P = 0.002, Fig. 1). Expression of TNF-α, IL-6, and TLR-4 increased significantly in inflamed mucosa than that of the non-inflamed mucosa (all P < 0.05). Time-dependent increase in Cyr61 expression was observed in CaCo-2 and HCT 116 after the treatment with LPS. Also, the relationship between C-reactive protein and Cyr61 showed statistic significance (P = 0.027).
Conclusion: Our results reveal a novel mechanism between Cyr61 and inflammatory bowel disease. We suggest the role of Cyr61 in therapies targeting Cyr61 in patients with IBD.
Keywords: Cyr61, inflammatory bowel disease, biomarker

Figure 1.

EE-0256 (PE-0528) Unusual complication of ulcerative colitis: Pyoderma gangrenosum and thromboembolic events
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Background and Aim: Extraintestinal manifestations are seen in 25–40% of inflammatory bowel disease. Ulcerative colitis (UC) is associated with various extraintestinal manifestations. Pyoderma gangrenosum, which is classified as one of the noninfectious neutrophilic dermatosis, is infrequently manifested as 0.5% to 2.0% in patient with UC, but it can cause a hazardous situation as it courses aggressively. Thromboembolic events are rare (accounting for 1.3% to 7%) among systemic complications of UC; however, they are a significant cause of mortality when they occur.
Methods: A 19-year-old woman visited the emergency department with complaint of diarrhea and ulcers in lower leg. She was admitted to another hospital with diarrhea 3 months ago. She was diagnosed with infectious colitis and treated with antibiotics, but the diarrhea was continued. Her ankle pain and swelling started after discharge, and it got worse. The ulcers located in pretibial areas, with the size of 2 to 15 cm and in oval shape with necrotic and hemorrhagic sloping edges oozing with pus. On examination, she was tachycardic.
Results: CT with thromboembolism protocol was performed; pulmonary thromboembolisms (PTEs) and deep vein thrombosis (DVTs) were detected. The patient underwent colonoscopy that demonstrated continuous erythematous, nodular, easy friability, and ulcerated mucosa throughout the colon, sparing the terminal ileum. Biopsies revealed severe active inflammatory changes and chronic inflammation with cryptitis and crypt distortion but no granuloma or vasculitis. We diagnosed UC based on colonoscopic finding and histopathologic reports. Skin lesion was diagnosed as pyoderma gangrenosum. The patient was started on antibiotics and intravenous methylprednisolone 30 mg daily. Tacrolimus ointment was applied for PG, and unfractionated heparin was infused for PTEs and DVTs at first and changed to low molecular weight heparin later.
Conclusion: We report a case of a 19-year-old woman with complicated pyoderma gangrenosum and venous and arterial thromboembolisms in a patient with UC.
Keywords: ulcerative colitis, extraintestinal manifestation
EE-0260 (PE-0529) Usefulness of adding other symptoms to partial Mayo score for prediction of endoscopic mucosal healing in patients with ulcerative colitis

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Background and Aim: Endoscopy is the gold standard for assessing activity of ulcerative colitis (UC). However, its use is limited due to high cost, burdensome preparation, and invasiveness. Previous studies have proved usefulness of fecal calprotectin (FCP) in predicting endoscopic mucosal healing (EMH) over partial Mayo score (pMS). The aim of this study was to evaluate whether additional symptoms to pMS can improve the prediction of EMH. Methods: We analyzed the data of consecutive 58 patients with UC (male: 67%, mean age: 39.5 years old) in Seoul National University Bundang Hospital between May 2017 and May 2018. Besides pMS, additional four symptoms (urgency, tenesmus, mucous stool, and night defecation) were collected within 5 weeks of endoscopy performance. FCP was measured using the Quantum Blue® Calprotectin rapid test and was collected within 7 days of endoscopy. Endoscopic activity was graded using Ulcerative Colitis Endoscopic Index of Severity (UCEIS) and EMH was defined as UCEIS 0–2. Results: FCP proved to be better in correlation with UCEIS in comparison to pMS (pMS: r = 0.520666, P < 0.001; FCP: r = 0.785943, P < 0.001). Combination of additional four symptoms and pMS demonstrated stronger correlation with UCEIS (r = 0.6932, P < 0.001) but failed to prove superiority over FCP. In predicting EMH, FCP (cut-off value: 512.4 mg/kg) exhibited sensitivity of 92.3% and specificity of 80.0% (AUC: 0.925, 95% confidence interval: 0.857–0.992), whereas additional symptoms to pMS (cut-off value: 7) revealed sensitivity of 92.3% and specificity of 70.7% (AUC: 0.904, 95% confidence interval: 0.816–0.992). Conclusion: Although additional symptoms to pMS aid in predicting EMH, it still failed to validate superiority over FCP. Clinical symptoms such as mucous stool may overlap with symptom of irritable bowel syndrome; they should be interpreted with caution in UC patients.

Keywords: ulcerative colitis, partial Mayo score, fecal calprotectin, endoscopic mucosal healing

EE-0263 (PE-0530) Pyostomatitis vegetans as an oral manifestation in a patient with ulcerative colitis

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Background and Aim: Pyostomatitis vegetans (PV) is a rare kind of stomatitis characterized by multiple miliary pustules that primarily affect the labial gingiva as well as the buccal and labial mucosa. Although the pathogenesis of PV remains unclear, it is now recognized as a rare oral manifestation of ulcerative colitis (UC) and Crohn’s disease (CD). PV is more common in UC and considered as a specific marker of disease activity in UC. Treatment is aimed at controlling underlying inflammatory bowel disease (IBD). Systemic steroids are usually used for these patients. Anti-neutrophilic agents, such as dapsone, have also been effective, especially in relapsing case. Methods: A 37-year-old Korean woman came to our clinic for evaluation of oral ulceration of 10-month duration. At the time of development of oral lesion, she had hematochezia and mucoid stool, and sigmoidoscopy at other hospital showed ulcerative proctitis. She received prednisone and 5-aminosalicylate. Remission of proctitis was achieved, but oral lesions were not improved. Results: A physical examination showed multiple white or yellowish, friable micropustules with an erythematosus and edematous mucosal base on labial and buccal mucosa, as well as ulcerations and hemorrhagic crusting. Complete blood counts showed peripheral eosinophilia (10.5%), and C-reactive protein was 4.17 mg/dL (normal range, < 0.47 mg/dL). Biopsy specimen showed intra-epithelial microabscesses and a dense mixed infiltrate of inflammatory cells consisting of neutrophils, eosinophils, and lymphocytes in the lamina propria. Histological findings were consistent with the diagnosis of PV. Remission of oral lesions was not achieved in spite of systemic steroids therapy. Oral lesions were gradually improved after adalimumab was introduced. Conclusion: Our case confirms previously reported good experience with biologics in the management of PV associated with IBD. In cases of PV without response to systemic steroids therapy, biologics may be considered to induce remission of oral lesions.

Keywords: ulcerative colitis, pyostomatitis vegetans, biologics
EE-0267 (PE-0531) The efficiency of iron supplementation in inflammatory bowel disease patients treated with anti-TNF agents

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Background and Aim: In patient with inflammatory bowel disease (IBD), anemia is one of the common complication. Iron supplementation is the most effective therapy IBD in patients with anemia; however, it could cause some adverse events. In era of anti-TNF (tumor necrosis factor) agents, there was no definite treatment evidence of oral iron supplements. Therefore, we aimed to analyze the effect of oral iron supplements in IBD patient treated with anti-TNF agents. Methods: We retrospectively reviewed the medical records of 37 patients with ulcerative colitis (UC) and 42 patients with Crohn’s disease (CD) who started anti-TNF treatment between January 2000 and December 2014. We analyzed the effect of iron supplement on hemoglobin changes as well as IBD recurrence. The definition of moderate anemia was defined as less than hemoglobin 10. Data from the year of anti-TNF initiation (year 0) and the following year (year 1) were compared. Results: Among 79 patients, 27 patients (34.2%) started anti-TNF agents and iron supplement simultaneously, and 52 patients (65.8%) only received anti-TNF agents. The prevalence of anemia and hemoglobin, hematocrit, CRP, and ESR levels were significantly improved compared with before treatment. Hemoglobin change was all significantly elevated regardless of iron supplement (anti-TNF agent + iron: from 9.8 to 11.7, P = 0.004; anti-TNF agent: from 11.9 to 13.3, P < 0.001). In IBD patients with moderate anemia, improvement of anemia was more prominent in iron supplement group (anti-TNF agent + iron: from 8.5 to 11.4, P = 0.001; anti-TNF agent: from 9.3 to 11.4, P = 0.081). Conclusion: Anti-TNF agent provided clinically meaningful improvements in hemoglobin, CBC, CRP, and ESR. In patients requiring anti-TNF agent treatment, anemia could be improved without iron supplementation. However, in patients with moderate anemia, iron supplementation may be helpful.

Keywords: inflammatory bowel disease, anti-TNF agents, iron, anemia, supplementation

EE-0268 (PE-0532) Increased genomic damage and vitamin B status in inflammatory bowel disease patients: A case-control, prospective, pilot study

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Background and Aim: Vitamin B deficiency in patients with inflammatory bowel disease (IBD) is well documented; however, few studies have explored genomic damage in patients with IBD using the cytokinesis-blocked micronucleus cytome (CBMN-Cyt) assay. This study investigated the frequency of micronuclei (MNi) using the CBMN-Cyt assay and the level of vitamin B in patients with IBD. Methods: This prospective study was conducted in 15 patients with ulcerative colitis, 15 patients with Crohn’s disease, and 30 healthy controls from one tertiary hospital. Serum vitamin B and homocysteine levels were measured, and the MNi status was analyzed using the CBMN-Cyt assay. Results: The patients with IBD showed significantly lower serum pyridoxine levels and significantly higher homocysteine levels than controls. The frequencies of binucleated cells (BNCs) with MNi, nucleoplasmic bridges (NPBs), and nuclear buds (Nbuds) were explored genomic damage in patients with IBD using the cytokinesis-blocked micronucleus cytome assay, micronuclei, homocysteine

Keywords: inflammatory bowel disease, vitamin B, cytokinesis-blocked micronucleus cytome assay, micronuclei, homocysteine
EE-0278 (PE-0533) Effects of change in the gut microbiota on colon tumorigenesis in AOM-DSS model

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Background and Aim: The altered intestinal microbial profiles have been known to be associated with colorectal cancer as well as inflammatory bowel diseases. To determine the role of the commensal bacteria in the development of colitis-associated cancer (CAC), we investigated the effects of intestinal microbial change through antibiotics administration on colon tumorigenesis in the azoxymethane (AOM)-dextran sodium sulfate (DSS)-induced murine CAC model. Methods: CAC was induced in the C57BL/6 mice by injection of 10 mg/kg AOM followed by two rounds of 2% DSS exposure to elicit colitis. Four antibiotics combination (vancomycin, ampicillin, neomycin, and metronidazole) or each individual antibiotic were administered for 2 weeks prior to and throughout the duration of AOM/DSS administration. After sacrifice of the mice, colonic inflammation, proliferation, and tumorigenesis were evaluated. To characterize the change of intestinal microbiota, high throughput Illumina MiSeq sequencing for sequential feces was performed. Results: Antibiotics treatment, regardless of cocktail or individual, decreased AOM/DSS-induced tumor numbers, mean tumor size, histologic colitis and dysplasia scores, and relative abundance of intestinal microbiota through antibiotics administration attenuates colon tumorigenesis. Ecological interactions of the gut microbial community, rather than individual bacterial population, play an important role in the development of CAC.

Keywords: microbiota, colitis-associated cancer, azoxymethane-dextran sodium sulfate, tumorigenesis

EE-0284 (PE-0534) Fecal calprotectin and fecal immunochemical test for prediction of disease severity in Crohn’s disease

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Background and Aim: Crohn’s disease (CD) is a major type of inflammatory bowel disease that causes inflammation in intestine with periods of exacerbation and remission. If the biomarkers reflects the status of mucosal inflammation and severity well, they may dispense with the requirement for invasive endoscopic examination. In this study, we analyzed and compared the usefulness of fecal calprotectin (FC) and fecal immunochemical test (FIT) as a marker for reflecting disease severity with Crohn’s Disease Activity Index (CDAI). Methods: Patients with CD who performed FC, FIT from January 2015 to September 2016 in Korea University Ansan Hospital were analyzed retrospectively. We investigated whether FC and FIT reflect CDAI using receiver operator characteristic (ROC) statistics. In addition, the correlation between the change of fecal test value and the change of CDAI was analyzed. Results: Among a total of 111 patients with CD, 94 patients had performed more than two consecutive fecal exams in this study period. The area under the curve (AUC) in ROC analysis of FC to predict remission (CDAI < 150) was 0.728 with a cut-off value of 466 mg/kg yielding 81.3% sensitivity and 63.3% specificity. AUC of FIT was 0.589 at a cut-off value of 18 ng/mL with 62.1% sensitivity and 69.4% specificity. However, there was no significant difference between FIT and FC (P = 0.038). Conclusion: Both FIT and FC were correlated with CDAI. Fecal calprotectin seems to be a better reflector of remission and CDAI changes in CD compared with FIT.

Keywords: Crohn’s disease, fecal calprotectin, fecal immunochemical test
EE-0311 (PE-0535) Colorectal carcinoma surveillance in stricturing Crohn’s disease: Endoscopic surveillance or surgery?
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Background and Aim: The risk of colorectal carcinoma (CRC) is increased in patients with Crohn’s disease (CD). Patients with severe inflammation and those with longer duration of diagnosis were more likely to develop colorectal carcinoma (CRC). The prevalence of cancer was higher in inflammatory bowel disease (IBD) patients with (0.78%) than without stricture (0.11%). Methods: We report a case of a 52-year-old Indian gentleman who was diagnosed with perianal CD. Following treatment with sulfasalazine for 2 years, he defaulted follow up but reported a history of weight loss and deep vein thrombosis; he was also malnourished with anemia. Colonoscopy proved difficult: because of altered rectosigmoid anatomy and severe stricturing disease, evaluation was only up to the descending colon despite changing to a thinner calibre gastroscope. Limited histology showed active colitis with inflammation. CT colonography revealed multiple stenotic colonic segments with wall thickening. Results: Using Baar’s proposed prediction risk model to assess his CRC risk—taking into account his age and duration of CD—he scores 15 points and has a probability of developing CRC 0.1% in the next year. Limited studies show that incidence of dysplasia/cancer in IBD patients who underwent surgery for stricturing disease is 1.2–3%. Conversely, prevalence of CRC after colectomy is < 3%. We postulate that his multiple strictures confer an even higher risk for occurrence of colonic adenocarcinoma. Where endoscopic surveillance for malignancy is challenging, there may be benefit in offering prophylactic surgical resection—the patient was however not keen for this. Conclusion: Monitoring for CRC is complex in Crohn’s patients with multiple strictures. Further studies to determine their risk of developing colorectal cancer vs risk/benefit of undergoing colectomy are needed in order to personalize the approach in dealing with such patients.
Keywords: Crohn’s, stricturing, colorectal cancer

EE-0326 (PE-0536) The usefulness of neutrophil to lymphocyte ratio, platelet to lymphocyte ratio, and fecal calprotectin as disease activity markers in inflammatory bowel disease
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Background and Aim: There is a lack of data about the usefulness of neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR), and fecal calprotectin (FC) in IBD. We aimed to investigate the clinical significance of NLR, PLR, and FC in IBD. Methods: We retrospectively analyzed 58 patients with IBD and 116 age- and sex-matched healthy subjects who underwent endoscopy and laboratory tests including inflammatory biomarkers. NLR and PLR were compared between IBD and healthy controls, and correlations between these indexes including FC and clinical/endoscopic activity were analyzed. Results: Receiver operating characteristic analysis was performed, which revealed a sensitivity of 70.7% and specificity of 73.3% when a cut-off of 1.798 was used for NLR (AUC, 0.802). For identifying IBD, the optimal cut-off of 139.86 for PLR had a sensitivity of 58.6% and specificity of 63.8% (AUC, 0.696). The positive correlations between NLR and CRP were observed (r = 0.377; P = 0.004), CRP (r = 0.587; P < 0.001), and FC (r = 0.278; P = 0.034) in IBD. FC and endoscopic score were moderately correlated (r = 0.381; P = 0.008) in UC. In IBD, correlations of NLR and PLR with endoscopic score were not statistically significant. FC > 200 μg/g (OR, 29.1, P = 0.035) and steroid use at the time of FC testing (OR, 40.3, P = 0.022) were independently associated with moderate to severe endoscopic activity. Conclusion: Although NLR and PLR are biomarkers for differentiating IBD, they are not useful indicators for reflecting the intestinal mucosal conditions in IBD. FC may be a useful inflammatory biomarker for determining the intestinal mucosal activity.
Keywords: inflammatory bowel disease, neutrophil to lymphocyte ratio, platelet to lymphocyte ratio; fecal calprotectin
EE-0328 (PE-0537) A study on the association between trabecular bone score and clinical features: Outcomes in patients with ulcerative colitis

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Background and Aim: The trabecular bone score (TBS), a recently developed diagnostic tool, is a novel, grey-level texture measurement that can provide quantified information on trabecular microarchitecture. In the literature, TBS has been reported to be useful in predicting risk for fragility fracture, independent of area bone mineral density (BMD). However, studies regarding the usefulness of TBS in ulcerative colitis was rarely published. We aim to analyze whether TBS is associated with clinical features and outcomes in patients with UC.

Methods: From the UC registry from Asan Medical Center, we identified all patients with UC who had at least one measurement of BMD. TBS was obtained after reanalysis of the BMD images.

Results: A total of 342 UC patients were included in the study. The median age at diagnosis was 40.1 years old (IQR, 29.3–50.4). The mean duration of follow up was 14.6 ± 9.4 years, and there were 52 deaths. The cumulative survival rate was significantly lower 25 years after the diagnosis of CD (91.7%) than in the standard population model (95.7%). SMRs for both all causes (3.5; 95% CI: 26.1–51.6) were high.

Conclusion: There is no significant association between TBS and clinical features in patients with UC. Additional studies are needed to clarify bone health and TBS in patients with UC.

Keywords: ulcerative colitis, bone mineral density, trabecular bone score

EE-0352 (PE-0538) Crohn’s disease-specific mortality: A 30-year cohort study at a tertiary referral center in Japan

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Background and Aim: In this study, survival and cause of death were investigated in patients with Crohn’s disease (CD) at a tertiary referral center.

Methods: A database was created based on the medical records of 1108 CD patients who had a history of visiting our hospital to investigate background characteristics, cumulative survival rates from diagnosis, causes of death, and the standardized mortality ratio (SMR) for each cause of death. A follow-up questionnaire survey of patients followed up inadequately was also conducted. The cumulative survival rate from diagnosis was determined using the life-table method and compared with that of a sex- and age-matched population model from the year 2000.

Results: The study included 1108 patients whose mean age at diagnosis was 25.6 ± 10.8 years. The mean duration of follow up was 14.6 ± 9.4 years, and there were 52 deaths. The cumulative survival rate was significantly lower 25 years after the diagnosis of CD (91.7%) than in the standard population model (95.7%). SMRs for both all causes (3.5; 95% confidence interval [CI]: 2.7–4.6) and CD-specific causes (36.7; 95% CI: 26.1–51.6) were high. Among the CD-specific causes, SMRs were especially high for small intestine and colorectal cancers, gastrointestinal diseases including intestinal failure (IF), perioperative complications, and amyloidosis.

Conclusion: The SMRs for both all causes and CD-specific causes were high in CD patients. CD-specific causes including intestinal cancer, IF, perioperative complications, and amyloidosis showed especially high SMRs.

Keywords: Crohn’s disease-specific mortality, standardized mortality ratios, cohort study, intestinal cancer, amyloidosis
**EE-0354 (PE-0539) Incidence and survival of gastrointestinal cancer in patients with inflammatory bowel disease: A nationwide population-based study in Korea**

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Background and Aim: The risk and outcomes of gastrointestinal (GI) cancer remain poorly defined in Asian populations with inflammatory bowel disease (IBD). We performed a nationwide population-based study to investigate GI cancer risk and survival in Korean patients with IBD.

Methods: Using the National Health Insurance claims data, we collected data on newly diagnosed patients with IBD (16,050 Crohn’s disease [CD] and 26,558 ulcerative colitis [UC]) from 2005 to 2015. Standardized incidence ratios (SIRs) and survival outcomes of GI cancers among IBD patients in comparison with the general population were calculated. Six types of GI cancers including esophagus, stomach, colon, small bowel, liver, and pancreas were evaluated. Patients who diagnosed GI cancer within 1 year from IBD diagnosis was excluded.

Results: The risk of stomach cancer was significantly decreased both in CD and in UC (SIR, 0.55; 95% confidence interval [CI], 0.34–0.90, 0.57; 0.45–0.73, respectively). Moreover, the risk of colorectal (SIR, 0.49; 0.37–0.65) and pancreatic (SIR, 0.52; 0.28–0.96) cancer were also significantly decreased in UC. Meanwhile, the risk of small bowel (SIR, 10.19; 4.86–21.37) cancer was significantly increased in CD. Regarding remaining GI cancers in CD or UC, there was no difference in cancer risk compared to the general population. The overall survival of colorectal (HR, 2.27; 0.13–4.53) was significantly shorter in CD. Meanwhile, overall survival of remaining GI cancers in CD or UC did not differ compared to the general population.

Conclusion: Compared with the general population, the risk and overall survival of GI cancers varied depending on the type of cancer and IBD.

Keywords: inflammatory bowel disease, incidence, survival, gastrointestinal cancer, Korea

**EE-0355 (PE-0540) Increased risk of inflammatory bowel disease in patients with chronic obstructive pulmonary disease: A nationwide population-based study**

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Background and Aim: The aim of this study was to assess whether the incidence of inflammatory bowel disease are increased in patients with COPD compared to general population of South Korea.

Methods: This nationwide, population-based study performed using data from the National Healthcare Insurance service in Korea. We included patients who were diagnosed with COPD according to ICD-10 code (J43.x and J44.x) from 2010 to 2014 and were prescribed one or more COPD medications at least twice per year. We compared COPD patients with non-COPD controls matched by age and sex with a ratio of 1:5. Cases with newly diagnosed IBD that meet both of ICD-10 codes (K50 for Crohn’s disease [CD] and K51 for ulcerative colitis [UC]) and V code for rare intractable disease (V130 for CD and V131 for UC) were identified. The cumulative incidence probability of IBD was estimated.

Results: During the mean follow up of 3.9 years, incidence rate of CD was 2.58 per 1,000 person-years, compared to 1.61 per 1,000 person-years among non-COPD controls (hazard ratio [HR], 1.61; 95% confidence interval [CI], 1.35–1.90; P < 0.001). Incidence rate of UC was 8.0 per 1,000 person-years, compared to 6.1 per 1,000 person-years among non-COPD controls (HR, 1.31; 95% CI, 1.19–1.44; P < 0.001). Analyzing the risk of IBD according to severity of COPD, the incidence rate of IBD was higher with increasing severity of COPD.

Conclusion: The risk of IBD increased in the patients with COPD of South Korea. These results are suggestive of an association between COPD and IBD.

Keywords: chronic obstructive pulmonary disease, inflammatory bowel disease

Figure 1.
**EE-0361 (PE-0541) Inflammatory bowel diseases: Epidemiological features and treatment**

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**Background and Aim:** The aims of this study were to determine the epidemiological, sociological, clinical features and the effect of treatment in inflammatory bowel disease (IBD) patients. We also aimed to create a database related to this group of patients for the future studies.

**Methods:** This study includes IBD patients who were diagnosed and followed up at Ondokuz Mayis University Faculty of Medicine. The files of these patients were scanned retrospectively to investigate the demographic features and the clinical, endoscopic, and laboratory findings. We recorded the patients’ disease activity index correlation. Ulcerative colitis (UC) and Crohn’s Disease (CD) patients were compared to find out if there are significant differences in terms of these characteristics.

**Results:** In our study, 150 patients were included (99 UC, 51 CD). In the patients whom followed, the UC/CD ratio was 2/1. The parasitos infestation history and allergic disease in CD was more than UC (P < 0.05). The duration between the onset of complaints and the diagnosis of CD was longer than in UC patients (P < 0.05). The rate of having surgery related with the disease was more in CH (P < 0.05). The rate of having surgery related with the disease was more in CD (P < 0.05). The frequency of anemia patients was 39.4% in UC and 53.1% in CD. While proctosigmoiditis was observed mostly in the UK patients, terminal ileitis was the most frequent one in CD. The anti-TNF treatment ratio was 22.3% in UC and 43.1% in CD. **Conclusion:** We believe that this study will provide a database on the epidemiological characteristics and treatment responses of the increasing prevalence of inflammatory bowel disease in Turkey.

**Keywords:** ulcerative colitis, Crohn’s disease, epidemiology

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**EE-0378 (PE-0542) Trend of medications usage and their associated outcomes in Taiwanese inflammatory bowel disease patients from 2001 to 2015**

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**Background and Aim:** 5-aminosalicylic acid, corticosteroids, thiopurine, and anti-tumor necrosis factor (TNF)-α agents were effective in treating inflammatory bowel disease (IBD). We assessed the trend of prescribing these medications and their associated outcomes in Taiwan IBD patients.

**Methods:** A nationwide cohort study of 3806 subjects with IBD, diagnosed and registered as a catastrophic illness from 2001 to 2015, was conducted.

**Results:** Among these patients, 919 (24.1%) patients were diagnosed with CD and 2887 (75.9%) with UC. From 2001 to 2015, we found all these medications prescribed more often gradually. Higher dosage 5-aminosalicylic acid decreased the risk of hospitalization (HR = 0.6) and operation (HR = 0.5). Thiopurine was associated with increased risk of hospitalization (HR = 2.3 in low dosage group, HR = 2.1 in high dosage group) but not affected operation risk. Higher dosage thiopurine increased the risk of tuberculosis (HR = 3.6) reactivation. Anti-TNF-α agent was associated with increased risk of hospitalization (HR = 4.0, in low dosage group, HR = 3.3, in high dosage group). Higher dosage anti-TNF-α agent increased the associated risk of operation (HR = 2.9), hepatitis B (HR: 4.3), and tuberculosis (HR: 5.1) reactivation. Corticosteroid was associated with increased risk of hospitalization (HR = 2.1, in low dosage group, HR = 3.5, in high dosage group) and risk of colostomy and ileostomy. High dosage corticosteroid also increased the risk of hepatitis B (HR = 2.8) and tuberculosis (HR: 2.8) reactivation. **Conclusion:** 5-aminosalicylic acid usage decreased the associated risk of hospitalization and operation for IBD patients, whereas thiopurine, corticosteroid, and anti-TNF-α agent were associated with increased risk of hepatitis B and TB reactivation, as well as the risk of hospitalization. No significant of increased risk of malignancy from all these medications usage observed in this cohort.

**Keywords:** inflammatory bowel disease, 5-aminosalicylic acid, corticosteroids, thiopurine, anti-tumor necrosis factor agents
EE-0388 (PE-0543) Long-term efficacy and safety of CT-P13, a biosimilar of infliximab, in patients with inflammatory bowel disease: A retrospective multicenter study

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Background and Aim: The biosimilar of infliximab, CT-P13 (Remsima®) has potential to reduce treatment costs and enhance access to biological therapy for patients with inflammatory bowel disease (IBD). However, the long-term efficacy and safety of CT-P13 in IBD patients remains unclear. Therefore, we aimed to evaluate the long-term clinical outcomes of moderate-to-severe IBD patients who are receiving CT-P13 treatment.

Methods: A retrospective multicenter study was performed for a total of 368 IBD patients who received at least three CT-P13 infusion at 16 referral hospitals in Korea from January 2012 to December 2016. Results: Among 368 patients, 267 are anti-tumor necrosis factor (TNF) naïve patients (149 Crohn’s disease [CD] and 118 ulcerative colitis [UC]) and 101 are patients who switched from the biologic originator to CT-P13 (78 CD and 23 UC). The retention rates at 1-, 3-, 5-year were 86.1%, 68.5%, and 58.7%, respectively, in anti-TNF naïve CD patients and 69.7%, 46.0%, and 26.7%, respectively, in anti-TNF naïve UC patients. The clinical response and remission rates in anti-TNF naïve CD patients were 94.3% and 78.6% at 14 weeks, 92.7% and 82.4% at 1 year, and 76.8% and 72.2% at 3 years, respectively, and those in anti-TNF naïve UC patients were 85.6% and 42.6% at 14 weeks, 80.0% and 59.8% at 1 year, and 55.2% and 44.2% at 3 years, respectively. CT-P13 treatment significantly improved clinical activity index (Crohn’s Disease Activity Index and partial Mayo scores) at 14 weeks, 1 year, and 3 years in both anti-TNF naïve CD and UC patients (all P < 0.001). After median follow up of 34 months, the efficacy of CT-P13 was maintained in 84.6% (66/78) of CD patients and 65.2% (15/23) of UC patients after switching from its originator. Adverse events related to CT-P13 treatment occurred in 11.9% (27/227) of CD and 8.5% (12/141) in UC patients.

Conclusion: CT-P13 appears to have great long-term efficacy and interchangeability and was overall well tolerated in patients with IBD. CT-P13 is a comparable alternative to its originator in the treatment of IBD.

Keywords: biosimilar, infliximab, Crohn’s disease, ulcerative colitis

EE-0389 (PE-0544) Pharmacodynamic study of golimumab in ulcerative colitis patients

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Background and Aim: Golimumab (GLM) was approved for the treatment of ulcerative colitis (UC) in 2013. While the other anti-TNF available drugs (infliximab and adalimumab) have validated algorithms concerning prescription and therapeutic drug monitoring (TDM), little is known about GLM. So far, there is no consensus on a possible therapeutic level or cut-off associated with clinical response, remission, or any other outcome measure such as endoscopic healing in UC for GLM. Therefore, we aim to explore the pharmacodynamic change of GLM in UC patients.

Methods: We used two kinds of methods for measuring the GLM level: one as in house method; the other with the IDKmonitor® Golimumab drug level ELISA kit (Immundiagnostik AG, Bensheim, Germany). After obtaining the informed consent, the serum was sampling at specific time points after the GLM injection. The dosage and schedule of GLM treatment was 200 mg (week 0), 100 mg (week 2), 50 mg (week 6) for the induction. Followed by 50 mg every 4 weeks as the maintenance therapy.

Results: A total of 11 UC patients who received GLM treatment were enrolled in this study with 24 trough level measured. The mean disease duration was 5.4 years. Their mean age was 37.5 years old. Male was still predominant in this cohort (73%). All of them received the combination therapy (91.7% thiopurine, 8.3% methotrexate). The correlation between the in house method and commercial kit was good (r² = 0.932, P < 0.0001). The mean trough level was 3.32 µg/mL for induction phase and 0.66 µg/mL for maintenance therapy, respectively.

Conclusion: Our results demonstrated that the in house method results correlated with the commercial kit. Our patients had lower trough level of GLM in maintenance phase than previous reports. Better understanding of these parameters could lead to improved patient care with GLM.

Keywords: inflammatory bowel disease, golimumab

Clinical characteristic of IBD patients

| Variable | N = 13 |
|----------|--------|
| Age (years) | 33.5 (17.7) |
| Gender (M:F) | F (77%) |
| 24 times of trough level from all patients, induction period: T1, maintenance period: T2, second phase: T3, third phase: T4 | 66.7 ± 6.1 |
| Body weight (kg) | 64.7 ± 6.1 |
| Disease type (%: NY) | 76.9 (5.3) |
| Proctis | 6 |
| Left side | 39 (43.7) |
| Total colon | 14 (38.5) |
| Concomitant medication (%: NY) | 26.9 (73.1) |
| Azathioprine | 26 (73.1) |
| Methotrexate | 1.5 (3.8) |
| Partial Mayo score | 1.70 (1.43) |
| Induction period (2-6 weeks) | 4.57 ± 1.99 |
| Maintenance period (7-12 week) | 3.0 |
| Maintenance period (13-20 week) | 3.78 ± 1.20 |
| Maintenance period (after 30 week) | 2.00 ± 0.45 |
| Endoscopy score | 2.00 (0.74) |
| Induction period | 2.29 ± 0.49 |
| Maintenance period (7-12 week) | 1.53 ± 0.39 |
| Maintenance period (13-20 week) | 2.11 ± 0.33 |
| Maintenance period (after 30 week) | 2.40 ± 0.59 |
| Modified endoscopy score | 4.78 (1.52) |
| Induction period | 5.49 ± 4.54 |
| Maintenance period (7-12 week) | 5.53 ± 1.55 |
| Maintenance period (13-20 week) | 4.11 ± 1.87 |
| Maintenance period (after 30 week) | 4.20 ± 2.49 |
| Trough level of GLM | 1.05 ± 0.21 |
| Induction period | 1.52 ± 0.21 |
| Maintenance period (7-12 week) | 0.69 ± 0.43 |
| Maintenance period (13-20 week) | 0.69 ± 0.29 |
| Maintenance period (after 30 week) | 0.77 ± 0.54 |
**EE-0404 (PE-0545) Real-world drug utilization in patients with inflammatory bowel disease: A population-based study in Taiwan**

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**Background and Aim:** This study aims to identify prescribing trends or quality of care of patients with inflammatory bowel disease (IBD) in Taiwan. **Methods:** Newly diagnosed IBD patients in 2010–2011 were identified in the Taiwan National Health Insurance Research Database. The IBD were defined by combining ICD-9 code and drug prescriptions. The drug utilization was grouped and assessed as (i) 5-ASA monotherapy, (ii) systemic steroid containing regimen without immunosuppressant and biologics, (iii) immunosuppressant containing regimen without biologics, and (iv) biologics containing regimen. **Results:** A total of 450 incident Crohn’s disease (CD) patients and 1397 ulcerative colitis (UC) were identified. Sixty-seven CD and 330 UC patients have catastrophic illness certificate (CIC) registration. During the initial 6-month follow-up period, 5-ASA were the most frequently prescribed regimen. The following prescribing trends were observed during the 2-year follow-up period in patients without vs with CIC, among CD patients. Briefly, the utilization of 5-ASA and steroid decreased, but immunosuppressant and biologics increased. The incidence of steroid-dependence in CD patients and UC patients was 14.2% and 10.4%, respectively, of which 29.7% and 35.2%, respectively, had CIC. The incidence of steroid-dependence among those with CIC was 28.4% in CD and 15.0% in UC. **Conclusion:** The total number of IBD patients is 6 times (CD) and 4 times (UC) greater than the number of those with CIC, indicating the challenge for accurate or consensus-reaching diagnosis. The steroid-dependence rate was relatively high, which may indicate an unmet need for optimizing multi-disciplinary diagnosis and treatment escalation.

**Keywords:** inflammatory bowel disease, drug utilization, real world

**EP-0048 (PE-0546) Cerebral infarction in ulcerative colitis patient with immune thrombocytopenia: A case report**

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**Background and Aim:** The risk of venous thromboembolism (VTE) is triple among inflammatory bowel disease (IBD) patients relative to general person. Although several consensus statements about VTE have been proposed, acute arterial events among IBD patients were less focused. Extra-intestinal manifestations of ulcerative colitis (UC) is common; however, few reports described immune thrombocytopenia (ITP). Hence, we report an 81-year-old patient with UC complicating acute cerebral infarction after he stopped cyclosporine for ITP. **Methods:** The patient was diagnosed UC for 10 years with oral sulfasalazine and achieved remission of symptoms. The patient had ITP for 1 year according to bone marrow examination which presented with platelet counts decreased to 4 × 10^9/L. Cyclosporine (50 mg bid) was prescribed as a maintenance therapy, and the platelet count was maintained in normal range. However, the patient stopped cyclosporine himself about 1 month ago. The patient admitted to hospital again due to hematochezia and diarrhea about 20 days ago. His medical history was complex, including hypertension, pulmonary emphysema, and diabetes. Laboratory tests showed that the patient’s platelet count was normal. Cyclosporine was applied again after consulted hematologist. Colonoscopy presented severe extensive lesions and confirmed UC by biopsy. **Results:** We started treatment with dexamethasone (8 mg/day) combined mesalazine (3 g/day). Defecation reduced to four times that day. Stool examination showed red blood cells negative but occult blood test positive. Unexpectedly, the patient developed paralysis and speaking problems. Brain CT scan showed multi-ischemic infarcts. Neurologists proposed careful monitor and intensive treatment in ICU. Unfortunately, he died of respiratory failure which caused by aspiration pneumonia. **Conclusion:** UC accompanying ITP developed cerebral infarction is rare. ITP might be related to UC. IBD patients are at high risk for thrombotic complications, which mean a decisive factor of morbidity and mortality, and we should pay more attention on acute arterial events.

**Keywords:** ulcerative colitis, immune thrombocytopenia, acute cerebral infarction
**EP-0051 (PE-0547) Study the change of Ig immune following Baron classification in ulcerative colitis**

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**Background and Aim:** Ulcerative rectal bleeding is a disease that is related to the immune mechanisms, particularly to the changes in cytokine concentrations and Ig antibodies. Mucosa and sub-mucosa lesions may be the cause of bleeding rectum. The disease that the patient experiences with remission and relapse is of unknown causes so far. This is a disease that is complex and difficult to treat. The study reviews the concentration of Ig immune antibodies in the serum and the association between different immune Ig concentrations classified using Baron’s classification in patients with colorectal bleeding. **Methods:** Cross-sectional study of 50 patients with diagnosis of colorectal ulcer bleeding, being under treatment at the Department of Gastroenterology of Bach Mai Hospital. All patients received blood tests to identify Ig antibodies and received laparoscopic colorectal diagnosis. **Results:** The proportion of female/male is 1/1. Age group of 40–49 is 32%. The concentration of antibody IgE clearly change in 38/50 case, rate is 76%. Following Baron classification, stage 2 is rate of 20% and stage 3 is rate of 80%. The rate of patients in stage 3 with IgE high is 92.1%. **Conclusion:** The concentration of antibody IgE clearly change in stage 3. **Keywords:** Change of Ig in ulcerative colitis

**EP-0053 (PE-0548) Retrospective case series of cytomegalovirus colitis in inflammatory bowel disease patients**

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**Background and Aim:** Concurrent cytomegalovirus (CMV) infection colitis is concerned as an exacerbating factor in patients with inflammatory bowel disease (IBD). We evaluate the clinical features of CMV colitis in hospitalized IBD patients. **Methods:** A retrospective study was performed involving IBD patients with CMV colitis hospitalized in Nanjing First Hospital from January 1, 2012, through December 31, 2017. The patients’ demographic data, clinical features, endoscopic and pathologic findings, treatment regimens, and outcome were analyzed. **Results:** Seven patients were identified with CMV colitis, including five ulcerative colitis (UC) patients and two Crohn’s disease (CD) patients. CMV colitis was diagnosed as being positive for CMV on immunohistochemical staining in colonic tissue. Of all the UC patients, 80% had disease exacerbation marked by fever and aggravated abdominal symptoms, while CD patients didn’t show this trend. Atypical appearances, such as wide mucosal defect, longitudinal ulceration, cobblestone-like appearance, irregular ulceration, and punched-out ulceration, were observed in UC CMV colitis patients. High-dose corticosteroids exposure was noted in 71.4% patients. Ganciclovir treatment which was given to five patients (four UC and one CD) made UC patients achieve clinical improvement, while didn’t show overall benefit for CD patient. **Conclusion:** Compared to CD patients, UC patients appear to have closer relationship between CMV infection and disease exacerbation. High-dose corticosteroids exposure is a risk factor for CMV infection. Antiviral treatment is recommended especially for UC CMV colitis. **Keywords:** inflammatory bowel disease, Crohn’s disease, ulcerative colitis, cytomegalovirus colitis
EP-0077 (PE-0549) Gastro-resistant, prolonged release mesalazine preparation, induced-neutropenia in patients with IBD

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Background and Aim: 5-Aminosalicylates have proven role in the management of inflammatory bowel disease. The availability mesalazine (like Mezavant Pentasa and Salofalk) preparations have enabled us to control the disease symptoms at wider level with minimal side effects than sulphasalazine.

Methods: We have collected the data from Ballarat Base Hospital, a regional hospital in Victoria, with ethics committee approval.

Results: Here is a case report of 81 male diagnosed with ulcerative colitis and was commenced on newest preparation of mesalazine and after 3 months use of it, presented in ER with severe illness, lethary, and found to be in severe neutropenia. Nil significant past history. Drug was discontinued, and short course of G-CSF was given and neutropenia resolved in 2 weeks.

Conclusion: Our patient showed the pattern of mesalazine-induced neutropenia but showed quick recovery after discontinuation of the drug and short course of G-CSF. We advised regular blood count checkup with its use.

Keywords: neutropenia, ulcerative colitis, mesalazine

EP-0126 (PE-0550) Development of a novel endoscopic scoring system to predict relapse after surgery in intestinal Behcet’s disease

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Background and Aim: Cumulative surgery rate and postoperative relapse of intestinal Behcet’s disease have been reported to be high. This study aimed to establish a scoring system based on follow-up endoscopic findings that can predict intestinal Behcet’s disease recurrence after surgery.

Methods: Fifty-four patients with intestinal Behcet’s disease patients who underwent surgery due to bowel complications and underwent follow-up colonoscopy were retrospectively investigated. Their clinical data including colonoscopic findings were retrieved. Classification and Regression Tree analysis was used to develop an appropriate model of endoscopic classification that can explain the post-surgical recurrence of intestinal Behcet’s disease most accurately based on the following classification: e0—no lesions; e1—< 20-mm sized solitary ulcer; e2—20-mm sized solitary ulcer; and e3—multiple ulcers regardless of size.

Results: Clinical relapse occurred in 37 patients (61.52%). Among 38 patients with colonoscopic recurrence, only 29 cases had clinically relapsed. Multivariate analysis identified higher DAIBD at colonoscopy (HR = 1.013, 95% CI, 1.005–1.021, \( P = 0.002 \)) and colonoscopic recurrence (HR = 2.829, 95% CI, 1.223–6.545, \( P = 0.015 \)) as independent risk factors for clinical relapse of intestinal Behcet’s disease. Endoscopic findings were classified into four groups, and multivariate analysis showed that the endoscopic score was an independent risk factor of clinical relapse (\( P = 0.012 \)). The risk of clinical relapse was higher in the e3 colonoscopy group compared to the e0 group (HR = 6.284, 95% CI, 2.036–19.391, \( P = 0.001 \)).

Conclusion: This new endoscopic scoring system could predict clinical relapse in patients after surgical resection of intestinal Behcet’s disease.

Keywords: Behcet syndrome, postoperative care, recurrence, endoscopy
OE-0103 (PE-0551) Induction with infliximab and a plant-based diet as first-line (IPF) therapy for moderate-to-severe to severe ulcerative colitis

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Background and Aim: No previous study has incorporated a plant-based diet in the induction phase of treatment for severe ulcerative colitis (UC). The aim of this study was to investigate the remission rate for infliximab combined with a plant-based diet as first-line (IPF) therapy for moderate-to-severe UC. Methods: This was a prospective single-group trial conducted at two tertiary hospitals. In 2012, infliximab became available for the treatment of UC in Japan. Moderate-to-severe to severe UC were candidates for the study. Severity was judged based on the Truelove & Witts criteria. Patients were admitted and given standard induction therapy with infliximab (5 mg/kg at 0, 2, and 6 weeks). Additionally, they received a plant-based diet, namely, a lacto-ovo-semi-vegetarian diet (30 kcal/kg standard body weight/day). The primary end-point was remission, defined as the disappearance of bloody stool at week 6 after initiation of study therapy. Improvement without disappearance of bloody stool was regarded as therapeutic response. Indication for surgery before completion of study therapy was regarded as therapeutic failure. This research was approved by an ethics committee. Results: IPF therapy was administered in 15 cases (male/female 8/7: 11 relapse cases, 2 initial episode cases, and 2 chronic continuous cases: 11 extensive colitis, 4 left-sided colitis: 10 severe, 5 moderate-to-severe). Median age was 37 years with a range from 18 to 78 years. Median disease duration was 36 months with a range from 4 to 336 months. Clinical remission, therapeutic response, and therapeutic failure were seen in 11, 2, and 2 cases, respectively. The remission rate was 73% in both intention to treat and per protocol analyses. The rate of therapeutic failure was 13%. Conclusion: IPF therapy induced remission at week 6 in 11 of 15 (73%) moderate-to-severe to severe UC patients. This is far better than the outcomes reported in the literature.

Keywords: ulcerative colitis, infliximab, plant-based diet, remission, inflammatory bowel disease

OE-0137 (PE-0552) Incidence of clostridium difficile infection in IBD patients taking anti-TNF therapies vs vedolizumab: A retrospective cohort study

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Background and Aim: It is unclear if vedolizumab has different risk of enteric infections such as clostridium difficile associated diarrhea (CDAD) compared to anti-TNF agents. We aim to study the risk of CDAD among vedolizumab and anti-TNF treated patients with inflammatory bowel disease (IBD). Methods: Retrospective review of case records was conducted for all IBD patients treated with vedolizumab and anti-TNF therapies at Singapore General Hospital from March 2010 to March 2018. Baseline characteristic, treatment duration with biologics, incidence of CDAD, and its associated risk factors (recent hospitalization within 3 months, antibiotics, steroid, immunomodulator, or proton pump inhibitor use within 4 weeks) were collected. Risk of CDAD was compared using Fisher exact test. Results: One hundred nine patients (vedolizumab: 23; anti-TNF: 86) were included. There was no significant difference in CDAD incidence between both groups, vedolizumab (1/23, 0.043%) vs anti-TNF (5/86, 0.058%), P = 0.63 (Table 1). The single case of CDAD in the vedolizumab cohort was receiving prednisolone and proton pump inhibitor at the time of diagnosis. For the 5 cases of CDAD from the anti-TNF cohort, majority (4/5, 80%) had minimum 1 risk factor, and 3/5 (60%) had minimum 2 risk factors. All patients were treated successfully with no recurrence reported over a median follow-up period of 16.7 months (IQR 12.5–39.5). Conclusion: While our study has observed comparable incidence of CDAD among IBD patients who were treated with vedolizumab or anti-TNF therapies, they were confounded by additional risk factors. Larger studies will be required to confirm this observation.

Keywords: CDAD incidence, IBD, vedolizumab vs anti-TNF, enteric infections, CDAD recurrence

CDAD table

Table 1. Cases of CDAD in both cohorts.

|                         | VDZ (n=23) | ANTI TNF (n=86) |
|-------------------------|------------|-----------------|
| Number of CDAD incidents| 1 (0.04%)  | 5 (0.06%)       |
| Risk factors (number of cases) |          |                 |
| Recent antibiotics      | 0          | 2               |
| Recent hospitalization  | 0          | 2               |
| Current PPI use         | 1          | 2               |
| Steroid treatment       | 1          | 3               |
| Immunosuppressive therapy | 0        | 3               |
| Combined steroid immunomodulator | 0 | 2               |
| Treatment               |            |                 |
| Median duration between initiation of biologic and CDAD episode*: weeks (IQR) | 56(32–52) | 27(15.5–49.5) |
| Treatment               |            |                 |
| Microlax alone          | 1          | 3               |
| Vancomycin alone        | 9          | 0               |
| Metronidazole-vancomycin| 3          | 2               |
| Recurrent CDAD          | 0          | 0               |
**OE-0145 (PE-0553) Ulcerative colitis in a Bangladeshi child: Case report**

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**Background and Aim:** Ulcerative colitis (UC) is a chronic idiopathic inflammatory disorder of colon. The incidence of pediatric-onset UC is uncommon in tropics and subtropics but roughly 15% to 20%, in most North American and European regions. We describe a case of pediatric ulcerative colitis with successful treatment. **Methods:** A 4-year-old girl who presented with passage of loose bloody stool, abdominal pain, and mild arthralgia along with significant weight loss. Her height was 95 cm and weight was 13 kg. Diagnosis was confirmed by colonoscopy and biopsy. Treatment was thereafter started with parenteral steroid initially then oral steroid and mesalamine. The patient is now on remission and is on regular follow up. **Results:** Ulcerative colitis (UC) is a multifactorial disease characterized by remission and relapse. The hallmark symptoms are chronicity (> 2–3 weeks), abdominal cramping, diarrhea, and bloody stool. About 10% of patients present with features of severe colitis. Childhood-onset UC is extensive in 60% to 80% of cases, twice as often as in adults. Children also have unique age-related considerations, such as growth, puberty, nutrition, and bone mineral density accretion during adolescence, as well as differing psychosocial needs and development. With medical management, most children are in remission within 3 months; however, 5–10% continues to have symptoms unresponsive to the treatment beyond 6 months. **Conclusion:** UC is rare in Bangladesh, especially in children. Several conditions like infective colitis, allergic colitis, Meckel’s diverticulitis, Crohn’s disease, etc. may mimic the features of UC. So if a child presents with recurrent bloody diarrhea, UC should be considered as differential diagnosis. **Keywords:** Bangladeshi child, ulcerative colitis

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**OE-0418 (PE-0554) Systematic review and meta-analysis: Prevalence of small intestinal bacterial overgrowth in inflammatory bowel disease**

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**Background and Aim:** We conducted a meta-analysis to assess the prevalence of small intestinal bacterial overgrowth (SIBO) in IBD patients, both ulcerative colitis (UC) and Crohn’s disease (CD). **Methods:** Electronic databases were searched up to May 2018 for all studies reporting prevalence of SIBO in IBD patients. The prevalence rate of SIBO among IBD patients and the odds ratio (OR) and 95% CI of SIBO in IBD patients compared with controls were calculated. **Results:** The final dataset included 11 studies (1175 adult patients with IBD and 407 controls), all utilizing breath test for SIBO diagnosis. The prevalence of SIBO in IBD patients was 22.30% (95% CI 19.92–24.68), while the odds for SIBO in IBD patients was 9.51 (95% CI 3.39–26.68) as compared to controls. In patients with CD, presence of fibrostenosing disease (OR = 7.47; 95% CI 2.51–22.20), prior bowel surgery (OR = 2.38; 95% CI 1.65–3.44), especially resection of ileocecal valve (ICV) increased the odds of SIBO. Methane positive on breath test was inversely associated with SIBO in IBD patients (OR = 0.72; 95% CI 0.11–4.51) compared to controls. Treatment with immunotherapy and disease activity was not associated with SIBO in CD patients. **Conclusion:** Prevalence of SIBO is significantly increased in IBD patients and more than 9-fold when compared controls. Prior surgery, presence of fibrostenosing disease, combined small and large bowel disease but not disease activity, and use of immunosuppression and methane positivity on breath test were associated with SIBO in IBD patients. **Keywords:** bacterial overgrowth, inflammatory bowel disease, breath tests, ulcerative colitis, Crohn’s disease
OE-0492 (PE-0555) Incidence and risk factors of micronutrient deficiency in the patients with inflammatory bowel disease in Korea

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Background and Aim: Inflammatory bowel disease (IBD) patients are vulnerable to micronutrient deficiencies due to diarrhea-related gastrointestinal loss and lack of dietary intake from anorexia related to disease activity. However, there is still limited number of studies on the incidence and risk factors of micronutrient deficiency. Methods: We retrospectively analyzed 105 IBD patients who underwent micronutrient examination including folate, vitamin B12, 25-OH-vitamin D, ferritin from March 2016 to March 2017. In addition, all of these patients had follow-up blood tests 6 months later at single tertiary university hospital. Results: In the deficiency group, 76 (72.4%) patients had a deficiency in one of the four micronutrients (folate, vitamin B12, 25-OH-vitamin D, and ferritin), and 29 (27.6%) were in the non-deficiency group. Deficiency group showed significantly higher rate of young age (mean ± standard deviation [SD], 38.7 ± 14.5 vs 54.4 ± 15.0; P < 0.001), incidence of deficiency in Crohn’s disease (CD) (CD, ulcerative colitis [UC], and intestinal Behcet’s disease [BD]; 78.9% vs 14.5% vs 66.6%; P < 0.001), use of azathioprine (35.5% vs 10.3%; P = 0.011) and anti-TNF agents (50.0% vs 20.7%; P = 0.006) compared with non-deficiency group. On the multivariate analysis, CD (Hazard ratio [HR], 3.600; 95% confidence interval [CI], 1.057–12.253; P = 0.040) and intestinal BD (HR, 15.469; 95% CI, 1.081–221.359; P = 0.044) were determined to be significant independent factors for micronutrient deficiency compared with UC. Conclusion: In conclusion, the incidence of micronutrient deficiency is high (72.4%), and CD and intestinal BD were associated with higher risk of deficiency than UC. Therefore, in IBD patients, especially the patients with CD and intestinal BD, need more attention in micronutrition.

Keywords: IBD, micronutrient deficiency

OE-0521 (PE-0556) Clinical profile of patients who underwent colectomy in ulcerative colitis

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Background and Aim: To analyze the clinical and demographic profile of ulcerative colitis patients who required surgical intervention. Methods: Data of 60 patients studied between the year 2011 and 2018 with ulcerative colitis (UC) operated by restorative proctocolectomy and ileo pouch anal anastomosis (IPPA) were analyzed. The hematological, biochemical investigation along with endoscopic evaluation was done. The clinical course of patients was studied to estimate the average time required for surgical intervention. Results: The mean age of the patients who underwent surgical intervention was 32.3 ± 7.8 years, out of which 40.6% were females and 59.4% were males, average duration of disease was 25.56 ± 5.4 months. The number of acute episodes before operation was 4.53 ± 1.12; follow up was done for 42 months. Out of 60 patients, 63% had hemoglobin < 10 g/dL with a mean value of 9.62 g/dL; 66% patients had ESR level > 30 mm/h with a mean of 41.55. Albumin level ≤ 2.8 mg/dL was observed in 58.3% patients with a mean value of 2.79. Among the 60 patients, 48% showed panceolitis, 40% showed left side colitis, and 12% showed proctitis, with 68% showing significant weight loss. The mean CRP was 44.9 mg/L; patient with panceolitis had higher CRP values. Conclusion: Patients with UC presenting with hypoalbuminemia, anemia, weight loss, pancolitis, elevated ESR, and CRP showed worse clinical course. Thus, to conclude early identification of aforementioned parameters may be helpful in selecting patients for surgical intervention.

Keywords: ulcerative colitis, colectomy, colitis
OE-0692 (PE-0557) Serological investigation of IgG and IgE antibodies against food antigens in patients with inflammatory bowel diseases

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Background and Aim: In inflammatory bowel diseases (IBD), the involvement of food antigens in immune responses remains unclear. The objective of this study was to assess the prevalence and clinical significance of food specific immunoglobulin G (IgG) and E (IgE) antibodies in patients with IBD.

Methods: We enrolled a total of 101 IBD patients, including 32 ulcerative colitis (UC), 69 Crohn’s disease (CD), and 50 healthy controls (HC). Serum IgG antibodies against 14 unique food allergens were measured by semi-quantitative enzyme linked immunosorbent assay (ELISA). Serum IgE antibodies against 10 food allergens were detected by western blotting (WB).

Results: Food sIgG antibodies were detected in 53.1% of UC patients, 91.3% of CD patients, and 42% of HC. CD patients showed the significantly higher IgG antibodies prevalence than UC groups and healthy controls (CD vs HC, P = 0.000; CD vs UC, P = 0.000). However, there was no significance between UC and HC groups (P = 0.324). The number of IgG-positive foods was significantly larger in CD patients than in UC or HC patients (CD vs UC, P = 0.000; CD vs HC, P = 0.008). The top five prevalent food allergens which caused positive sIgG antibodies in IBD patients were tomato (77.5%), corn (68.8%), egg (61.3%), rice (57.5%), and soybean (38.7%). IBD-related surgery was suggested as a risk factor (IBD-related surgery: OR = 10.910, P = 0.014). Anti-food IgE antibodies prevalence were not different among UC (57.1%), UC (65.2%) patients, and controls (60%) (CD vs UC, P = 0.868; UC vs HC, P = 0.686).

Conclusion: High prevalence of serum food sIgG may be related to incidence of CD. sIgG antibodies may potentially be utilized to guide diets for CD patients.

Keywords: inflammatory bowel diseases, food antigens, food specific immunoglobulin G

OE-0707 (PE-0558) Retinoic acid aggravates mucosal inflammation by augmenting Th1/Th17 differentiation in inflammatory bowel disease

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Background and Aim: Recent murine studies have highlighted the pro-inflammatory role of retinoic acid (RA) in sustaining inflammation. However, there is limited human data. We investigated the in vivo and in vitro role of RA in modulating mucosal inflammation in inflammatory bowel disease (IBD).

Methods: This cross-sectional study included controls, steroid naïve ulcerative colitis (UC), and Crohn’s disease (CD) patients. Mucosal biopsies and blood were evaluated for RA levels and immunophenotypic profiles (CD4, CD8, MAIT, γδ T cells). In healthy volunteers, we assessed the effect of RA on CD4 T-cell responses differentiated in the presence and absence of inflammatory conditions.

Results: Twenty-nine UC patients, 13 CD patients, and 15 healthy controls were included. IBD patients had an increased tissue (UC: 3.4 vs 0.8 ng/mL; P < 0.0001, CD: 3.5 vs 0.8 ng/mL; P < 0.0001) and serum (UC: 1.4 vs 0.7 ng/mL; P < 0.05, CD: 1.7 vs 0.7 ng/mL; P < 0.01) RA levels than controls. Active UC had higher tissue RA levels than patients in remission (4.0 vs 2.5 ng/mL; P < 0.01). This effect was accompanied by significantly increased IL-17 and IFNγ in tissue CD4+, CD8+, MAIT+, and γδ T cells which additionally showed significant positive correlation with tissue RA levels in IBD patients. Further, in vitro RA primed dendritic cells upregulated CCR9+ T cells which expressed induced levels of IFNy and IL-17 in Th1/Th17 conditions. Conclusion: This is the first study to estimate RA levels in human gut showing that tissue RA levels are significantly increased in IBD and correlate significantly with pro-inflammatory cytokines in mucosa.

Keywords: IBD, retinoic acid, IFNg, IL-17, inflammation
OE-0814 (PE-0559) Intestinal tuberculosis on top of Crohn’s disease: A never-ending dilemma

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Background and Aim: The global trend indicating rising incidence of inflammatory bowel disease in newly industrialized countries like the Philippines will add up to the major health problem of tuberculosis disease burden. Addressing this looming concern requires adequate data to develop good clinical practice for better delivery of health care. Availability of clinical information will help clinicians develop comprehensive approach in dealing with possible coexistence of Crohn’s disease and intestinal tuberculosis.

Methods: We present a case of 33-year-old, male, Filipino diagnosed with Crohn’s disease with coexisting intestinal tuberculosis.

Results: Judicious approach to distinguish Crohn’s disease from intestinal tuberculosis is the initial step for management. Treatment of intestinal tuberculosis must take precedence over Crohn’s disease. Treatment with intestinal tuberculosis follows the basic principle of treatment with pulmonary tuberculosis employing a 6- to 9-month regimen. In cases of complications, like stricture formation leading to obstruction and perforation, surgical intervention must be considered.

Conclusion: A thorough clinical evaluation, including comprehensive history and complete physical examination in addition to endoscopic, histopathologic, and biochemical investigations must be seek out prior to any attempts to start definitive treatment. Ensure to rule out other diseases especially infectious etiology, most particularly intestinal tuberculosis because medications use to treat Crohn’s disease has the potential to induce flare of tuberculosis leading to complications. Compendium of scientific information and clinical data will help clinicians to develop strategies and clinical pathways to address possible dilemma due to close association of these two diseases.

Keywords: inflammatory bowel disease, Crohn’s disease, intestinal tuberculosis

Figure 1. Endoscopic findings

OE-0823 (PE-0560) Efficacy of infliximab with azathioprine for steroid-dependent ulcerative colitis refractory to golimumab

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Background and Aim: Biotherapy has been recently advanced as an indication and maintenance therapy for inflammatory bowel disease such as ulcerative colitis (UC). Golimumab (GLM), which was an anti-tumor necrosis factor alpha, was approved to use for patients with UC as an indication and maintenance therapy in Japanese insurance system in addition to infliximab (IFX) and adalimumab (ADA). However, we sometimes experience the patients with secondary failure of biotherapy. We present the case of a patient with an extensive and steroid-dependent ulcerative colitis, who received a maintenance therapy of infliximab and azathioprine after failure of maintenance therapy using GLM.

Methods: This was a case report. Results: This case report is a 46-year-old woman. Her past medical history is uterine myoma. She had been diagnosed with UC at the age of 26 and was in remission maintained by oral administration of 5-aminosalicylic acid (5-ASA). She experienced several cycles of relapse and remission. Steroid and leukocytapheresis (LCAP) therapy were received during repeated relapses. One and a half year ago, she got worse to severe UC and received an induction therapy of corticosteroid (PSL 40 mg/day). Although clinical remission was achieved, the attempt to taper corticosteroids was unsuccessful, it means that it has become steroid-dependent UC. Therefore, GLM was used as a maintenance therapy. Then, she was success to get free from steroid. After 10 months with this treatment, the patient was admitted to the hospital with severe condition of UC (UCAI score; 15). Steroid therapy (PSL 40 mg/day) was used as an induction therapy. Then, IFX (5 mg/kg) concomitant with azathioprine (50 mg/day) was used as a maintenance therapy. She remains in clinical remission.

Conclusion: Switching biotherapy and adding AZA was an important treatment option for UC patients after secondary failure of biotherapy. In the near future, new type of bioagents are desired to be available in Japan.

Keywords: infliximab, golimumab, ulcerative colitis, steroid-dependent UC
EE-0239 (PE-0561) Five cases of ulcerative colitis developed during the immunosuppressive therapy after renal transplantation

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Background and Aim: Corticosteroids and calcineurin inhibitors are remission induction therapeutic drugs for moderate and more severe ulcerative colitis (UC) in Japan. Recipients after renal transplant require immunosuppressive therapy with corticosteroids, calcineurin inhibitors, and anti-metabolites. Therefore, since recipients after renal transplantation already use immunosuppressive drugs, it is considered to be rare to develop UC. We are reporting 5 cases of UC that developed during administration of immunosuppressive drugs after renal transplant in our hospital.

Methods: Among 350 UC patients who had medical treatment at the St. Marianna University School of Medicine Hospital during the period from April 2009 to March 2018, we retrospectively examine 5 cases in which UC developed during administration of immunsuppressive drugs after renal transplant in our hospital. Results: The average age at onset of UC was 40 ± 11 years, the sex was 3 males, the background disease of renal transplantation was 3 IgA nephropathy cases, 1 diabetic nephropathy case, and 1 focal glomerulosclerosis case. The time from renal transplantation until the development of UC was 8.6 ± 6.3 years, clinical activity index (CAI) score was CAI 9 ± 5.4, and the disease type were 1 pancolitis case/2 left sided colitis cases/2 proctitis type cases. The endoscopic score at the time of diagnosis was 1 Mayo 1 case, 3 Mayo 2 cases, and 1 Mayo 3 cases. In all cases, immunosuppressive therapy with three agents was performed after renal transplantation. For UC remission induction and maintenance treatment, there were 4 cases performed only with internal administration of 5-ASA and 1 case with remission maintenance with azathioprine after induction using calcineurin inhibitor. Conclusion: We experienced 5 cases of UC that developed during immunosuppressive therapy after renal transplantation. We shall consider and report with additional bibliographic consideration.

Keywords: renal transplantation, immunosuppressive therapy, ulcerative colitis, corticosteroids, calcineurin inhibitors

EE-0356 (PE-0567) Alterations of fecal short-chain fatty acids in patients with irritable bowel syndrome: A systematic review and meta-analysis

Authors: QINGHUA SUN; LIPING DUAN

Background and Aim: Recent studies indicate that disorder of gut microbiota potentially contributes to the pathogenesis of irritable bowel syndrome (IBS) and fecal short-chain fatty acids (SCFAs) generated from gut microbial fermentation can partly reflect the change of gut microbiota. Therefore, we performed a systematic review and meta-analysis on fecal SCFAs in IBS patients.

Methods: Randomized controlled trial (RCT) and case–control studies were searched through major databases: PubMed, Embase, Web of Science, CNKI, Wanfang database. The SMD with 95% confidence interval of fecal SCFAs was calculated. Results: Nine studies were included in our analysis. The results in Table 1, the proportion of acetic acid is significantly lower in IBS patients (SMD: −0.39; 95% CI: [−0.77, −0.02]), while the proportion of propionic acid higher in IBS patients (SMD: 0.40; 95% CI: [0.02, 0.78]) compared with healthy controls. In a following subgroup analysis based on types of IBS, acetic acids, propionic acids, and butyric acids were found significantly higher in IBS-D patients than in IBS-C patients in one study. We also analyzed the fecal SCFAs of IBS patients receiving treatments. Patients who were receiving antibiotics and probiotics, SCFAs changed insignificantly, and those who were receiving low FODMAP diets, acetic acids and butyric acids declined significantly. Conclusion: There were differences of fecal SCFAs between IBS patients and health controls. It implied that some fecal SCFAs might be a helpful indicator for diagnosing IBS from healthy people as well as monitoring IBS treatment effectiveness to some extent. Solid and certain conclusions need more studies.

Keywords: irritable bowel syndrome, short-chain fatty acids, meta-analysis

Table 1 Characters of the included studies and pooled results of alteration of faecal SCFAs in IBS patients versus healthy controls patient versus healthy controls.

| Study | Country | Design | Type | Sample Size | Study Duration | Intervention | Main Result | Notes |
|-------|---------|--------|------|-------------|----------------|--------------|-------------|-------|
| Study 1 | USA | RCT | IBS-D | 50 | 8 weeks | FODMAP | SCFAs changed insignificantly | |
| Study 2 | USA | RCT | IBS-C | 50 | 8 weeks | FODMAP | SCFAs changed insignificantly | |
| Study 3 | China | RCT | IBS-D | 50 | 8 weeks | Antibiotics | SCFAs changed insignificantly | |
| Study 4 | China | RCT | IBS-C | 50 | 8 weeks | Antibiotics | SCFAs changed insignificantly | |
| Study 5 | China | RCT | IBS-D | 50 | 8 weeks | Probiotics | SCFAs changed insignificantly | |
| Study 6 | China | RCT | IBS-C | 50 | 8 weeks | Probiotics | SCFAs changed insignificantly | |
| Study 7 | China | RCT | IBS-D | 50 | 8 weeks | Low FODMAP diet | SCFAs changed insignificantly | |
| Study 8 | China | RCT | IBS-C | 50 | 8 weeks | Low FODMAP diet | SCFAs changed insignificantly | |
| Study 9 | China | RCT | IBS-D | 50 | 8 weeks | Low FODMAP diet | SCFAs changed | |
OE-0061 (PE-0568) Protease activated receptor-2 induces immune activation and visceral hypersensitivity in post-infectious irritable bowel syndrome

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Background and Aim: The role of protease activated receptor-2 (PAR-2) in the pathogenesis of abdominal pain in irritable bowel syndrome (IBS) is not well defined. We aimed to investigate the role of PAR-2-mediated visceral hypersensitivity by using a post-infectious IBS (PI-IBS) mouse model. Methods: T. spiralis infected PI-IBS mouse model was used. Fecal serine protease activity and intestinal mast cells were evaluated. Intestinal permeability was assessed by using the lactulose/mannitol ratio and cecal expressions of PAR-2 and tight junction (TJ) proteins were examined by western blot. Intestinal immune profile was assessed by measuring Th (T-helper) 1/Th2 cytokine expression. Visceral sensitivity was evaluated by abdominal withdrawal reflex (AWR) in response to colorectal distension (CRD). Results: Mice infected with T. spiralis developed visceral hypersensitivity after 8 weeks. PI-IBS mice had higher AWR scores for all levels of distention (20, 40, 60, and 80 mmHg) and lower pain and volume thresholds compared to the control mice (all P < 0.05). Colonic PAR-2 expression (P = 0.03) as well as fecal serine protease activity (P = 0.02) and intestinal mast cell counts (P < 0.001) were elevated in PI-IBS compared to the control mice. Decreased colonic TJ protein expression, increased lactulose/mannitol ratio (P = 0.001), and elevated colonic Th1/Th2 cytokine ratio (P = 0.001) were observed in PI-IBS compared to the control mice. Administration of PAR-2 agonist in control mice demonstrated similar changes observed in PI-IBS mice, while PAR-2 antagonist normalized intestinal hyper-permeability (P = 0.001) led a trend towards decreased Th1/Th2 ratio (P = 0.07) and reduced visceral hypersensitivity (decreased AWR scores and higher pain and volume thresholds) in PI-IBS mice. Conclusion: PAR-2 activation induces intestinal hyper-permeability leading to immune activation and visceral hypersensitivity in PI-IBS mouse model.

Keywords: protease activated receptor-2, irritable bowel syndrome, permeability, visceral hypersensitivity

OE-0075 (PE-0569) Prevalence and predictors of small intestinal bacterial overgrowth in irritable bowel syndrome: A systematic review and meta-analysis

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Background and Aim: The reported prevalence of small intestinal bacterial overgrowth (SIBO) among irritable bowel syndrome (IBS) patients is variable. The aim of the study is to estimate the prevalence and identify predictors of SIBO in IBS. Methods: PubMed, Cochrane Library, and EMBASE through July 2017 were searched to identify studies evaluating the prevalence of SIBO in IBS. The pooled prevalence of SIBO among individuals with IBS was compared with healthy controls. Predictors of SIBO among IBS patients were also evaluated. Results: Fifty studies (8398 IBS, 1432 controls) met the inclusion criteria. Overall pooled prevalence of SIBO in IBS was 38% (95% CI 32–44) and was higher among IBS patients (OR 4.7, 95% CI 3.1–7.2) compared with controls. The pooled prevalence of SIBO in IBS was higher in studies diagnosed by breath tests (40%, 95% CI 33–46) compared with culture (19%, 95% CI 8–30). Furthermore, the prevalence of SIBO was higher in studies diagnosed by lactulose breath test (47%, 95% CI 39–56%) compared with glucose breath test (31%, 95% CI 24–38%). Among those with IBS, female gender (OR 1.5, 95% CI 1.0–2.1), older age (standard mean difference 3.1 years, 95% CI 0.9–5.4), and IBS-diarrhea (OR 1.7, 95% CI 1.3–2.3) compared with other IBS subtypes increased the odds of SIBO; proton pump inhibitor (PPI) use (OR 1.1, 95% CI 0.7–1.7) was not associated with SIBO. Conclusion: More than one third of IBS patients tested positive for SIBO, and the odds of SIBO in IBS was increased by nearly fivefold. The prevalence of SIBO varied according to the diagnostic modality performed. Female gender, older age, and IBS-diarrhea but not PPI use were associated with SIBO among individuals with IBS.

Keywords: small intestinal bacterial overgrowth, irritable bowel syndrome, breath test, culture
**OE-0162 (PE-0570) Prevalence and predictors of irritable bowel syndrome (ROME IV, ROME III, and Asian criteria) among medical students in a government medical college in South India**

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**Background and Aim:** Irritable bowel syndrome (IBS) is the most common functional gastrointestinal disorder. The prevalence of IBS in various Asian countries (ROME III) is 5–10%. (i) To estimate the prevalence and predictors of clinical irritable bowel syndrome by ROME IV, ROME III, and Asian criteria. (ii) To measure the agreement between ROME IV, ROME III, and Asian criteria.

**Methods:** It was a cross-sectional questionnaire-based study done on 552 medical students (138 students per batch × 4 batches) who gave their consent for the study were included. Filled up questionnaires were collected and chi-square test was applied.

**Results:** Prevalence in-creases with increasing age and higher MBBS batch using Rome III (P = 0.012, 0.027) and Asian criteria (P = 0.002, 0.017) but not with ROME IV (P = 0.23, 0.40). IBS was found to have an association with mode of delivery, physical activity, BMI, coffee, dairy products, carbonated beverages, sleep duration, analgesic, and antibiotics intake. Cohen’s kappa coefficient (κ) were 0.699, 0.367, and 0.213, between ROME III and Asian, ROME IV and ROME III, and ROME IV and Asian criteria. Prevalence of clinical IBS according to ROME IV, ROME III, and Asian criteria was 5.8%, 19%, 30.4%, respectively (Fig. 1). More specifically, ROME IV-positive IBS was mainly a subgroup of ROME III-positive IBS with more serious symptoms.

**Keywords:** IBS, ROME IV, ROME III, Asian, prevalence

**OE-0461 (PE-0571) The impact of gastroesophageal reflux disease, irritable bowel syndrome, and functional constipation on health-related quality of life in patients with chronic kidney disease**

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**Background and Aim:** It is unknown if gastroesophageal reflux disease (GERD), irritable bowel syndrome (IBS), and functional constipation (FC) impacted quality of life of patients with various stages of chronic kidney disease (CKD). This was a cross-sectional study conducted in three centers (two in Kota Bharu and one in Kuala Lumpur) in Malaysia involving 391 patients (mean age 52.4 ± 16.6, females 53.5%, Malays 86%). All completed the Malay language-translations of Kidney Disease Quality of Life (KDQOL-SF-24) with three main components, that is, disease-specific, physical and mental, GERDQ, and ROME III Diagnostic Questionnaires for IBS and FC. Multiple logistic regression analysis was used to evaluate association between GERD, IBS, and FC with components of KDQOL. Significance set at P < 0.05. Statistics: Of 391 respondents, 57.5% had CKD stage 4 and 5 disease and 45.5% on dialysis. FC, GERD, and IBS were reported in 80.8%, 13.0%, and 6.4%, respectively. Only FC affected total disease-specific scores of KDQOL-SF-24 (P < 0.001). All three GERD, IBS, and FC affected total physical scores of KDQOL-SF-24 (all P < 0.03), but none affected total mental scores of KDQOL-SF-24 (all P > 0.4). On the disease-specific domains of KDQOL-SF-24, GERD affected symptoms and sleep (both P < 0.005), FC affected social support and patient satisfaction (both P < 0.03), and both GERD and FC affected emotions and burden of kidney disease (all P < 0.03). On the physical domains of KDQOL-SF-24, FC affected general health perception (P < 0.001), both IBS and FC affected physical functioning (both P < 0.03), and both GERD and IBS affected pain (both P < 0.03). On the mental domains of KDQOL-SF-24, GERD affected emotion (P = 0.001) and FC affected energy or fatigue (P = 0.049). Conclusion: FC is very common among patients with CKD and affected especially the disease-specific component of KDQOL-SF-24. GERD and IBS are less common than FC and GERD affected more domains of KDQOL-SF-24 than IBS.

**Keywords:** gastroesophageal reflux disease, irritable bowel syndrome, functional constipation, quality of life, chronic kidney disease
OE-0463 (PE-0572) What factors affect marital quality, psychology, and quality of life in married females with functional gastrointestinal disorders?
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Background and Aim: We aimed to determine factors associated with marital quality, psychological stress, and quality of life (QOL) among married females affected by functional gastrointestinal disorders (FGIDs) including irritable bowel syndrome (IBS), functional dyspepsia (FD), and overlap of both. Methods: This was a cross-sectional study among married females with and without clinically diagnosed IBS, FD, or both. Factors studied included age, education, height, weight, incomes of wife and husband, duration of current marriage, number of marriages, and number of children. Revised Dyadic Adjustment Scale (RDAS); a measure of distress; lesser score more distress) and Relationship Dynamics Scale (RDS; a measure of conflict; higher score more conflicts) were outcome measures of marital quality. Hospital Anxiety Depression Scale (HADS) and Quality of Life (EQ-5D-5L and EQ-VAS) were also evaluated outcomes. Multivariate analysis was used to determine associations between factors and outcomes. Results: Of 68 participants (mean age 37.8), 56% were IBS, 32.4% were FD, and 12% overlap of both. Factors associated with distressed relationship were wife income, height, weight, anxiety, and QOL. Factors associated with marital conflicts included education (P = 0.009), wife income (P = 0.02), height (P = 0.02), and number of children (P = 0.05). Factors associated with anxiety included age (P = 0.04), duration of current marriage (P = 0.01), and number of marriages (P = 0.03) and with depression, age, and duration of marriage (both P = 0.01). QOL was affected by marital conflicts (P = 0.01) not others. Of 150 controls without FGIDs (mean age 34.0 ± 9.4 years), there were no identifiable factors associated with distressed relationship (all P > 0.05), but with marital conflicts, husband income was significant factor (P < 0.001). Conclusion: Compared to controls, there are identifiable personal and psychological factors associated with marital distress and conflicts among married females with FGIDs.

Keywords: marital quality, psychological factors, distressed relationship, functional gastrointestinal disorders

OE-0582 (PE-0573) The efficacy and predictors of low-FODMAPs diet vs standard dietary advice in Chinese adults with diarrhea-predominant irritable bowel syndrome: A randomized controlled trial
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Background and Aim: A diet low in FODMAPs (fermentable oligo-, di- and mono-saccharides and polyols) improves IBS symptoms in western populations. We performed a randomized controlled trial to evaluate the efficacy of low-FODMAP diet in Chinese patients with diarrhea-predominant IBS (IBS-D). Methods: Patients with IBS-D (ROME III criteria) from Sir Run Run Shaw Hospital were randomized after 2-week run-in period to receive low-FODMAP diet or traditional dietary advice (NICE Guidelines modified by DRIs for Chinese population) for 3 weeks. Primary end-point was a ≥ 50-point reduction in IBS Symptom Severity Score (IBS-SSS). Predictors of response to low-FODMAP diet including fecal short-chain fatty acid (SCFA) levels were analyzed. Results: Of the 108 patients randomized, 100 (mean age 44 ± 13 years; 53 males) completed the study. The primary end-point was met in 30/51 (59%) patients in low-FODMAP diet and 26/49 (53%) in traditional dietary advice groups (difference = 6%, 95% CI −13% to +24%; P = 0.562). Among patients who completed the low-FODMAP diet, fecal butyric acid (P = 0.04) decreased while isobutyric acid (P = 0.01) and isovaleric acid (P = 0.007) levels increased during intervention. No changes were found in group on traditional diet. On multivariate analysis, severe symptoms (IBS-SSS ≥ 300 [AOR = 9.5, 95% CI 1.8–51.5]) and high level of saccharolytic fermentation index A (AOR = 3.9, 95% CI 1.0–14.8) were associated with improvement on low-FODMAP diet. None of these factors predicted patients’ response to traditional dietary advice. Conclusion: The low-FODMAP diet and traditional dietary advice both reduced symptoms in Chinese patients with IBS-D. The presence of severe symptoms and high levels of saccharolytic fermentation in the colon predicted response to low-FODMAP diet but not traditional dietary advice. This suggests that the effect of the FODMAP diet but not the traditional diet is mediated via changes in the microbiome.

Keywords: FODMAPS, irritable bowel syndrome, gastrointestinal symptoms, short-chain fatty acid, predictor
**OE-0660 (PE-0574) Effect of sleep disorders on lower gastrointestinal symptoms in the spectrum of functional gastrointestinal diseases**

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**Background and Aim:** To observe the relationship between sleep disorders and symptoms in functional gastrointestinal disorders (FGIDs) patients with sleep disorders. **Methods:** According to the ROME III standard, questionnaires were conducted among patients with FGIDs who visited the gastroenterology clinic in Tianjin to assess the severity of symptoms and the quality of sleep, anxiety, and depression scores and use two independent sample-grade data Mann–Whitney rank sum test for preliminary analysis of the impact of sleep disorders on gastrointestinal symptoms in FGIDs patients. **Results:** Nine hundred thirty-one patients completed the questionnaire, of which 651 patients had sleep disturbance. FD patients with anxiety and depression coexist in 360 cases of sleep disorders, 301 cases with anxiety, and 495 cases depression. IBS patients with sleep disturbance and anxiety, depression coexist 138 cases (47.26%) of patients, 181 cases (61.99%) with anxiety, and 170 cases (58.22%) with depression. There were 81 patients in FD overlapped IBS, among which 70 patients were sleep disorders (86.42%). The proportion of FD overlapped IBS in patients with sleep disorders was higher than the proportion of FD overlapped IBS in patients without sleep disorders. The number of patients with these symptoms: lower abdominal pain, lower abdominal discomfort (non-painful), sheep dung-like or stiff stools, stool defeation, weakness (soft) or watery stools, feeling of defecation, urgency and defeation < 3 times a week, and defeation > 3 times a day, accounts for 36.10%, 34.56%, 21.20%, 32.41%, 31.64%, 44.39%, 27.04%, 13.21%, 10.75% of all patients with sleep disorders. Sleep disorder group were significantly higher than those controls at lower abdominal pain, lower abdominal discomfort (non-painful), sheep dung-like or stiff stools, and feeling of defeation. **Conclusion:** Sleep disorders significantly affect the overlap and severity of lower gastrointestinal symptoms in the spectrum of FGIDs. **Keywords:** sleep disorders, functional gastrointestinal disorders, lower gastrointestinal symptoms, anxiety, depression

**OE-0775 (PE-0575) Saccharomyces boulardii supernatants upregulate serotonin transporter expression in intestinal epithelium**

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**Background and Aim:** Irritable bowel syndrome (IBS) is one of the most common functional gastrointestinal diseases with high prevalence all over the world and its pathogenesis is not fully explained. Serotonin transporter (SERT) is a transmembrane transport protein which reuptakes excessive 5-hydroxytryptamine to terminate its physiological effects, and the aberrant expression of SERT has been demonstrated to closely associate with IBS etiology. Probiotics have been proved by substantial evidence to play an important role in IBS management. Saccharomyces boulardii is a commonly used fungal probiotics in clinical practice, and it has been reported to be efficacious in relieving IBS symptoms; however, the precise mechanism remains unclear. The aim of the study is to explore the effects of Saccharomyces boulardii on the expression of SERT in intestinal epithelium and provide new evidence to the mechanisms of fungal probiotics relieving IBS. **Methods:** Human colonic epithelial cells HT-29 and Caco-2 and C57BL/6 mice were treated with different concentrations of Saccharomyces boulardii supernatants (SbS), and the Sabauraud Dextrose Broth was utilized as control group. SERT mRNA levels and SERT protein levels in HT-29 cells, Caco-2 cells, and mice intestinal tissues were detected by real-time-PCR and western blotting. **Results:** SERT mRNA levels in HT-29 and Caco-2 cells treated with SbS for 24 h were higher than that in control groups. Likewise, the expression of SERT protein in both cells was also upregulated in comparison to the control, tendency of which was similar to that of the corresponding mRNA. In addition, SbS can significantly upregulate SERT mRNA and protein level in mice intestinal tissues after being treated for 1 week. **Conclusion:** SbS can upregulate SERT expression in intestinal epithelial cells and mice intestinal tissues. **Keywords:** Saccharomyces boulardii supernatants, serotonin transporter, intestinal epithelial cells, intestinal epithelial tissues
EE-0026 (PE-0578) Peripheral T-cell lymphoma with cytomegalovirus infection presenting as multiple gastrointestinal ulcers: A case report

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Background and Aim: Gastrointestinal ulcers are caused by a wide spectrum of diseases; infection, drug-induced enteritis, malignancy, vasculitis, and inflammatory bowel disease are the most common ones. Diagnosis of the above diseases especially peripheral T-cell lymphoma is often very challenging, with non-specificity of clinical symptoms and radiologic findings, complicated by presence of comorbidities, thus diagnosis relying on yield of tissue biopsy. CMV infection in lymphoma patients has been extensively documented in the medical literature, especially in immunocompromised populations, but relatively less in apparently immunocompetent patients. Methods: We report a 68-year-old male presenting with dyspepsia and melena and multiple gastrointestinal ulcers on endoscopy. We could not establish diagnosis of PTCL-NOS despite multiple biopsies taken on several endoscopic sessions, because of expression of pan B cell markers and presence of opportunistic cytomegalovirus (CMV) infection. CMV IgM was negative and IgG positive with a CMV viral load of 2.31 × 10^6 copies/mL, serum lactate dehydrogenase (LDH) was not elevated. Southern blot gene rearrangement was positive for T-cell receptor beta. Our patient eventually expired from massive gastrointestinal hemorrhage following 4 cycles of chemotherapy. Results: In the current case, we had minimal evidence of lymphoma despite the patient presented with mild weight loss and no history of fever and sweating, with normal LDH and globulin levels. The proper diagnosis could not be established without performing multiple biopsies on multiple intervals, setting up of a Multiple Disciplinary Team and gene rearrangement studies. Conclusion: Irrespective of the cause of immunodeficiency, the gross appearance and location of the lesions in gastrointestinal CMV disease are similar; it should be recommended to rule out comorbidities associated with immune dysfunction, especially active advanced lymphoma, in elderly patients presenting with gastrointestinal ulcers which are positive for CMV infection.

Keywords: peripheral T-cell lymphoma, cytomegalovirus infection, gastrointestinal ulcers, ulcers

EE-0295 (PE-0579) Clinical features and prognostic factors of stercoral ulcer

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Background and Aim: Stercoral ulcer is an uncommon cause of colon ulcer. It usually causes no symptoms but may result in gastrointestinal tract bleeding or perforation. Only several case reports about massive bleeding due to stercoral ulcer had been reported. So we investigated to clarify the clinical manifestations and outcomes of stercoral ulcer complicated with bleeding. Methods: We performed a retrospective study using medical records of the patients who had stercoral ulcer on colonoscopy in Yeungnam University Medical Center from January 2010 to July 2017. We analyzed clinical outcomes of patients with stercoral ulcer such as recurrent bleeding of hemorrhagic stercoral ulcer (re-bleeding). Results: In total 123 subjects with stercoral ulcer, 79 subjects (64.23%) were presented with lower gastrointestinal bleeding. Overall re-bleeding risk of hemorrhagic stercoral ulcer was high (32.9%). The risk of re-bleeding was not different according to characteristics of ulcer base. In multivariate logistic regression analysis, shock at presentation (OR = 13.146, 95% CI; 2.645–65.332), transfusion (OR = 7.231, 95% CI; 1.684–31.052), CVA (OR = 6.652, 95% CI; 1.143–31.314), taking clopidogrel (OR = 6.037, 95% CI; 1.251–29.131), and 3 or more comorbidities (OR = 4.4, 95% CI; 1.092–18.319) were significantly associated with increased risk of re-bleeding. However, endoscopic therapy for hemostasis did not show any statistical significance with risk of re-bleeding (OR = 3.135, 95% CI; 0.664–14.816). Conclusion: Overall re-bleeding risk of stercoral ulcer is high. And such risk is much higher in patients at risk, such as multiple comorbidities and massive bleeding. Aggressive treatment of stercoral ulcer, prophylaxis of constipation, and intensive management for hemorrhagic stercoral ulcer may be needed in this kind of patients.

Keywords: stercoral ulcer, rectal ulcer, lower GI bleeding
EE-0316 (PE-0580) A case of bleeding cecal diverticulum with gastric heterotopia and perforation in a 17-year-old adolescent
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Background and Aim: Diverticular bleeding generally occurs in middle-aged or elderly patients and patients taking anticoagulant or antiplatelet agents. If it occurs at a relatively young age without risk factors, the possibility of other diseases should be considered. We report the case of a 17-year-old adolescent who finally diagnosed with gastric heterotopia after surgery.

Methods: This was a case report.

Results: A 17-year-old adolescent visited our clinic with abdominal pain and hematochezia after undergoing colonoscopy in another hospital. The patient was diagnosed as diverticular bleeding and referred to our hospital. Emergency colonoscopy was performed. Cecal diverticular bleeding was diagnosed, and successful hemostasis with clipping was performed. The patient was discharged 3 days after hemostasis without events. Six months later, he visited the outpatient clinic and complained of sustained right lower abdominal discomfort and an episode of hematochezia 1 month before the visit. Colon study was performed to determine the distribution of the colon diverticulum. There was a diverticulum and an external compression in the cecum, and no other diverticulum was found in the colon. Three weeks after the colon study, the patient visited the hospital and complained of aggravated right lower abdominal pain. Abdominopelvic CT showed thickening of the ascending and transverse colon, suggesting nonspecific colitis and multiple lymph nodes of less than 1 cm in size in the ileocolic chain, suggesting reactive lymph nodes. On the basis of the sustained right lower abdominal pain and discomfort and repeated findings of hematochezia, anemia, and abnormal findings on both CT and colon study, we recommended surgery, and laparoscopic ileocecal resection was performed. After pathological examination, congenital diverticulum with gastric heterotopia in the cecum and cecal perforation was diagnosed. Conclusion: In a case of hematochezia, even in younger patients, a complete colonoscopy should be performed, and one should be aware of the occurrence of rare diseases such as gastric heterotopia.

Keywords: hematochezia, diverticular bleeding, gastric heterotopia

EE-0357 (PE-0581) Massive lower gastrointestinal bleeding from rectal ulcers as presentation of disseminated tuberculosis in an immunocompetent host
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Background and Aim: Disseminated tuberculosis (TB) results from the lymphohematogenous spread of mycobacterium tuberculosis and typically do not present in people with intact immune system. Gastrointestinal TB is 7–10% in all of extrapulmonary cases. Involvement of rectum and anal canal is uncommon and massive transfusion requiring lower GI bleeding is rare.

Methods: We report a case of a previously healthy 49-year-old Filipino who presented with altered mental status, low grade fever, and cough. Work-up revealed TB meningitis and pulmonary tuberculosis. During this admission, he developed massive hematochezia requiring multiple blood transfusions. On colonoscopy, clean-based rectal ulcers were noted, and biopsies showed TB PCR positivity. Anti-Koch’s treatment with dexamethasone was started; however, patient developed drug-induced liver injury, and re-challenge was done to continue treatment with resolution of bleeding noted. Patient was sent home after physical therapy and completion of treatment for pneumonia and pressure ulcers.

Results: In patients treated for intestinal TB, it is expected that there will be a complete resolution of the lesions, detectable by endoscopy or by imaging, following therapy.

Conclusion: Massive bleeding from ulcers in any part of the gastrointestinal system should therefore be included in differential diagnoses for disseminated TB especially in endemic areas, where the burden of disease is high and even immunocompetent hosts can be affected. High index of suspicion is warranted in order to institute early treatment for this potentially life-threatening condition.

Keywords: disseminated tuberculosis, immunocompetence, massive GI bleeding, GI TB, rectal ulcers
**EP-0029 (PE-0582) Incomplete intestinal obstruction caused by intramural hematoma secondary to warfarin therapy: A case report**

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**Background and Aim:** Warfarin is used extensively for therapeutic purposes. Incomplete intestinal obstruction caused by intramural hematoma secondary to anticoagulant therapy is rare. We present a case of warfarin therapy that resulted in spontaneous intramural ileal hematoma and the follow up after treatment.

**Methods:** A 73-year-old male who had taken warfarin (2.5 mg/day) by himself for 20 days without monitored the standardized ratio of thrombin presented with acute onset of abdominal pain accompanied by nausea and vomiting. He was treated with clopidogrel since being determined as having chronic arterial obstruction 1 year earlier. The patient was able to pass gas. Abdominal examination revealed distension and mild tenderness, but no defense or rebound. Laboratory investigations showed the prothrombin time (PT) was 85.5 s, and the INR on admission was 11.24. CT scan showed circumferential thickening and intramural hyperdensity of the ileal wall, luminal narrowing, proximal intestinal dilation.

**Results:** He was successfully treated with conservative management with fasting, total parenteral nutrition, cessation of warfarin, modification of low molecular heparin, and treatment with vitamin K1 were performed. After 10 h, PT was 21.6 s, and the INR was 1.88. The abdominal distension disappeared completely on the third day of treatment, and defecation function was normal. Followed up for 1 month, without any discomfort. **Conclusion:** The small intestinal wall hematoma can happen on the warfarin from 10 days to several years involvement of jejunum, ileum, and duodenum. The majority of patients after infusion of fresh plasma, vitamin K1, and gastrointestinal decompression treatment can be fully returned to normal.

**Keywords:** warfarin, spontaneous intramural ileal hematoma, intestinal obstruction

**Image 1 Abdominal CT finding**

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**EP-0046 (PE-0583) Lower gastrointestinal tract hemorrhage caused by amyloidosis associated with multiple myeloma: A case report**

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**Background and Aim:** Multiple myeloma is a neoplasm of plasma cells which produce monoclonal immunoglobulin, sometimes is combined with amyloidosis that resulted from the deposition of amyloid proteins in body tissues and lead to organ dysfunction. We report a case that has lower gastrointestinal tract hemorrhage as a primary manifestation of multiple myeloma accompanied with gut amyloidosis.

**Methods:** A 61-year-old man reported a 5-month history of abdominal pain, bloody diarrhea, and a weight loss of 10 kg. Colonoscopy showed multiple colonic ulcers appearing indistinguishable among enterophthisis, ulcerative colitis, and ischemic colitis, while his laboratory test supported none of them. Pathological findings only suggested non-specific chronic inflammation. On his back and chest wall, there were patches of dark brown rashes with slight itch throughout the course of his disease. A 6-week diagnostic treatment of mesalazine 1 g tid po was carried out and the abdominal pain and hematochezia got partly remission, but colonic ulcers gave no improvement. Afterwards, the patient developed community-acquired pneumonia and heart failure. Moreover, the anemia was aggravating. We conducted bone marrow aspiration and found neoplastic plasma cell proliferation. Monoclonal immunoglobulin was also detectable in his blood, leading to the diagnosis of multiple myeloma. Re-examination of his colonic biopsies revealed positive by Congo red staining. **Results:** The patient is now receiving an appropriate chemotherapy for multiple myeloma, yet still under our follow up. **Conclusion:** Hematochezia is a common complaint of patients. In those with unexplained mucosal lesions, gastrointestinal amyloidosis should be suspected, and staining of biopsies from lesions by Congo red is recommended. Subsequent etiologic evaluation would be helpful to make optimal medical decisions.

**Keywords:** hemorrhage, multiple myeloma, monoclonal immunoglobulin, amyloidosis
OE-0405 (PE-0584) The efficacy of contrast-enhanced computed tomography for colonic diverticular bleeding
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Background and Aim: Recently, colonic diverticular bleeding is getting increased. However, there is no established treatment strategy for diverticular bleeding. The aim of this study is to investigate the efficacy of contrast-enhanced computed tomography (CE-CT) for diverticular bleeding.

Methods: A total of 151 cases diagnosed as diverticular bleeding with CE-CT were analyzed (88 men and 63 women with a mean age of 72.7 years). The patient background, clinical behavior, treatment contents, and factors related to detecting the site of bleeding were evaluated.

Results: The average length of hospital stay was 6.3 days. One-hundred and six (70.2%) had hypertension, and 71 (47.0%) had constipation. Seventy-one (47.0%) took antithrombotic drug, and 27 (17.9%) took non-steroidal anti-inflammatory drugs. Extravasation was detected in 54 cases (35.8%) by CE-CT. Among those cases, we performed angiography and emergency endoscopy for 15 and 31 cases, respectively, and the detection rate of bleeding diverticula was 42.6% (21/46). On the other hand, we performed emergency endoscopy for 35 cases in whom extravasation was not detected, and the detection rate of bleeding diverticula was only 11.4% (4/35) (P < 0.05) (Fig. 1). We performed interventional radiology (IVR), endoscopic hemostasis, and operation for 13, 35, and 1 case, respectively.

Conclusion: The finding of extravasation on CE-CT contributes to the detection of bleeding diverticula and hemostatic treatment such as IVR or endoscopic hemostasis.

Keywords: lower GI bleeding, diverticular bleeding, contrast-enhanced computed tomography

OE-0406 (PE-0585) Clinical characteristics and risk factors of bleeding in colonic angiodysplasia among the Taiwanese
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Background and Aim: Colonic angiodysplasia (AGD) is a common cause of gastrointestinal bleeding. However, the characteristics and actual prevalence of patients with colonic AGD is limited. We determined the clinical features and risk factors for bleeding of colonic AGD in a Taiwanese population.

Methods: From February 2007 to December 2016, 16,760 colonoscopies were performed at Tri-Service General Hospital. Eighty-four patients were diagnosed with AGD. We conducted a retrospective study by analyzing the medical records of these 84 patients. The clinical features and endoscopic findings were evaluated thoroughly. Furthermore, we distinguished colonic AGD into bleeding and non-bleeding types and identified the risk factors for actively bleeding colonic AGD.

Results: In our study, the prevalence of colonic AGD is 0.5% in all patients receiving colonoscopy. Among those 84 patients with colonic AGD, we found that the percentage of them increased with age. In all, 53.6% of patients with colonic AGD were older than 70 years old. More than half of the patients had hypertensive cardiovascular disease (53.6%), and the AGD lesions were predominantly in the left-sided colon (34.5%). We analyzed several factors to identify those associated with bleeding colonic AGD. The results indicated that age (P = 0.014) and chronic kidney disease (P = 0.033) were significant factors associated with bleeding lesions. In addition, hypertensive cardiovascular disease and type 2 diabetes mellitus also were associated with bleeding tendencies.

Conclusion: Angiodysplastic lesions in Taiwanese patients were left-sided colon predominant. Old age and chronic kidney disease were independent risk factors associated with bleeding colonic angiodysplasia.

Keywords: colonic angiodysplasia, bleeding, risk factor
OE-0466 (PE-0586) The risk factors affecting colonic diverticular rebleeding

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Background and Aim: Patients with colonic diverticular disease may develop diverticular bleeding in 3% to 15% of cases. Early rebleeding is defined as within 30 days after hemostasis, and late rebleeding is defined as that occurring after 30 days. We examined the association between rebleeding (early and late) and various factors including patients’ background and initial management. Methods: We performed a retrospective study of patients with colonic diverticular bleeding from August 1, 2011, through March 31, 2017, at our hospital and related institutions. Using the hospital registry, we divided 205 patients into three groups: early, late, and no rebleeding. We analyzed that the association between rebleeding and various factors including patients’ background factors: age, gender, past history, medication, hospital length of stay, presence or absence of blood transfusion, and post-hospitalization course. Results: There were 46 patients in the early rebleeding group, 30 cases in the late rebleeding group, and 129 cases without rebleeding group. As risk factors of early rebleeding, liver disease complications tended to be higher in univariate analysis (P = 0.06) and significantly higher in multivariate analysis (odds ratio 6.8, P = 0.02). Meanwhile, as risk factors of late rebleeding, cerebrovascular accidents were significantly higher in univariate analysis (P = 0.001) as well as in multivariate analysis (odds ratio 6.8, P = 0.02). In addition, blood transfusion was performed more frequently in early rebleeding group than in late rebleeding group (P = 0.003). There were no significant differences of average hospital length of stay among three groups: 12 days in the early rebleeding group; 11 days in the late rebleeding group, and 9.2 days in the no rebleeding group. Conclusion: In the current study, hepatic disease was considered as an independent risk factor of early rebleeding, and cerebrovascular accident was considered as an independent risk factor of late rebleeding. Keywords: colonic diverticular bleeding, rebleeding, risk factor

OE-0979 (PE-0587) The comparison between endoscopic band ligation (EBL) and endoscopic clipping for colonic diverticular bleeding

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Background and Aim: Endoscopic band ligation (EBL) has been performed to achieve hemostasis for colonic diverticular bleeding as well as endoscopic clipping. But the direct comparison between EBL and endoscopic clipping is few reported. Methods: We retrospectively analyzed 37 patients who underwent EBL or endoscopic clipping for colonic diverticular bleeding from January 2015 to February 2018 on the basis of single-center experience in Japan. Results: Of the 37 patients, 17 (45.9%) were treated with EBL. The success rates of hemostasis were 94.1% in EBL group and 100.0% in clipping group, respectively. No significant differences in time required for detection of bleeding diverticulum (14.4 ± 1.9 min vs 13.5 ± 2.0 min, P = 0.76), time for hemostasis (22.5 ± 3.5 min vs 19.8 ± 3.3 min, P = 0.59), and total procedure time (36.8 ± 4.4 min vs 34.9 ± 4.5 min, P = 0.77) were observed between the two groups. The short-term rebleeding rate within 30 days was significantly lower in EBL group (0.0% vs 25.0%, P = 0.009), but the long-term rebleeding rate over 1 year did not differ significantly between the two groups (45.5% vs 35.3%, P = 0.59). As for complications, perforation occurred in neither group, and fever developed 1 of EBL group and 2 of clipping group, respectively. Conclusion: EBL for colonic diverticular bleeding is safe and efficacious as well as endoscopic clipping. EBL significantly decreased the short-term rebleeding rate, but the long-term rebleeding rate was comparable. Keywords: endoscopic band ligation, colonic diverticular bleeding

Patient characteristics and results

Table 1 Patient characteristics and results.

|                      | EBL (n=17) | Clipping (n=20) | P-value |
|----------------------|------------|-----------------|---------|
| Male sex, n (%)      | 14 (82.4%) | 20 (100.0%)     | 0.00    |
| Age, years           | 78.7 ± 2.7 | 79.1 ± 2.5      | n.s.    |
| Right side diverticular bleeding, n (%) | 9 (52.9%) | 15 (75.0%) | n.s. |
| Cardiovascular disease, n (%) | 7 (41.2%) | 9 (45.0%) | n.s. |
| Hemodialysis, n (%)  | 6 (30.0%)  | 2 (10.0%)       | n.s.    |
| Anti-platelet agent, n (%) | 5 (26.4%) | 8 (40.0%) | n.s. |
| Anti-coagulant agent, n (%) | 4 (23.5%) | 2 (10.0%) | n.s. |
| Success of procedure, n (%) | 16 (94.1%) | 20 (100.0%) | n.s. |
| Time for detection of bleeding diverticulum, min | 14.4 ± 1.9 | 13.5 ± 2.6 | n.s. |
| Time for hemostasis, min | 21.5 ± 3.5 | 19.8 ± 3.3 | n.s. |
| Total procedure time, min | 36.8 ± 4.4 | 34.9 ± 4.5 | n.s. |
| Duration for hospitalization, days | 11 ± 2.9 | 8.7 ± 2.0 | n.s. |
| Short-term rebleeding within 30 days, n (%) | 0 (0.0%) | 5 (25.0%) | 0.009 |
| Long-term rebleeding in the patients with over 1 year following, n (%) | 5 (29.4%) | 9 (45.0%) | n.s. |
Patients with regular hemodialysis showed a higher incidence and mortality from lower gastrointestinal bleeding: A nationwide population study

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Background and Aim: Patients with regular hemodialysis displayed a bleeding tendency and a higher risk of gastrointestinal (GI) bleeding. Patients under regular hemodialysis were at higher risk of peptic ulcer bleeding. Few studies have evaluated the relationship between hemodialysis, bleeding tendency and a higher risk of gastrointestinal (GI) bleeding. Patients under regular hemodialysis were enrolled, and both 1148 patients with CKD-non HD and the control were identified by a 1:2 match. The cumulative incidence of lower GI bleeding was 12.9% in hemodialysis patients, 3.6% in the CKD-non HD group, and 2.8% in the control group. The cumulative incidence of lower GI bleeding was 12.9% in hemodialysis patients, 3.6% in the CKD-non HD group, and 2.8% in the control group. In multivariate analysis for lower GI bleeding, hemodialysis (Hazard ratio [HR] 29.09), chronic kidney disease (HR 6.61), male (HR 3.14), and extreme old age (age ≥ 85, HR 15.74) were independent risk factors for lower GI bleeding. The bleeding-related mortality rates were 2.4%, 1.1%, and 0% in these three groups, P < 0.05. Conclusion: Hemodialysis was the most important risk factor for lower GI bleeding, angiodysplasia bleeding, and bleeding-related mortality.

Keywords: hemodialysis, chronic kidney disease, lower gastrointestinal bleeding, angiodysplasia

Difference of colorectal cancer microbial community by metagenomics and culture-based methods

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Background and Aim: Dysbiosis of intestinal microbiota is promoting the development of colorectal cancer (CRC). We confirmed the intestinal microbiota composition from fecal sample of Korean CRC patients. Metagenomic analysis was performed, and we isolated single microbes through culture-based method. Methods: CRC fecal samples were collected from 12 individuals. Metagenome sequencing was based on the 16S rRNA gene amplicon on the Illumina MiSeq platform. The bacteria strains were subcultivated on the agar plate medium in aerobic and anaerobic and further identified by using the 16S rRNA gene sequencing. Results: Bacteria diversity by metagenome analysis was decreased in CRC group compared to control group. In CRC group, relative abundance of Firmicutes and Bacteroidetes were increased while the prevalence of Proteobacteria was decreased. The difference of microbial composition between control and CRC group was found at the genus level. Bacteroides, Parabacteroides of Bacteroidetes, have increased and Acinetobacter, Pseudomonas of Proteobacteria, have significantly decreased in CRC compared to control group. Using culture method, we isolated diverse bacteria of species level including 5 strains of Bacteroides: B. ovatus, B. uniformis, B. salyersiae, B. vulgatus, and B. xylanisolvens and 2 strains of Fusobacterium: F. gondiiforans and F. necrophorum from CRC patients. Conclusion: Metagenome analysis showed the genus Bacteroides, Parabacteroides of the phylum Bacteroidetes has increased and the genus Acinetobacter, Pseudomonas of Proteobacteria, decreased in CRC group compared to control group. In addition, we have isolated various strains associated with CRC by culture-based method.

Keywords: microbiota, anaerobic culture, MiSeq
EE-0148 (PE-0590) Melatonin in the colon modulates intestinal microbiota in response to the stress and sleep deprivation

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Background and Aim: IBD was aggravated by stress and sleep deprivation. Melatonin has both the control of circadian clock and potent anti-inflammatory effects. We aimed to know the effect of water stress and sleep deprivation on intestinal microbiota and the roles of melatonin.

Methods: We used C57BL/6 mice and specially designed water bath for stress and sleep deprivation (for 6 h during light cycle) for 10 days. We measured melatonin concentration of feces and colon tissues by High Pressure Liquid Chromatography. Genomic DNA from feces was extracted and amplified using primers targeting from V3 to V4 regions of bacterial 16S rRNA genes, the sequencing was carried out at Chunlab, Inc. (Seoul, Korea), with Illumina MiSeq Sequencing System (Illumina, USA).

Results: Compared to control group (CL), melatonin concentration was significantly low in the water stress group (WS) and sleep deprivation group (SD). Fecal melatonin (pg/mL) was 0.132 in CL, 0.062 in WS, and 0.068 in SD and colon tissue showed 0.45 in CL, 0.007 in WS, and 0.03 in SD. After melatonin Tx by IP 10 mg/kg, the concentration was recovered to the level of CL. In metagenomic analysis of microbiota showed a shifting of abundance in colitogenic microbiota in WS and SD. Melatonin injection significantly modified this harmful effect. WS showed reduced abundance of lactobacillales and increased abundance of erysipelotrichales and enterobacteriales. SD showed loss of lactobacillus and loss of akkermansia muciniphila and prominent abundance of bacteroides massiliensis. These changes were modulated by melatonin injection.

Conclusion: This study suggested that stress and sleep deprivation contributed the pathogenesis of IBD by modulating colitogenic microbiota. Melatonin concentration in feces and colon tissue was significantly reduced in stressful condition which was vulnerable to develop inflammation. These effects were alleviated by melatonin injection. Melatonin may be an important modifier of intestinal microbiota.

Keywords: IBD, sleep, stress, melatonin, intestinal microbiota

EE-0165 (PE-0591) Link between stool frequency and gut microbiota

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Background and Aim: Until now, data on the role of gut microbiota affecting to defecation conditions are still lacking. This study aimed to identify the association between the gut microbiota and stool frequency in young Korean population.

Methods: We collected fecal samples from healthy individuals divided into three groups according to stool frequency: Group 1, a small number of defecation (≤ 2 times/week); Group 2, normal defecation (1 time/day or 1 time/2 days); and Group 3, a large number of defecation (≥ 2–3 times/day). The defecation patterns (number of defecation from 1-week diaries) were recorded. We evaluated the composition and distribution of the gut microbiota in each group via 16S rRNA-based taxonomic profiling of the fecal samples.

Results: Fecal samples were collected from a total of 60 individuals (31 men and 29 women aged 34.1 ± 5.88 years), and each group comprised 20 individuals. The microbial richness of Group 1 was significantly higher than that of Group 3 and tended to decrease with increasing number of defecation. The biological community composition was fairly different according to the number of defecation, and the ratio of Bacteroidetes/Firmicutes was higher in Group 1 than in the other groups, and the abundance of Bifidobacterium in Group 1 was lower than that in Group 2 and Group 3. Moreover, we found specific strains at the family and genus levels in Groups 1 and 3.

Conclusion: The ratio of Bacteroidetes/Firmicutes and the abundance of Bifidobacterium were different according to the stool frequency, and specific bacteria were identified in the subjects with large and small numbers of defecation, respectively. These findings suggest that stool frequency might be associated with the richness and community composition of the gut microbiota.

Keywords: microbiota, stool frequency
**EP-0021 (PE-0592) The long-term metabolic profile and microbiota status are altered after right hemicolectomy in patients with colorectal cancer**

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**Background and Aim:** The long-term effect of gut microbiota and subsequent metabolic profiles in colectomy patients is limited. We evaluated and compared long-term effects of metabolic profiles and microbiota status in early colorectal cancer (CRC) patients receiving curative colectomy to the controls.  

**Methods:** In this cross-sectional study, we analyzed metabolic syndrome (MS) occurrence in 165 patients after curative partial colectomy with right hemicolectomy (RH) or low anterior resection (LAR) and 333 age-sex matched controls. Fecal samples from some of those with RH, LAR, and controls were analyzed by next-generation sequencing method.  

**Results:** MS occurrences were significantly higher in patients after RH, but not LAR, when compared with the controls over the long-term (>5 years) follow up (P = 0.020) (Table 1). Compared with control group, RH group showed lower bacterial diversity (P = 0.007), whereas LAR group showed significantly higher bacterial diversity at the genera level (P = 0.016). Compared with the control group, the principal component analysis revealed significant differences in bacterial genera abundance after RH and LAR (P < 0.001). Firmicutes to Bacteroidetes ratio was significantly lower in the RH group than the control group (22.0% versus 49.4%, P < 0.05).  

**Conclusion:** Early CRC patients after RH but not LAR had a higher occurrence of MS than the controls during long-term follow up. In parallel with the metabolic profile, gut microbial diversity also significantly decreased after RH. This study suggests that patients after curative RH due to CRC should receive not only standard surveillance including colonoscopy but also standard regular metabolic screening.  

**Keywords:** metabolic syndrome, gut microbiota, colorectal cancer, right hemicolectomy

**Table 1** Anthropometric and laboratory data between patients with right hemicolectomy at time of GI tract surgery.  

|                      | Patients with RH | Controls | p value |
|----------------------|------------------|----------|---------|
| Age y/o              | 53               | 333      |         |
|                      | 70 ± 9.8         | 69 ± 7.0 | 0.225   |
| Sex, M (%)           | 23 (43.4%)       | 191 (57.4%) | 0.074  |
|                      |                  |          |         |
| Body mass index (kg) | 23.8 ± 3.6       | 24.5 ± 3.1 | 0.187  |
| Waist (cm)           | 86.0 ± 8.8       | 86.4 ± 10.8 | 0.909  |
| Systolic BP (mm Hg)  | 131 ± 16         | 126 ± 18 | 0.113   |
| Diastolic BP (mm Hg) | 76 ± 10          | 75 ± 11 | 0.704   |
| HDL-cholesterol (mg/dL) | 55 ± 13      | 51 ± 13 | 0.117   |
| Total cholesterol (mg/dL) | 187 ± 34    | 203 ± 38 | 0.023   |
| Triglyceride (mg/dL)  | 123 ± 68         | 120 ± 60 | 0.797   |
| Serum glucose (mg/dL) | 110 ± 24        | 100 ± 22 | 0.029   |
| Metabolic syndrome (%)| 30 (56.6%)      | 104 (31.2%) | 0.020   |

**OE-0426 (PE-0593) Determining the specific gut microbiota patterns associated with colorectal cancer**

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**Background and Aim:** The role of gut microbiome in the etiology of colorectal cancer (CRC) is emerging, and the type of microbiota patterns in South Asian populations has not been studied. Hence, we set out to study the gut microbiota patterns in patients with CRC, diabetes (DM), and healthy individuals to find the specific gut microbiota patterns associated with CRC.  

**Methods:** The relative abundance of 45 types of gut microbiota was determined in stool samples in patients with CRC (n = 24), DM (n = 20), and healthy individuals (n = 44), using a PCR array. Data were analyzed using a specific software for analysis. **Results:** Bacteroides fragilis was expressed 23.88-fold higher in patients with CRC, and 77.09-fold higher in patients with DM when compared to healthy individuals. Aeromonas species were the predominant microbes, in patients with DM (226.64-fold higher), followed by Enterococcus faestum (183.1-fold higher), Shigella dysentriae and Streptococcus agalactiae compared to healthy individuals. Akkermansia muciniphila, Bacteroides vulgatus, and Bacteroides thetaiotaomicron were 5.87, 2.12, and 8.03-fold higher in CRC patients, while expression of most bacterial species of the genus Enterobacteriaceae were lower (Fig. 1).  

**Conclusion:** Bacteria of the genus Enterobacteriaceae were most abundant type of gut bacteria patients with DM, while their abundance was lower in patients with CRC. Bacteroides fragilis was equally highly expressed in patients with DM and CRC. Since DM is known to be a risk factor for the development of CRC, the role of Bacteroides fragilis in the pathogenesis of CRC should be further investigated.  

**Keywords:** colorectal cancer, gut microbiota, Sri Lanka

**Figure 1** (A) The log10 of the fold change for the CRC patients relative to the Healthy individuals. (B): The log10 of the fold change for the DM patients relative to the Healthy individuals.
**OE-0664 (PE-0594) Butyrate-producing bacteria inhibit intestinal carcinogenesis through modulating gut microbiota and Wnt pathway**

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**Background and Aim:** The gut microbiota plays a vital role in intestinal carcinogenesis. Evidence indicates that the decrease of butyrate-producing bacteria can be found in patients with colorectal cancer (CRC). However, little is known about the effect of butyrate-producing bacteria supplementation on intestinal carcinogenesis. In this study, we aimed to investigate the antitumor effects and mechanisms of *Clostridium butyricum* (one of butyrate-producing bacteria) on the composition of intestinal microbiota and cancer progression. **Methods:** High-fat diet-fed Apcmin/+ mice were gavaged with *Clostridium butyricum* at a dose of 2 × 109 cfu/0.2 mL 3 times a week for 12 weeks. Mice with high-fat diet and basal diet were used as high-fat diet controls and untreated controls, respectively. At the 12th week of the experiment, fresh feces were collected for microbiota illumina sequencing analysis, and ileocecal feces were used for short-chain fatty acids (SCFAs) analysis. Parameters of intestinal tumor development, cellular proliferation and apoptosis, and Wnt signaling pathway were also determined. The human colon cancer cell lines Caco-2 and HCT116 were used to further verify the antitumor effect of *Clostridium butyricum*. **Results:** *Clostridium butyricum* significantly prevented high-fat diet-induced intestinal tumorigenesis in Apcmin/+ mice compared with fed a single high-fat diet. *Clostridium butyricum* increased ileocecal concentrations of short-chain fatty acids and activated GPR43 and GPR109A in Apcmin/+ mice. Additionally, *Clostridium butyricum* inhibited proliferation and promoted apoptosis in intestinal tumor cells. Moreover, *Clostridium butyricum* ameliorated deteriorative composition of intestinal microbiota, which increased probiotics including SCFA-producing bacteria and decreased CRC-related bacteria. At the molecular level, *Clostridium butyricum* inhibited the tumor-associated Wnt/β-catenin signaling pathway. **Conclusion:** Supplementation of butyrate-producing bacteria suppressed intestinal carcinogenesis through modulating intestinal microbiota and Wnt pathway. These findings broaden our understanding for the butyrate-producing bacteria supplement in the prevention and treatment of CRC.  

**Keywords:** producing-butyrate bacteria, intestinal carcinogenesis, gut microbiota, high-fat diet, Apcmin/+ mouse

**OE-0742 (PE-0595) Clarifying the virulence mechanisms of common ribotypes for Clostridioides difficile infection in Hong Kong**

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**Background and Aim:** Clostridioides difficile (C. difficile) can cause infection and lead to diarrhea and pseudo-membranous colitis. Hypervirulent ribotype 027 was not so prevalent in Hong Kong. Instead, we previously reported that other ribotypes were more common and with higher mortality. This project aims to investigate virulence mechanisms of common ribotypes in Hong Kong. **Methods:** Ribotypes 002, 012, 014, 046, and 027 were cultured in BHI medium. Growth curve was determined by measuring OD600 at 5 timepoints. Toxin A and B concentrations were determined by ELISA at 3 timepoints. Sporulation and germination were performed using sample heated for 25 min at 60°C. Sporulation was CFU of heated sample over CFU of unheated sample on BHI agar with taurocholate. Germination was CFU of heated sample on agar without taurocholate over CFU of heated sample on agar with taurocholate. We will do mice experiment to gavage five ribotypes using cefoperazone treatment. **Results:** In growth curve, 002 had a slightly longer stationary phase. 002, 014, and 027 showed significantly higher germination than other two at 0 h and 48 h (002: P < 0.02). Results of animal experiment are in progress. **Conclusion:** Ribotypes 002 had high spore production as 014 and 027 and high sporulation and germination rates, which may contribute to high mortality of 002 in Hong Kong. **Keywords:** Clostridioides difficile, sporulation and germination, clostridioides difficile infection, toxin production, ribotypes

![Figure 1 Toxin B conc. of 5 ribotypes](image-url)
OE-0772 (PE-0596) Proton pump inhibitor is associated with a development of Clostridium difficile infection especially in younger patients

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**Background and Aim:** Clostridium difficile infection (CDI) is a common hospital-acquired infection among elder hospitalized patients. Recent studies have identified PPI as a potential risk factor for CDI; however, there are few reports about an age-dependent risk of PPI toward a development of CDI. This study aims to clarify the relationship of the incidence between age and PPI use. **Methods:** This retrospective study includes 7922 patients who had been hospitalized in our institute between April 2016 and March 2018. CDI was defined when a positive stool test for CDI antigen and/or CD toxins was obtained in patients with diarrhea. The use of antibiotics and PPI were statistically compared between younger (<75 years old) and elder (≥75 years old) CDI patients. **Results:** PPI was given to 864 of 3843 younger and 1266 of 4079 elder patients, and the usage was significantly higher in CDI patients. The age was significantly higher in CDI (81.9 ± 12.5 years old) than non-CDI patients (66.6 ± 7.5 years old). The age was significantly higher in CDI patients (81.9 ± 12.5 years old) than non-CDI patients (66.6 ± 7.5 years old) (P < 0.0001). The incidence of CDI was 25.4 years old) (P = 0.6708). **Conclusion:** PPI is a risk factor of the development of CDI, and its positive association is higher in the patients younger than 75 years old.

**Keywords:** Clostridium difficile infection, PPI

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OE-0792 (PE-0597) Fecal microbiome analysis of chronic intestinal pseudo-obstruction patients

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**Background and Aim:** Chronic intestinal pseudo-obstruction (CIPO) is a rare disease characterized by impaired motility of the gastrointestinal tract, mimicking mechanical intestinal obstruction. We conducted the first study to compare the gut microbiome of CIPO patients with healthy controls. **Methods:** A total of 20 CIPO patients who visited Asan Medical Center from January 2017 to January 2018 were prospectively enrolled. Stool samples were collected at study enrollment. Twenty stool samples of CIPO patients were compared with 13 stool samples of healthy controls. Samples were analyzed using 16S rRNA gene pyrosequencing. **Results:** Among 20 CIPO patients, 9 (45%) were male, mean age at enrollment was 57.1 years. Six (30%) CIPO patients had active symptoms at enrollment. Based on image studies, 15 (75%) revealed a transition zone, 7 (35%) showed small bowel dilatation. Bacterial richness and diversity were increased in the CIPO group compared with healthy controls. **Conclusion:** A higher abundance of Akkermansia and Alistipes and lower abundance of Prevotella were detected in CIPO patients compared with controls. Principal component analyses indicated slight difference in bacterial composition between the 2 groups. In the subgroup analysis among CIPO patients based on active symptoms, transition zone, and small bowel involvement at enrollment, no significant difference was observed. **Keywords:** intestinal pseudo-obstruction, colon, chronic, fecal microbiome
OE-0928 (PE-0598) Integrative analysis of the gut microbiome and metabolome in a rat model with acute stress induced irritable bowel syndrome

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Background and Aim: Stress is one vital etiology of irritable bowel syndrome (IBS), which is well known for perturb the microbiome and exacerbate IBS-associated symptoms. Changes in the microbiota and its metabolites affect the IBS pathophysiology. We investigated the alterations and correlations of the gut microbiome and metabolism in response to stress due to colorectal distention combined with restraint stress (CDR) administration in rats. Methods: CDR stress was used to induce IBS-like symptoms in rats. Metagenomic sequencing of the 16S rRNA gene was used to characterize the ileocecal intestinal contents microbiome. UPLC-MS/MS assaying of small molecules was used to characterize the metabolomes of the ileocecal intestinal contents. Results: IBS group significantly decreased in the species diversity compared to controls; no significant differences were observed in the mean community richness. The gut of IBS group was depleted of some potentially beneficial bacteria, such as Christensenellaceae, Bacteroides sp., and Ruminococcaceae but were enriched in some bacterial taxa containing opportunistic pathogens. The differences in the metabolite profiles significantly changed. Tryptamine and L-phenylalanine were the primary differentially excreted metabolites identified, and phenylalanine, tyrosine, and tryptophan biosynthesis was the major metabolic pathway induced by stress. Several altered gut bacterial taxa exhibited potential interactions with stress-induced IBS through their associations with altered metabolism indicators, such as the positive correlation between Tryptamine and Prevotella and the negative between L-phenylalanine and Oscillibacter. Conclusion: Consequently, the gut microbiome, metabolism, and their interaction are altered and may be critical for the onset or development of stress-induced IBS.

Keywords: microbiome, metabolism, irritable bowel syndrome, stress

OE-0944 (PE-0599) Fecal microbiota transplantation in treating Clostridium difficile infection in Taiwan

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Background and Aim: Frequent usage of antibiotic increases the incidence of Clostridium difficile-associated diarrhea worldwide. Fecal microbiota transplantation has been proved as a very effective therapy in refractory or relapsing Clostridium difficile infection. However, it has not been widely performed in Taiwan. Our study aimed to investigate fecal microbiota transplantation therapy in patients with refractory Clostridium difficile infection middle Taiwan. Methods: From September 2012 to May 2018, we reviewed the medical records of patients with Clostridium difficile infection who underwent fecal microbiota transplantation therapy. The stool sources were all donated from family members of all patients. The stools and blood of donors were tested and screened before fecal microbiota transplantation. The clinical characteristics of patients, diagnostic methods of Clostridium difficile infection, treatment methods, treatment outcomes, and adverse events of fecal microbiota transplantation therapy were analyzed. Results: Six patients were enrolled into our study. The mean age of all patients was 74.5 years. The main symptom was diarrhea. All patients achieved clinical cure with a cure rate of 100%. The mean follow-up duration was 7.9 months. One patient developed a recurrence of Clostridium difficile infection after fecal microbiota transplantation. There was no any procedure-related adverse effect. Conclusion: Fecal microbiota transplantation seems to be a highly effective therapy for refractory Clostridium difficile infection and/or pseudomembranous colitis in our present study. Because the limitation of our small number patients, we need more large-scale clinical studies to confirm the long-term efficacy and safety of fecal microbiota transplantation.

Keywords: Clostridium difficile infection, Clostridium difficile-associated diarrhea, pseudomembranous colitis, fecal microbiota transplantation

The colonoscopy pictures
**OE-0964 (PE-0600) Experience of fecal microbiota transplantation for the treatment of *Clostridium difficile* infection in Hong Kong: A large case series from Asia**

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**Background and Aim:** *Clostridium difficile* infection (CDI) is a leading cause of healthcare-associated infection and is related with significant morbidity and mortality, with incidence rates rising in many parts of the world. Difficult-to-treat cases are associated with extended hospital stay and may result in widespread nosocomial outbreaks. By replacing the gut microbiota from a healthy donor, fecal microbiota transplantation (FMT) has been shown to be effective for the treatment of recurrent or refractory CDI. In close collaboration with the healthy donor stool biobank established by the Faculty of Medicine, CUHK, which applies rigorous donor screening criteria, we provided FMT to patients with CDI. **Methods:** We retrospectively reviewed all cases with FMT done for CDI to assess the technical and logistical feasibility, as well as efficacy and safety of this intervention. **Results:** A total of 26 FMTs were performed for the treatment of CDI since 2013. Four of 26 patients (15.4%) required a second FMT. The mean age was 64.3 years (interquartile range 52.0–80.8) with males consisting 61.5% of cases. Resolution of diarrhea without relapse within 8 weeks was achieved in 19 of 26 patients (73.1%), which was comparable with 64.3 years (interquartile range 52.0–80.8) with males consisting 61.5% of cases. Resolution of diarrhea without relapse within 8 weeks was achieved in 19 of 26 patients (73.1%), which was comparable with incidence rates rising in many parts of the world. **Conclusion:** To the best of our knowledge, this is the first case series from Hong Kong using FMT to treat CDI and is one of the largest reported in East Asia to date. The delivery of FMT was shown to be feasible, safe, and effective. FMT will likely become an important part of the armamentarium for physicians managing patients with difficult-to-treat CDI in the near future. **Keywords:** fecal microbiota transplantation, FMT, *Clostridium difficile*, stool biobank

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**EE-0013 (PE-0601) Development of a culturally tailored technology-based colon cancer support program for Asian Americans**

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**Background and Aim:** Despite well-known benefits of technology-based support programs, technology-based colon cancer support programs for Asian Americans have rarely been developed and used. The purpose of this study was to present the challenges in developing a culturally tailored technology-based colon cancer support program for Asian Americans (TCOLS) using computers and mobile devices. **Methods:** The TCOLS has been developed based on the Bandura’s Theory of Behavioral Change. To develop the program, the Ruby on Rails framework and the Xen hypervisor were used. The TCOL was developed to include social media sites, 10 educational modules, and 20 online resources. During the development process, the challenges that the research team met were recorded, and weekly research team meetings were held to discuss and resolve the challenges. The written records were analyzed using a content analysis. **Results:** First, the use of multiple languages raised several practical challenges including the inaccuracy of Google translator. Second, security issues related to computer servers were raised because the research team did not have a control of computer servers located in the central IT office. Third, the use of the existing electronic data collection system was a challenge to incorporate in the program (e.g. WeChat, Line, Kakaotalk). **Conclusion:** There exist several challenges that need to be considered in future development of a technology-based support program for colon cancer that is tailored to a specific cultural group. **Keywords:** colon cancer, support program, technology, issues, languages
EE-0017 (PE-0602) Factors affecting the detection of colorectal cancer on abdominal ultrasonography

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Background and Aim: Although colonoscopy is the gold standard diagnostic method for colorectal cancer, it is an uncomfortable and invasive procedure for some patients. Abdominal ultrasonography (AUS) is a non-invasive, convenient method for diagnosing an abdominal disease. This study aimed to investigate the factors affecting the detection of colorectal cancer on AUS. Methods: From April 2013 to March 2017, we retrospectively analysed 56 patients (men, 34; women, 22; mean age, 73.6 ± 8.3 years) with colorectal cancer. AUS was performed in all cases after the definitive diagnosis. Using logistic regression analysis, we evaluated factors (age, sex, body mass index, and visceral fat mass as well as the size, location, and progression of the cancer invasion) affecting AUS sensitivity. All procedures were performed as a part of the routine clinical practice. Results: AUS detected 39 of 56 (69.6%) colorectal cancer. All undetected colorectal cancers were in the distal colon. The mean size of undetected colorectal cancers was 35.0 ± 16.0 mm. In 17 patients with undetected colorectal cancer, 10 patients (58.8%) had gastrointestinal symptom and 7 patients (41.1%) had subserosal or serosal invasion. The presence of cancer in the distal colon and the depth of invasion into the submucosa or muscularis propria were independent factors for a false negative result with AUS (odds ratio [OR], 11.6; 95% confidence interval [CI], 2.06–293.0; P < 0.01 and OR, 8.30; 95% CI, 2.26–30.9; P < 0.05, respectively). Conclusion: AUS sensitivity reduced in the distal colon and reduced in the colorectal cancer with the depth of invasion into the submucosa or muscularis propria. Distal colon cancer may be difficult to detect by AUS even if it is a large tumor and infiltrating deeper. Patients with gastrointestinal symptoms should recommend colonoscopy as much as possible.

Keywords: colorectal cancer, abdominal ultrasonography, sensitivity

EE-0043 (PE-0603) Efficacy of balloon-assisted endoscope for colorectal endoscopic submucosal dissection

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Background and Aim: Colorectal endoscopic submucosal dissection (ESD) has been widely spread due to technical and equipment development. However, there are cases where maneuverability is poor. We evaluated the efficacy of balloon-assisted endoscope (BAE) for colorectal ESD with poor endoscopic maneuverability before and after adoption. Methods: We confirmed maneuverability preoperatively in all 400 cases of colorectal ESD performed at Showa University Fujigaoka Hospital from April 2011 to April 2018. Eighty-three subjects of deep colon cases were judged as poor maneuverability and included. Fifty-four cases in the BAE group using a balloon-assisted endoscope (group B) and 29 cases in the conventional group (group C) not using it were retrospectively compared. We used a single balloon-assisted endoscope (ST-CB 1; Olympus, Tokyo, Japan) for BAE. Tumor size, resected specimen size, procedure duration, dissection speed, en bloc resection rate, histology, and associated complications were compared between groups. Results: Lesion localization (cecum, ascending/ transvers, descending) was (22/32) in group B and (15/14) in group C, respectively. The mean tumor size (29 mm), tumor invasiveness, fibrosis, perforation, and postoperative bleeding did not differ between the two groups. Two groups showed similar percentages of en bloc resection (97.8% vs 97.9%), but there was statistically significant difference between the two groups in R0 resection (96.3% vs 82.8%; P = 0.048). In group B, compared with group C, procedure duration tended to be shorter (67.9 min vs 80 min), dissection speed tended to be earlier (19.6 mm²/min vs 17.4 mm²/min). Conclusion: In cases of colorectal ESD with poor maneuverability, BAE contributed to shortening of resection time and improvement of R0 resection rate. This study with BAE suggests the possibility of contributing to the further spread of colorectal ESD. Keywords: endoscopic submucosal dissection, colorectal ESD, colorectal tumor, balloon endoscope, balloon-assisted endoscope
EE-0087 (PE-0604) The risk for colorectal adenoma is associated with liver fibrosis in patients with non-alcoholic fatty liver disease

Authors: MIN CHEOL KIM; BYUNG IK JANG; JOON HYUN CHO; SUNG BUM KIM; KOOK HYUN KIM; SI HYUNG LEE; TAE NYEUN KIM  
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Background and Aim: Non-alcoholic fatty liver disease (NAFLD) is associated with risks for developing colorectal adenoma, which is related to various metabolic factors. However, studies on the risks of developing colorectal adenoma according to the severity of NAFLD are limited. This study aimed to evaluate the association between advanced fibrosis in NAFLD and the risk for colorectal adenoma. Methods: We retrospectively analyzed the data of 6,332 adults who underwent abdominal ultrasound and first-time colonoscopy on the same day in a health screening program at Yeungnam University Hospital from September 2009 to June 2017. NAFLD was diagnosed using abdominal ultrasound. We evaluated the presence of advanced fibrosis in NAFLD using various non-invasive score, which also analyzed the detection rate of colorectal adenoma according to the presence of advanced fibrosis in the subjects with NAFLD. Results: The subjects with NAFLD had a higher prevalence of colorectal adenoma, advanced adenoma, and multiple adenomas. In the multivariate analysis adjusting for demographic and metabolic factors, NAFLD was an independent risk factor for colorectal adenoma. Conclusion: NAFLD with advanced fibrosis is an independent risk factor for colorectal adenoma compared with NAFLD without advanced fibrosis. Keywords: liver fibrosis, non-alcoholic fatty liver disease, colorectal adenoma

EE-0091 (PE-0605) The clinical significance of colonoscopy in the patients with CT-diagnosed acute diverticulitis

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Background and Aim: International guideline recommends performing a colonoscopy after an episode of acute diverticulitis. The aim of this study was to assess the colonoscopy results and its clinical significance in patients with acute diverticulitis on CT scan. Methods: From January 2006 to December 2016, medical records of patients with CT-diagnosed acute diverticulitis diagnosed on CT scan who underwent complete colonoscopy within 1 year of diagnosis were reviewed retrospectively. Results: Among the 235 patients with acute diverticulitis diagnosed on CT scan, 77 patients without exclusion criteria were included. The mean age was 49.7 ± 15.3 years, and 51 (66.2%) patients were men. The lesion was in the right colon in 68 (88.3%) patients, and all the lesions were shown as bowel wall thickening on CT scan. Fluid collection was noted in 11 (14.3%) patients, abscess in 3 (3.9%) patients, and lymphadenopathy in 7 (9.1%) patients on CT scan; 97.4% of the patients were improved with conservative treatment. Mean interval from diagnosis to colonoscopy was 40.2 ± 56.4 days. Adenomatous polyps were found in 19 (24.7%) patients; among them, 5 (6.5%) patients had advanced adenoma. Colorectal adenocarcinoma was found in 4 (5.2%) patients, and all of them were over 70 years old. The prevalence of advanced colorectal neoplasia was higher in patients over 60 years and admitted for longer than 10 days. On multivariate analysis, age over 60 years was identified as independent risk factor for ACN. Conclusion: Colonoscopy detected ACN in 11.7% patients with acute diverticulitis. Because patients over 60 years have a higher risk of ACN, follow-up colonoscopy is needed after the diagnosis of acute diverticulitis. Keywords: colonoscopy, colonic diverticulitis, colorectal neoplasia

EE-0087 (PE-0604) The risk for colorectal adenoma is associated with liver fibrosis in patients with non-alcoholic fatty liver disease

Authors: MIN CHEOL KIM; BYUNG IK JANG; JOON HYUN CHO; SUNG BUM KIM; KOOK HYUN KIM; SI HYUNG LEE; TAE NYEUN KIM  
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Background and Aim: Non-alcoholic fatty liver disease (NAFLD) is associated with risks for developing colorectal adenoma, which is related to various metabolic factors. However, studies on the risks of developing colorectal adenoma according to the severity of NAFLD are limited. This study aimed to evaluate the association between advanced fibrosis in NAFLD and the risk for colorectal adenoma. Methods: We retrospectively analyzed the data of 6,332 adults who underwent abdominal ultrasound and first-time colonoscopy on the same day in a health screening program at Yeungnam University Hospital from September 2009 to June 2017. NAFLD was diagnosed using abdominal ultrasound. We evaluated the presence of advanced fibrosis in NAFLD using various non-invasive score, which also analyzed the detection rate of colorectal adenoma according to the presence of advanced fibrosis in the subjects with NAFLD. Results: The subjects with NAFLD had a higher prevalence of colorectal adenoma, advanced adenoma, and multiple adenomas. In the multivariate analysis adjusting for demographic and metabolic factors, NAFLD was an independent risk factor for colorectal adenoma (adjusted odds ratio [OR], 1.15; 95% confidence interval [CI], 1.01–1.30), advanced adenoma (adjusted OR, 1.50; 95% CI, 1.12–2.01), and multiple adenomas (adjusted OR, 1.32; 95% CI, 1.01–1.73). When NAFLD was further stratified based on the stage of fibrosis using the non-invasive score models, the subjects with NAFLD and advanced fibrosis had a significantly higher risk for colorectal adenoma, advanced adenoma, and multiple adenomas than those with NAFLD without advanced fibrosis. Conclusion: NAFLD with advanced fibrosis is an independent risk factor for colorectal adenoma compared with NAFLD without advanced fibrosis. Keywords: liver fibrosis, non-alcoholic fatty liver disease, colorectal adenoma

EE-0091 (PE-0605) The clinical significance of colonoscopy in the patients with CT-diagnosed acute diverticulitis

Authors: MIN CHEOL KIM; JOON HYUN CHO; SUNG BUM KIM; KOOK HYUN KIM; SI HYUNG LEE; BYUNG IK JANG; TAE NYEUN KIM  
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Background and Aim: International guideline recommends performing a colonoscopy after an episode of acute diverticulitis. The aim of this study was to assess the colonoscopy results and its clinical significance in patients with acute diverticulitis on CT scan. Methods: From January 2006 to December 2016, medical records of patients with CT-diagnosed acute diverticulitis diagnosed on CT scan who underwent complete colonoscopy within 1 year of diagnosis were reviewed retrospectively. Results: Among the 235 patients with acute diverticulitis diagnosed on CT scan, 77 patients without exclusion criteria were included. The mean age was 49.7 ± 15.3 years, and 51 (66.2%) patients were men. The lesion was in the right colon in 68 (88.3%) patients, and all the lesions were shown as bowel wall thickening on CT scan. Fluid collection was noted in 11 (14.3%) patients, abscess in 3 (3.9%) patients, and lymphadenopathy in 7 (9.1%) patients on CT scan; 97.4% of the patients were improved with conservative treatment. Mean interval from diagnosis to colonoscopy was 40.2 ± 56.4 days. Adenomatous polyps were found in 19 (24.7%) patients; among them, 5 (6.5%) patients had advanced adenoma. Colorectal adenocarcinoma was found in 4 (5.2%) patients, and all of them were over 70 years old. The prevalence of advanced colorectal neoplasia was higher in patients over 60 years and admitted for longer than 10 days. On multivariate analysis, age over 60 years was identified as independent risk factor for ACN. Conclusion: Colonoscopy detected ACN in 11.7% patients with acute diverticulitis. Because patients over 60 years have a higher risk of ACN, follow-up colonoscopy is needed after the diagnosis of acute diverticulitis. Keywords: colonoscopy, colonic diverticulitis, colorectal neoplasia
**EE-0153 (PE-0606) Development and endoscopic appearance of colorectal tumors are characterized by the expression profiles of miRNAs**

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**Background and Aim:** Accumulating data indicates that certain microRNAs (miRNAs or miRs) are differently expressed in the samples of tumors and paired non-tumorous samples taken from the same patients with colorectal tumors. We previously reported to clarify the relationship between the expression of the miRNAs and the endoscopic morphological appearance of the colorectal tumors. **Methods:** We analyzed miRNAs (miR-143, -145, -7, -21, -34a) of 162 tubular or tubulovillous adenoma or tubular early cancer, or 75 tubular type 2 advanced cancer, 26 familial adenomatous polyposis (FAP), 15 ulcerative colitis associated tumor (UCAT), and 9 sessile serrated adenoma/polyp (SSA/P). Moreover, we classified adenomas and early cancer in endoscopic morphological appearance. At last, we tried to clarify the relationship between the expression of the miRNAs and the colorectal tumor development. **Results:** The expression levels of miR-143, -145, and -34a were reduced in most of the polypoid and FAP tumors compared with those in the flat elevated, UCAT, SSA/P ones. In type 2 cancers, the miRNA expression profile was similar to that of the polypoid and FAP tumors. The expression levels of miR-7 and -21 were upregulated in non-granular type of laterally spreading tumor, UCAT, SSA/P compared with those in polypoid and FAP tumors. **Conclusion:** These findings indicated that the expression of onco-related miRNAs was closely associated with the development and endoscopic appearance of colorectal tumors. **Keywords:** microRNA, colorectal tumor development, adenoma carcinoma sequence, de novo type pathway, inflammatory colonic carcinogenesis

**EE-0156 (PE-0607) Alcohol consumption is associated with the risk of developing colorectal neoplasia: Propensity score matching analysis**

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**Background and Aim:** Despite the well-known association between alcohol consumption and the development of colorectal neoplasm (CRN), the cumulative effect of alcohol consumption on the development of CRN has not been thoroughly elucidated to date. **Methods:** We retrospectively identified 1,448 patients who underwent index and subsequent surveillance colonoscopy during the study period. The association between significant alcohol consumption (males > 30 g/day, females > 20 g/day) and the cumulative occurrence of overall and advanced CRN at the time of surveillance colonoscopy was analyzed using propensity score matching (PSM) analysis. **Results:** In the PSM analysis with 210 matched-pairs, the cumulative rate of overall CRN at 5 years after index colonoscopy was higher in the significant alcohol consumption group than in the control group (40% vs 27.6%, *P* = 0.004). Significant alcohol consumption (adjusted hazard ratio [aHR]: 1.86, 95% CI: 1.28–2.70, *P* = 0.001) was associated with the occurrence of overall CRN at surveillance colonoscopy. In subgroup analyses based on the risk categories of index colonoscopic findings, significant alcohol consumption was associated with the overall CRN occurrence in the normal (aHR: 1.90, 95% CI: 1.16–3.13, *P* = 0.01) and low-risk groups (aHR: 2.13, 95% CI: 0.98–4.62, *P* = 0.06). However, there was no association between significant alcohol consumption and the development of advanced CRN on surveillance colonoscopy. **Conclusion:** Significant alcohol consumption is associated with the risk of overall CRN occurrence, especially in patients in the normal or low-risk categories at index colonoscopy. Alcohol consumption habits should be reflected in the determination of optimized time intervals for surveillance colonoscopy. **Keywords:** alcohol drinking, propensity score, colorectal neoplasm
EE-0208 (PE-0608) Do we need colonoscopy in patients with gastric cancer or gastric adenomas?
The risk of colorectal cancer in patients with gastric cancer or gastric adenomas
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Background and Aim: Patients diagnosed with gastric cancer have a higher prevalence and increased risk of colorectal cancer. But few studies have investigated the risk of colorectal cancer or adenoma in patients with early gastric cancer or gastric adenoma. The purpose of this study is to investigate the prevalence of colorectal adenoma or cancer in patient with gastric adenoma and early gastric cancer. Methods: We performed a prospective study. From January 2015 to December 2016, 110 patients who had treated stomach ESD due to early gastric cancer or adenoma were enrolled. Healthy age- and sex-matched controls were enrolled from general screening population. Demographic factors and colonoscopic findings of the cases and the controls were collected, and prevalence and risk factor of colorectal adenoma and cancer of both groups are analyzed. Results: Data from 110 patient in the gastric neoplasm group (93 with gastric adenoma, 17 early gastric cancer) and 110 healthy control group participants were included in the statistical analysis. The presence of gastric adenoma or early gastric cancer was an independent risk factor for colorectal adenoma (OR = 4.4312, 95% CI = 2.7159–7.2301). The presence of gastric adenoma or early gastric cancer was an independent risk factor for colorectal high risk adenoma (OR = 5.0980, 95% CI = 1.9995–12.9986). There was no statistical relation between gastric adenoma or early gastric cancer and colorectal cancer (P = 0.0948). Conclusion: The risk of colorectal adenoma and high risk colorectal adenoma increased significantly in patients with gastric adenoma and early gastric cancer. Therefore, we suggest that colonoscopic surveillance should be strictly considered in patient with gastric adenoma and early gastric cancer. Keywords: colorectal cancer, colorectal adenoma, colonoscopic surveillance, early gastric cancer, gastric adenoma

EE-0238 (PE-0609) Colonic diffuse large B cell lymphoma hidden in actinomycosis
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Background and Aim: Rarely, actinomycosis can mask malignant diseases. We report a case of colonic diffuse large B cell lymphoma (DLBCL) which was misdiagnosed as abdominal actinomycosis. Methods: A 76-year-old woman presented with right flank pain and weight loss. Abdominal CT (Fig. 1) and colonoscopy (Fig. 2) revealed huge ascending colon mass. Although initial impression was malignancy, colonoscopic biopsy revealed no malignant cells, but sulfur granule and filamentous organism (Fig. 3) suggested actinomycosis. Results: We administered intravenous penicillin G under the impression of abdominal actinomycosis. But her condition deteriorated rapidly, and follow-up CT showed markedly increased colon mass and new multiple nodular lesions around ascending colon. We performed sono-guided percutaneous biopsy of nodular lesion. Pathologic result was DLBCL. The patient was scheduled for chemotherapy but expired due to cancer progression. Conclusion: Diagnosis of gastrointestinal infiltrating tumors is often difficult because superficial biopsy rarely provide confirmative diagnosis. This case shows the difficulty of correct diagnosis of lymphoma due to the concomitant actinomycosis. Deep biopsy or surgery must be considered in case of actinomycosis with no response to antimicrobial therapy. Keywords: lymphoma, actinomycosis
EE-0254 (PE-0610) Prognostic value of DNA mismatch repair status and KRAS mutations in Korean colorectal cancer patients

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Background and Aim: The association of DNA mismatch repair (MMR) and KRAS mutation on clinical outcome of patients with colorectal cancer are frequently documented. However, the development of a more accurate prediction on clinical outcome using combination of both biomarkers remains a worthy area of investigation. The aim of this study was to evaluate the clinical relevance of KRAS mutation and MMR status in Korean patients with colorectal cancer (CRC). Methods: Clinical and pathological information for 1174 patients, who underwent surgery for colorectal cancer in 3 teaching hospitals from 2011 to 2013, were reviewed and recorded. Mutation analysis for exon 2 of KRAS gene was performed by Sanger sequencing. Expression of MMR proteins including MLH1 and MSH2 was evaluated by immunohistochemistry. Results: The overall frequencies of KRAS mutation was 34.9%. Mutations in KRAS codon 12 and codon 13 were detected in 26.7% and 8.2% of patients, respectively. Overall, 90 (7.7%) tumors that had at least loss of expression for at least one MMR protein were defined as MMR protein defective (MMR-D), and the remaining tumors were classified as MMR protein intact (MMR-I). According to KRAS mutation and MMR status, CRC was classified to 4 groups: Group 1, KRAS-mutated and MMR-I; Group 2, KRAS-mutated and MMR-D; Group 3, KRAS wild and MMR-I; and Group 4, KRAS wild and MMR-D. We found that patients in Group 4 had the best prognosis, and patients in Group 2 had the worst overall survival. KRAS mutation was independently associated with shorter time to recurrence and poorer overall survival. Conclusion: Combination status of KRAS mutation and MMR provide fundamental genetic signatures affecting tumor behavior and may be used as a prognostic biomarker for CRC patient. These findings should be validated by further larger prospective study.

Keywords: colorectal cancer, KRAS mutation, DNA mismatch repair

EE-0276 (PE-0611) Risk of colorectal neoplasia following colonoscopic resection of sessile serrated adenoma/polyp

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Background and Aim: The study was conducted to investigate the risk for colorectal neoplasia after colonoscopic resection of sessile serrated adenoma/polyps. Methods: Among the patients who underwent colonoscopy at the University of Korea Ansan Hospital between January 2012 and December 2015, a total of 147 patients with any serrated adenoma/polyp were enrolled in our study. Baseline characteristics and findings on initial and surveillance colonoscopy were extracted retrospectively. The incidence and risk factors of any colorectal neoplasm at the time of surveillance colonoscopy were evaluated. Results: In the 147 patients with any serrated adenoma/polyp, 3 (2%) with traditional serrated adenoma at index colonoscopy were excluded. Among 144 with sessile serrated adenoma/polyp (SSA/P), male was 89 (61.8%), and mean age was 57.1 years (range 21–85). At index colonoscopies of 144 patients, 166 SSA/P were resected, and 266 other colorectal neoplasms such as tubular adenoma, tubulovillous adenoma, and cancer were detected. Among them, 30 (20.8%) patients underwent surveillance colonoscopy until September 2016. The mean interval between surveillance colonoscopy and initial colonoscopy was 19.6 months (range, 6.2–37.9 months). Cumulative incidence rate for any neoplasm on surveillance colonoscopy was 53.3% (n = 16), with a rate of 6.7% (n = 2) for advanced neoplasm. In univariate analysis between the two groups according to the metachronous colorectal adenomas, the risk factor was not found, although male was more prevalent (61.9% vs 33.3%, P = 0.151). Conclusion: The results reveal that SSA/P is associated with increased risk of metachronous colorectal neoplasm although significant risk factor of them is not found. Therefore, the short interval of surveillance colonoscopy can be considered in the patients with SSA/P on screening colonoscopy.

Keywords: sessile serrated adenoma, colonoscopy, colorectal neoplasia
EE-0293 (PE-0612) Are additional treatments really needed after endoscopic resection for rectal small neuroendocrine tumors?

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**Background and Aim:** Little is known about the long-term outcomes of endoscopically resected rectal neuroendocrine tumors (NETs). The present study aimed to investigate treatment strategies determining additional treatment after endoscopic resection (ER) of rectal NETs and long-term outcomes of endoscopically resected rectal NETs. **Methods:** We analyzed medical records of patients who underwent ER for rectal NETs from January 2005 to December 2016. The clinicopathological characteristics of these lesions were analyzed and long-term outcomes were evaluated. **Results:** A total of 322 patients were studied. The complete and curative resection rates were 76.4% and 55.9%, respectively. Rectal NETs initially resected as polyps and treated with conventional EMR were observed more frequently in the non-curative group than those resected as tumors and treated with a combination of EMR and cold biopsy. Positive lymphovascular invasion (OR, 75.993; P < 0.001), positive (OR 75.993; P < 0.001) resection margins were more likely to undergo additional treatment. Although lymph node metastasis was found in 6 patients, none experienced local or metastatic tumor recurrence during the median follow up of 40.49 months. **Conclusion:** Long-term outcomes after ER for rectal NETs were excellent. The prognosis showed favorable outcomes regardless of whether patients receive additional salvage treatments. **Keywords:** rectal neuroendocrine tumor, endoscopic resection, additional treatment, outcome

EE-0329 (PE-0613) Colorectal cancer masquerading as Streptococcus viridans uterine abscess

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**Background and Aim:** Uterine abscess is a rare condition with an incidence of 0.5% amongst gynecologic patients and 13.6% in elderly gynecologic patients. The commonest cause of uterine abscesses are malignant gynecological tumors. **Methods:** A 70-year-old lady presented to the emergency department (ED) with colicky abdominal pain for 5 months, loose stools, and weight loss of 4 kg. She was febrile (37.9°C) and had lower abdominal tenderness. Hemoglobin was 9.9 g/dL. A computed tomograph of thorax, abdomen and pelvis demonstrated a loculated rim enhancing collection in the uterine fundus and left adnexa region measuring 8.2 cm × 8.8 cm × 7.6 cm and focal circumferential enhancing wall thickening involving the rectosigmoid colon measuring 4 cm × 5 cm × 3.7 cm. **Results:** The uterine collection was percutaneously drained; the aspirate yielded frank pus which grew Streptococcus viridans and *Pseudomonas aeruginosa*. A colonoscopy was performed which showed a circumferential mass at the rectosigmoid junction that measured 10 cm. Histopathology showed adenocarcinoma. Laparotomy was then performed which revealed a rectosigmoid mass which had invaded the posterior wall of the uterus and small bowel loops. An anterior resection with total abdominal hysterectomy and bilateral salpingo-oophorectomy with small bowel resection was performed. Two out of 20 lymph nodes had tumor metastasis (Staging: pT4b, N1b, M0). The proximal and distal resection margins were tumor-free. **Conclusion:** This case highlights the importance of maintaining a high index of suspicion of colorectal malignancy in extracolonic abscesses associated with Streptococcus viridans. **Keywords:** rectosigmoid adenocarcinoma, Streptococcus viridans abscess, uterine abscess

**Figure 1.** Gross surgical specimen
EE-0348 (PE-0614) The endoscopic and clinicopathologic characteristics of de novo colon cancers
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Background and Aim: Most colon cancers occur via the adenoma–carcinoma sequence. Some colon cancers bypass this sequence and appear directly from normal tissues. We investigated the endoscopic and clinicopathologic features of early colon cancers originating de novo.

Methods: In an academic hospital, 292 pathologic specimens of early colon cancers taken by endoscopic removal or surgical resection from 252 patients were reviewed retrospectively. De novo colon cancer was defined as early colon cancers without adjacent adenoma.

Results: Mean lesion size of 17 (4%) de novo cancers from 16 patients (mean age 60 ± 9 years, male n = 10) was 1.24 ± 0.55 cm. Most lesions were located in the left colon; rectum 6 (35.3%), sigmoid colon 5 (29.4%), descending colon 4 (23.5%), and transverse colon 2 (11.7%). Elevated type was common: Is/Isp 5/2 (41.2%), IIa (+IIC) 3/2 (29.4%), IIc (+IIC) 3/1 (23.5%), and laterally spreading tumor 1 (5.8%). Central erosions or ulcers were seen in 6 (35.3%). Submucosal and lymphovascular invasion showed in 10 (58.8%) and 4 (23.5%), respectively.

Conclusion: Although de novo colon cancers comprise only 4% of early colon cancer, there showed high rate of submucosal and lymphovascular invasion. Therefore, it should be managed cautiously because de novo cancer may be very aggressive even though it has a very small size.

Keywords: Colon cancer, de novo cancer

EE-0377 (PE-0615) 10 cases of low-grade appendiceal mucinous neoplasm
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Background and Aim: Low-grade appendiceal mucinous neoplasm (LAMN) is a distended, mucous-filled appendix. They are a rare form of appendiceal mass and develop from both benign and malignant processes. There are no clear optimal management at present for LAMN. We have experienced 10 cases of LAMN, so we will report it clinicopathologically.

Methods: From January 2008 to June 2018, we prospectively enrolled 10 patients of LAMN treated. Male: Female = 4 cases: 6 cases, average age 66.6 years (46 to 89 years old), median cyst diameter 4.2 cm (0 to 6.0 cm), average observation period 41.1 months. Treatment was appendectomy (6 cases), ileocecal resection (3 cases), and right colon resection (1 case).

Results: The stump was negative in all cases, and there was no metastasis to lymph node dissection. There was no relapse survival without additional treatment except one case. Since only one patient had mucinous disseminated nodule in the entire abdominal cavity, weight loss resection including omentectomy and hyperthermic intraperitoneal chemotherapy were performed. Currently, about 2 years have passed since surgery, but there is no relapse survival.

Conclusion: The appendix mucinous cyst is a relatively rare disease, in which the mucus is stored in the lumen of the appendix and is expanded like a cyst. Depending on the case, it may shift to peritoneal pseudomyxoma. It is not only due to the rupture of cysts but also pathological differences. In overseas reports, LAMN is classified into two types by pathologic histology. In one type it is said that there is a high risk of peritoneal pseudomyxoma, and there are reports that tumor reduction surgery and hyperthermic intraperitoneal chemotherapy should be performed in that case.

Keywords: LAMN, appendix cyst, pseudomyxoma peritonei
EE-0390 (PE-0616) A rare case of primary signet ring cell carcinoma of colon presenting like Crohn’s disease and review of case series from a tertiary hospital

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Background and Aim: Primary signet ring cell carcinoma (SRCC) of colon is rare. We recently encountered a rare case of SRCC in a young girl with the clinical, endoscopic, and image findings mimicking the Crohn’s disease. The diagnosis was only made after surgery. Therefore, we would like to share the clinical picture of this special case, and we also reviewed the SRCC case series in our hospital. We provided our lessons learned from this case series.

Methods: We retrieved the SRCC diagnosis from the pathology databank from 2003 to 2018. The clinical data were recorded and analyzed. Results: A total of 16 primary colonic SRCC patients were identified during the study period. The follow-up period ranged from 0.2 to 7 years, mean as 1.7 years. The incidence rate of SRCC in CRC was about 0.15%. Their age ranged from 14 to 86 years old. Male gender predominant (5 to 3 ratio). Mostly presented with abdominal pain and fullness (50%). The location of tumor was most frequently found at the sigmoid colon (43.75%), followed by ascending colon (25%) and descending colon (18.75%). They were often diagnosed at advanced stage (stage 3: 56.3%, stage 4: 31.3%) that only 18.8% are still alive. Conclusion: CC is rare. Our special patient with the presentation mimics Crohn’s disease is atypical even as the SRCC (female gender, younger age, and location is not at the most common area) provides us the lesson that treatment without satisfied effect should work up for other possibility.

Keywords: signet ring cell carcinoma, colorectal carcinoma

Clinical characters of the SRCC patients

| Table 1: Clinical Characteristics of SRCC patients (N=16) |
|---------------------------------|
| Clinical Characteristics of SRCC patients (N=16) |
| Mean Age – yr (Range) | 50 (14-86) |
| Sex – no. (%) |
| Male | 10 (62.5) |
| Female | 6 (37.5) |
| T Stage – no. (%) |
| T1 | 1 (6.3) |
| T3 or T4 | 15 (93.7) |
| N stage – no. (%) |
| N0 | 2 (12.5) |
| N1 | 2 (12.5) |
| N2 | 2 (12.5) |
| M stage – no. (%) |
| M0 | 11 (68.8) |
| M1 | 5 (31.2) |
| Stage – no. (%) |
| O | 1 (6.2) |
| I | 0 (0) |
| II | 1 (6.2) |
| III | 9 (55.3) |
| IV | 5 (31.3) |
| Location – no (%) |
| Ascending colon | 4 (25) |
| Transverse colon | 1 (6.25) |
| Descending colon | 3 (18.75) |
| Sigmoid colon | 7 (43.75) |
| Rectum | 1 (6.25) |
| Survival- no (%) | 3 (18.8) |

EE-0396 (PE-0617) Clinical outcomes according to adherence to the additional examination in National Colorectal Cancer Screening Program: A nationwide population-based cohort study

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Background and Aim: In the Korea National Cancer Screening Program (NCSP), fecal occult blood test (FOBT) is conducted every year for adults over 50 years, and an additional colonoscopy or barium enema is selected in the individuals with positive FOBT. However, the adherence of the additional examination was lower than expected. Therefore, we aimed to investigate the impact of the adherence to the additional examination on clinical outcomes in the NCSP.

Methods: The study population was adults aged 50 years or older that were participated in the NCSP from 2007 to 2015. Data were obtained from the Korea National Health Insurance Corporation database, which were linked with the Central Cancer Registration and National Statistical Office. The main outcomes were the detection of CRC and the proportion of local, regional, and metastatic lesions.

Results: After the wash-out period from January 2007 to December 2008, a total of 319,998 were FOBT-positive cases in the National Cancer Screening Program between January 2009 and December 2010. Among the study subjects (n = 184,103) excluding subjects that met the exclusion criteria, 82,300 (44.7%) were compliant to additional examination and 101,803 (55.3%) were not. The overall CRC incidence was 2.6% in the non-compliance and 6.6% in the compliance group. Of these, regional lesions were 80.6% in the non-compliance and 85.3% in the compliance group, while the metastatic lesions were 19.4% in the non-compliance and 14.7% in the compliance. Additionally, the overall mortality and cancer-specific mortality within 5 years were lower in the compliance group than the non-compliance. Conclusion: According to the compliance with the additional examination after positive FOBT, the proportion of localized lesions among the diagnosed CRC was higher in the compliance group than the non-compliance. In addition, the 5-year mortality was lower in the compliance group than the non-compliance.

Keywords: colorectal cancer, fecal occult blood test, additional examination, adherence
EP-0121 (PE-0618) Comparison of clinical and endoscopic characteristics of sessile serrated adenomas/polyps without or with dysplasia/adenocarcinoma in a Korean population: A Korean Association for the Study of Intestinal Diseases (KASID) multicenter study

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Background and Aim: Sessile serrated adenomas/polyps (SSA/Ps) are precancerous lesions that account for one third of colorectal cancers. The endoscopic and pathologic differentiation between SSA/Ps without dysplasia (SSA/PO) and SSA/Ps with dysplasia or adenocarcinoma (SSA/PD) can be difficult. This study aimed to assess the clinical characteristics of SSA/PD.

Methods: This multicenter retrospective cohort study included 532 patients who underwent endoscopic resection and were pathologically diagnosed with SSA/POs and SSA/PDs. Initially, medical, endoscopic, and histopathological records of patients who underwent endoscopic resection of SSA/POs and SSA/PDs at eight university hospitals in Korea between January 2005 and December 2015 were reviewed. Results: SSA/Ps were more commonly detected in men and were more frequently located in the proximal colon. Most SSA/Ps had a flat, slightly elevated, or sessile morphology. The most prevalent endoscopic findings of SSA/Ps were nodular surface, disrupted vascular pattern, altered fold contour, dome-shaped morphology, and pale color. SSA/POs were more frequently located in the proximal colon, while SSA/PDs were more frequently located in the distal colon. SSA/POs displayed 0-Ip, Isp, Ilb, or Ila ± Ic morphology more frequently, while SSA/PDs displayed 0-Ic or Ila morphology more frequently. A rim of debris was more frequently found in SSA/POs, while nodular surface and disrupted vascular pattern were more frequently observed in SSA/PDs. In the univariate analysis of endoscopic features, SSA/PDs were significantly associated with the distal colon location, 0-Isp and Ilb morphologies, nodular surface, and disrupted vascular pattern. In the multivariate analysis, 0-Ib, nodular surface, and disrupted vascular pattern were significantly associated with SSA/PDs.

Conclusion: SSA/Ps with 0-Ib morphology, nodular surface, or disrupted vascular pattern are associated with an increased risk of dysplasia or carcinoma.

Keywords: sessile serrated adenoma/polyp, endoscopic morphology, dysplasia, carcinoma

EP-0125 (PE-0619) The accuracy of Asia Pacific Colorectal Screening Score (APCS) as a risk prediction score for advanced colorectal neoplasia in asymptomatic patients in Cardinal Santos Medical Center (CSMC) for years 2015–2017: A retrospective study

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Background and Aim: Colorectal Cancer (CRC) is now the third most common gastrointestinal cancer worldwide. In the Philippines, CRC is now the leading cause of cancer. Due to emerging number of new CRC cases annually, early screening may be beneficial to patients. In 2011, the Asia Pacific Colorectal Screening (APCS) was developed and validated to identify those who may be at risk in having advanced colorectal neoplasia (ACN) in asymptomatic Asian patients. Methods: This is a retrospective, cross-sectional, descriptive study approved by the Institutional Review Board of Cardinal Santos Medical Center (CSMC). Subjects were comprised of 865 asymptomatic patients who underwent screening colonoscopy from January 2015 to December 2017 in the said institution. The APCS scores were identified, and patients were risk stratified as average (AR), moderate (MR), and high risk (HR). The association and accuracy of APCS scores were determined by chi-squared and diagnostic accuracy tests. Results: The average age was 57 ± 11.6 years, almost equally distributed between male and female, 32% with first degree family history of CRC and smoking history. Among 865 patients, the prevalence of ACN was 30% overall, distributed as 4% on AR, 10% on MR, and 16% on HR. Chi-squared test showed positive association on APCS score and histopathologic findings of ACN with P value of < 0.001. However, the diagnostic accuracy was low at 35% on moderate risk and 53% on high risk. Conclusion: The APCS score showed positive association on ACN results, may be used as a guide, but not accurate and effective tool on whom asymptomatic patients to advice to undergo CRC screening.

Keywords: APCS score, colorectal cancer, screening, advanced colorectal neoplasia
EP-0127 (PE-0620) Impact of visceral fat distribution on survival, metastasis of stage III colorectal cancer
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Background and Aim: There have been studies about the relationship between visceral obesity and risk of colorectal neoplasia. Visceral obesity may also affect the outcome of colorectal neoplasia. The aim of this study is to investigate the associations between visceral adipose tissue and oncologic outcomes in stage III colorectal cancer (CRC). Methods: Four hundred seventy-two patients were identified. Subcutaneous and visceral adipose tissue areas were measured volumetrically via computed tomography scan for each patient at three levels, lumbar spine 3 to 4, 4 to 5 and lumbar spine 5 to sacrum. Adjusting age, sex, and other clinical factors, the effect of visceral adipose tissue area on mortality, recurrence was evaluated using Cox proportional hazard regression. Results: In univariate and multivariate analysis, higher visceral to total adipose tissue (VT) ratio (HR 1.02, 95% CI 1.001–1.069, P = 0.043) and higher visceral to subcutaneous adipose tissue (VS) ratio (HR 1.02, 95% CI 1.001–1.069, P = 0.043) were both associated with poor CRC-specific survival. Interestingly, in the evaluation of each recurrence site, higher VT ratio (HR 1.067, 95% CI 1.007–1.131, P = 0.028) and higher VS ratio were both related to higher risk of peritoneal seeding recurrence (HR 1.025, 95% CI 1.003–1.047, P = 0.027). Among each spine level, higher visceral to total adipose tissue ratio at L3–L4 level was significantly associated with higher risk of peritoneal seeding recurrence (HR 4.969, 95% CI 1.303–18.949), while other levels showed no such relationship. Conclusion: Visceral obesity is closely related to the increased risk of CRC-specific mortality and peritoneal seeding metastasis in patients with stage III colorectal cancer.

Keywords: colorectal cancer, metastasis, survival, visceral obesity

EP-0153 (PE-0621) Anti-diabetic medications and the risk for colorectal cancer in adult type 2 diabetes: A population-based nested case-control study
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Background and Aim: To evaluate whether anti-diabetic medications can modify the colorectal cancer (CRC) risk in adult type 2 diabetes mellitus (DM) patients. Methods: A nested case-control study was performed from a population-based prospective cohort with a biennial evaluation provided by the National Health Insurance Corporation between the years 2007 and 2014. Among the 2,084,602 patients who were newly diagnosed as type 2 DM in this period, the cases had incident CRC identified at least 1 year after DM diagnosis, and the controls were matched to each case by age, sex, and the year of DM diagnosis. Results: A total of 7,272 cases and 7,272 matched controls were analyzed. The use of insulin or sulfonylurea increased the risk for CRC (aOR [95% CI], 1.170 [1.096–1.249] and 1.158 [1.084–1.237], respectively), showing a trend of increasing risk with increasing cumulative doses (P for trend < 0.001). Regardless of sex and fasting serum glucose level, sulfonylurea use significantly increased the CRC risk in those with age over 65 years, body mass index over 25 kg/m², and non-smokers. Among sulfonylurea drugs, interestingly, gliclazide did not increase the CRC risk (aOR [95% CI], 0.874 [0.743–1.028]), whereas glimepiride or the other sulfonylurea drugs significantly increased the CRC risk (aOR [95% CI], 1.174 [1.100–1.254] and 1.275 [1.044–1.557], respectively). Metformin showed a decreasing tendency toward the CRC risk, but it was not statistically significant and dose-response relationship was not prominent. The use of thiazolidinedione and dipeptidyl peptidase-4 inhibitors did not modify the risk for CRC, probably due to shorter cumulative doses than sulfonylurea drugs or metformin. Conclusion: Insulin and sulfonylurea drugs other than gliclazide increase the CRC risk in type 2 DM patients. Further studies are warranted for new anti-diabetic agents.

Keywords: colorectal cancer, diabetes mellitus, antidiabetic drug, sulfonylurea, chemoprevention
**OE-0060 (PE-0622) The diagnostic accuracy of Papanicolaou staining in brush biopsy as an alternative to tissue biopsy in patients undergoing colonoscopy for non-obstructing colonic tumors in Vicente Sotto Memorial Medical Center from February 2016 to September 2017**

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**Background and Aim:** The study was conducted to determine the diagnostic accuracy of Papanicolaou stain in detecting malignancy from brush biopsy specimens in patients undergoing colonoscopy at Vicente Sotto Memorial Medical Center and shortening turnaround time of results along with the demographic profile of patients with colonic tumors. **Methods:** Details of all patients undergoing colonoscopy for colonic tumors at Vicente Sotto Memorial Medical Center were taken which included demographic, clinical presentation, and risk factors and prospectively reviewed. Patients were explained of the significance of the study and any drawbacks. Informed consent was taken. On colonoscopy, brush biopsies around the four sides of colonic tumors were sampled after the tissue biopsy was taken. These were then smeared directly to slides and fixed with 95% ethyl alcohol and stained with Papanicolaou method. The stained slides were read by 2 pathologists and interpreted as benign or malignant and results compared with the standard biopsy result. **Results:** Sixty-four patients underwent colonoscopy for colonic tumors. The average age of the 60 patients was 55.60 years old, 53.3% were females, 85% had hereditary disease, 66.7% had IBD, and 50% were smokers. Test of association between PAP stain results and gold standard yielded significance of the study and any drawbacks. Informed consent was taken. On colonoscopy, brush biopsies around the four sides of colonic tumors were sampled after the tissue biopsy was taken. These were then smeared directly to slides and fixed with 95% ethyl alcohol and stained with Papanicolaou method. The stained slides were read by 2 pathologists and interpreted as benign or malignant and results compared with the standard biopsy result. **Results:** Sixty-four patients underwent colonoscopy for colonic tumors. The average age of the 60 patients was 55.60 years old, 53.3% were females, 85% had hereditary disease, 66.7% had IBD, and 50% were smokers. Test of association between PAP stain results and gold standard yielded significant results wherein of the 44 PAP stain positive, 42/44 were also positive in the gold standard assessment (\(P < 0.001\)), 42/51 were positive in H&E as well as in the gold standard (\(P = 0.00101\)). Pap stain yielded higher accuracy with sensitivity of 93% and specificity of 89% in detecting malignancy. **Conclusion:** The result of this study shows that the use of Papanicolaou stain in brush biopsy for colonic tumors in detecting malignancy has significant diagnostic accuracy. Moreover, it is easy to perform, cost effective, and can be reported in a limited time easily. **Keywords:** Papanicolaou stain, colonic mass, brush biopsy, colonoscopy

**OE-0100 (PE-0623) Sociodemographic determinants of quality of life in rectal cancer**

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**Background and Aim:** We present the findings of the first study on the QOL of Sri Lankan CRC patients. **Methods:** Colorectal cancer patients with stages I–III who underwent treatment with a curative intent at 2 referral centers in Sri Lanka were invited to participate in the study. Participants were recruited at different stages of treatment. Translated and validated Sinhala version of the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-CR29 questionnaires were administered. Quality of life was compared between 2 sexes; different treatment modalities, stoma, and non-stoma patients were calculated. **Results:** A total of 102 participants (Male: Female 53:49) were recruited, mean age 57.2 years (SD = 12.0). Twenty-five of them (24.5%) were undergoing neo-adjuvant treatment while the remaining had surgery at different times. The majority (77.5%) were treated for rectal cancer. There was a statistically significant negative correlation with age and body image (Spearman rho –0.22, \(P = 0.34\)), dysuria (\(P = 0.31\)), and a positive correlation with emotional functioning (\(P = 0.03\)). Males had a significantly higher score for the blood and mucus (\(P = 0.021\)) and dysuria (\(P = 0.004\)) symptoms scales. The level of education had a statistically significant association with the anxiety scale (Kruskall–Wallis test, \(\chi^2(4) = 12.2, P = 0.016\)) where anxiety score was higher (better) with increasing education level. In contrast the social functioning scale score decreased (worse) with increasing level of education scale (Kruskall–Wallis test, \(\chi^2(4) = 14.6, P = 0.006\)). Neither the religious beliefs nor their living conditions (own house/rented house/living with children) had any statistically significant effect on the functional or symptom scales. **Conclusion:** Certain aspects of QOL worsened with increasing age. Patients with higher education levels appeared less anxious but had poor social functioning. There were no associations with QOL and religious beliefs or living conditions. **Keywords:** quality of life, Sri Lanka, colorectal cancer, sociodemographic
OE-0428 (PE-0624) Clinicopathological features and abnormal microsatellite instability (MSI) correlation in colorectal cancer patients in Northern Malaysia

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Background and Aim: DNA mismatch repair gene (MMR) abnormalities are seen in 95 percent of hereditary nonpolyposis colorectal cancer (HNPCC) and 10–15 percent of sporadic colorectal cancers. There are limited data on MMR abnormalities in Malaysian colorectal cancer patients. Recognized phenotypes include young age (< 50 years), proximal colon, abundant lymphocyte infiltration, mucin producing and signet ring morphology, and poorly differentiated. This study was aimed to determine the frequency of abnormal MMR gene protein expression in colorectal carcinoma in Northern Peninsular Malaysia using immunohistochemistry test.

Methods: Clinicopathological information was obtained from 73 patients' records who underwent bowel resection for colorectal cancer (CRC) at tertiary hospital in Kedah from January to December 2017. Immunohistochemistry for MLH1, MSH2, MSH6, and PMS2 proteins were performed on paraffin-embedded tissue containing carcinoma for cases presented with listed phenotypes. Results: A total of 73 cases of colorectal carcinomas of sporadic and hereditary types were assessed. Nine (12.3%) from 28 subjects (38.3%) of which immunohistochemistry testing performed; had absent immunohistochemical expression of any one of the MMR gene proteins. This comprised absent MLH1 and PSM2-4, absent MSH2 and MSH6-3, absent PSM2-2. There were 24 right-sided tumors, 5 mucins producing, 3 poorly differentiated tumors. Two had marked lymphocytes infiltration. Seven were aged below 50 years. Three had extra-colonic tumor with 2 had first degree relative with CRC. Conclusion: Cancers with abnormal MMR gene expression were associated with microsatellite instability-high (MSI-H) phenotype. About 12.6 percent demonstrated absent MSH2, MSH6, and PMS2 protein expression in isolation or in combination with other MMR genes, which often predicts a germline mutation, synonymous with a diagnosis of HNPPC. This appears to be comparable frequency compared to reported data previously.

Keywords: colorectal cancer, MMR gene expression, Lynch syndrome

OE-0551 (PE-0625) Overexpression of elafin in colorectal cancer and the clinical significance

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Background and Aim: It has been reported that elafin drove poor outcomes in some tumors, but little data have shown that in colorectal cancer. In this study, we aimed to investigate the expression of elafin in colorectal tumor. Methods: We included 88 patients who were diagnosed with colorectal cancer by histopathology after the resection of colon at Peking University First Hospital. The clinical information of patients was collected. The expression of elafin in tissues of colorectal tumor and of adjacent non-tumor was examined by immunohistochemistry (IHC). The paired chi-squared test was used to analyze the proportions of high-score group between two groups. We also analyzed the RNAseq data presented in TCGA database to confirm the mRNA levels of elafin in colorectal tumor. Continuous variables of RNAseq data were displayed as mean ± standard deviation. The relationship between the RNAseq expression level of elafin and the clinicopathological features was conducted by an independent two sample t-test. Results: Of the 88 paired samples, 68 (77.3%) colorectal cancer tissues indicated high-expression of elafin, while 52 (59.1%) matched adjacent noncancerous tissues showed high-expression (P = 0.010). The high scores of elafin was correlated with clinical stage based on AJCC guidelines (P = 0.028). The RNAseq and the clinical data were available in 438 colorectal cancer tissues and 41 normal tissues in TCGA database. The RNAseq data showed elafin was upregulated in colorectal cancer samples as compared to non-tumor tissues (176.42 ± 402.13 vs 96.75 ± 150.07; P = 0.208). We also found no statistically significant correlations between the mRNA levels of elafin and clinicopathological features. Conclusion: Elafin was increased in patients with colorectal cancer and might have relationships with clinicopathological features. However, elafin may not affect the progress of colorectal cancer obviously. Further studies are needed to clarify the role of elafin in the development of colorectal cancer.

Keywords: colorectal cancer, elafin, immunohistochemistry, TCGA database
OE-0559 (PE-0626) Simultaneous cytoreductive surgery, hyperthermic intraperitoneal chemotherapy, and hepatectomy for colorectal peritoneal and liver metastases

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Background and Aim: Emerging publications about cytoreductive surgery (CRS) and heated intraperitoneal chemotherapy (HIPEC) for colorectal peritoneal metastases show encouraging outcomes. Simultaneous liver resection could offer a chance of cure to selected patients with liver and peritoneal metastases. Methods: We reported a patient with colorectal liver and peritoneal metastases that was managed with hepatectomy, CRS, and HIPEC to maximize the chance of survival. Results: A 45-year-old gentleman had laparoscopic right hemicolectomy for obstructing carcinoma of ascending colon in 2015. In view of bilobar liver metastases, pulliative chemotherapy of XELOX and bevacizumab was given. He was referred to our center for consideration of liver resection in 2017. PET scan showed another metachronous carcinoma of rectum with liver metastases at left lobe and segment 5. In the multidisciplinary meeting, the plan was robotic total mesorectal resection (TME) followed by left hepatectomy. Robotic TME and loop ileostomy were performed uneventfully. Two months later, intraoperatively the peritoneal cancer index was 7. Left lateral sectionectomy, wedge resection of segment 5, peritonectomy, closure of ileostomy, and hepatectomy were performed 3 months after rectal resection. Intraoperatively, the peritoneal cancer index was 7. Left lateral sectionectomy, wedge resection of segment 5, peritonectomy, closure of ileostomy, and HIPEC were performed, with complete cytoreduction (CC-0). Post-operatively, he recovered well apart from postoperative ileus. The patient remained disease free for 6 months. His latest PET scan showed small volumes of recurrent liver and peritoneal disease. He declined third line chemotherapy as he was asymptomatic. Conclusion: CRS/HIPEC and hepatectomy could be considered in highly selected patients with colorectal metastases with minimal postoperative morbidity when compared with systemic chemotherapy or biologics. Keywords: colorectal neoplasms, peritoneal neoplasms, liver neoplasms, cytoreductive surgery procedures, antineoplastic agents

OE-0649 (PE-0627) Factors associated with knowledge of colorectal cancer: A population-based study of 2,400 Chinese individuals

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Background and Aim: Colorectal cancer (CRC) is one of the most common cancers worldwide. Its screening is an important preventive strategy, yet its uptake rates remained suboptimal. This study examined the knowledge level of CRC and its association with sociodemographic factors among Chinese elderly population. Methods: A population-based telephone survey was conducted among 2,400 residents aged between 61–76 years in Hong Kong. Data on social-demographic factors and their knowledge of CRC symptoms, risk factors, and screening were collected. The level of knowledge was categorized as high, middle, and low. Binary logistic regression was conducted to identify the factors associated with knowledge level of CRC. Results: The knowledge level of CRC risk factors was suboptimal (low: 55.3%) when compared with that of its symptoms (low: 32.4%) and screening (low: 5.0%). Individuals with older age (71–76 years; AOR: 2.23, 95% CI = 1.28–3.88), higher education level (at tertiary or above; AOR: 1.34, 95% CI = 1.00–1.80), and lower income level (AOR: 1.27, 95% CI = 1.00–1.59) were associated with a higher knowledge level of CRC risk factors (Table 1). However, no association was observed between these factors and the knowledge level of CRC symptoms and its screening. Conclusion: We identified a relatively low knowledge level of CRC risk factors, especially for those at younger age, lower education level, and higher income level. These individuals represent target groups for education on CRC knowledge. Future research should examine the reasons of these significant associations and devise tailored educational programs. Keywords: colorectal cancer, screening, knowledge, Chinese

CRC knowledge factors

Table 1. Factors associated with knowledge of colorectal cancer

| Knowledge of          | Symptom   | Rural (%) | Urban (%) | AOR (95% CI) | p     | Risk factors | Rural (%) | Urban (%) | AOR (95% CI) | p     | Screening | Rural (%) | Urban (%) | AOR (95% CI) | p     |
|-----------------------|-----------|-----------|-----------|--------------|-------|--------------|-----------|-----------|--------------|-------|-----------|-----------|-----------|--------------|-------|
OE-0657 (PE-0628) Prevalence of colonic polyps and colorectal carcinoma in a cohort of Sri Lankan rural patients: A single-center experience

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Background and Aim: Prevalence of colonic polyps and histological types vary among different populations. It is believed that the prevalence of colonic polyps among South Asians is lower when compared to other ethnicities. However, data regarding this are sparse.

Methods: A retrospective record-based study from May 2015 to May 2018 in the Gastroenterology Unit of a tertiary care general hospital in Uva Province of Sri Lanka. Data were collected from databases of Endoscopy Unit and Department of Histopathology. Polyp sizes and numbers were taken from endoscopy records, and histological types were according to the histology report.

Results: Five hundred thirty-four patients (mean age 48, range 7–82, SD 16; 311 [58%] males) underwent complete (371/534 [69%] Ileum; 513/534 [96%] Cecum) colonoscopies; 80/534 (15%) patients (52 males [65%], mean age 55, range 16–78, SD 16) found to have polyps or growths on colonoscopy; carcinoma: 18, polyps only: 60. Two patients had both carcinoma and polyps. Colonoscopy findings: number of polyps—46 patients ≤2 polyps, 17 patients 3–10 polyps, 1 patient ≥10 polyps; size of the polyps—42 patients <1 cm polyps, 12 patients 1–2 cm, 8 patients >2 cm. No patients had polyposis syndromes. Eight patients were excluded from final analysis due to inadequate data on histopathology. There were 109 specimens from 72 patients for final analysis (Table 1).

Conclusion: The commonest type of polyp was hyperplastic polyps. The majority had <2 polyps; 18/534 (3%) patients had carcinoma. Prevalence of polyps in this cohort is 12%, which is lower than in the west. Tubular adenoma is the commonest adenomatous polyp.

Keywords: colonoscopy, prevalence of colonic polyps, rural community, Sri Lanka, South Asia

Histological type and site of polyps

| Type                | Rectum | Sigmoid and Descending Colon | Transverse Colon | Ascending colon and rectum | Total |
|---------------------|--------|------------------------------|-----------------|----------------------------|-------|
| Hyperplastic polyp  | 11     | 6                            | 8               | 14                         | 39 [69%] |
| Inflammatory polyp  | 3      | 1                            | 0               | 4                          | 4 [14%] |
| Juvenile polyp      | 1      | 0                            | 0               | 1                          | 1 [13%] |
| Tubular adenoma     | 9      | 8                            | 6               | 1                          | 24 [22%] |
| Tubulo villous adenoma | 7    | 6                            | 4               | 0                          | 17 [15%] |
| Villous adenoma     | 3      | 1                            | 1               | 1                          | 6 [5%] |
| Adenocarcinoma      | 5      | 5                            | 0               | 4                          | 14 [13%] |
| Poorly differentiated carcinoma | 5 | 0 | 1 | 2 | 4 [4%] |
| Total               | 39     | 29                           | 20              | 22                         | 109 [100%] |

OE-0830 (PE-0629) Prognostic impact of CDX2 in colorectal cancer

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Background and Aim: CDX2 (Caudal-type homeobox transcription factor 2) protein is a master transcriptional factor involved in intestinal development. Lack of CDX2 protein expression was associated with more aggressive behavior of colorectal cancer. In 2016, found it was especially useful to utilize it as an indicator for the determination of adjuvant chemotherapy for stage II colorectal cancer. Validation of CDX2 expression in Taiwanese population still requires clarification. Hence, a retrospective study was conducted to characterize colorectal cancer patients without CDX2 expression.

Methods: We identified 378 patients diagnosed of colorectal cancer treated at our institution from 2012 to March of 2018, including 26 patients with CDX2-negative colorectal cancer and a comparison cohort of 352 patients with CDX2-positive metastatic CRC.

Results: The prevalence of absent CDX2 expression in our cohort was 6.8%. There is no gender difference between CDX2 negative and CDX2 positive groups. CDX2 negative expression was more likely to be found at right side colon compared to left side colon in 2 to 1 ratio. Mean age of CDX2 negative colorectal cancer patient is 69.9 years old in female and 62.9 years old in male patients. High percentage of CDX2 loss expressive colorectal patients had moderately to poorly histological tumor grade.

Conclusion: Our study showed loss of CDX2 expression in colorectal cancer patients seemed to be associated with (i) moderately to poorly differentiated tumor histological grade and (ii) right side colon predominance.

Keywords: CDX2, colorectal cancer
OE-0910 (PE-0630) Circulating miRNAs miR-519d and miR-150 associated with colon cancer progression

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Background and Aim: Screening for the early detection of colon cancer is of great significance for improving the patient survival. The purpose of this study was to explore the potential of circulating microRNAs (miRNAs) as a biomarker for colon cancer and to explore whether it can differentiate benign adenomas from colon cancer and normal people. Methods: The difference of miRNAs expression in 3 pairs of colon cancer and normal human plasma samples was investigated by microarray. After comparing the differential miRNAs expression profile with our group previous results of miRNAs chip expression differences in colon cancer tissue, we chose three miRNAs (miR-150, miR-519d, and miR-519e) to be further verified in colon and normal human plasma specimens. The correlation between their expression and clinicopathological factors was discussed. Finally, miR-519d and miR-150 were selected to investigate the expression and diagnostic significance in 90 specimens including normal persons, benign adenomas, and colon cancer. Results: Compared with normal people, the expression of miR-519e in colon cancer was not changed, while both miR-150 and miR-519d downregulated. miR-150 and miR-519d expressions were closely related to differentiation and lymphatic metastasis. Low expression levels of miR-150 and miR-519d can distinguish normal human, benign adenomas, and colon cancer, which has the potential as biomarkers for early colon cancer.

Keywords: circulating miRNAs, colon cancer

OE-0949 (PE-0631) Surveillance colonoscopy after positivity of fecal immunochemical tests with normal screening colonoscopy

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Background and Aim: Little is known for the outcome of surveillance colonoscopy (Sur-C) after positivity of fecal immunochemical tests (FITs) with normal findings on screening colonoscopy (Scr-C). We aim to understand the findings on Sur-C after multiple rounds of colorectal cancer (CRC) screening. Methods: We retrospectively evaluated individuals that attended the biennial FIT-based CRC screening program in a single hospital between March 2010 and December 2017. Stool specimen was analyzed by immunochemical tests (Kyowa, Tokyo, Japan). Colonoscopies were recommended to those with FIT ≥ 30 ng/g feces. Subjects with Sur-C after sequential positive results of FITs with normal findings on Scr-C were enrolled for analysis. The age, gender, quality indicators including colonoscopy compliance rate, adenoma detection rate, and cancer detection rate are calculated in the screening and Sur-C individuals. Results: A total of 51,789 participants (M: F = 47.9%: 52.1%; mean age: 59.8 years old) underwent 80,195 tests in 4 rounds of FIT-based CRC screening. The positivity rate of FIT was 8.2% (n = 6591). The colonoscopy compliance rate was 70.3% (n = 4635). Among 51,789, there were 106 individuals (with 125 FITs) meet the criteria for Sur-C. The colonoscopy compliance rate, adenoma detection rate, and cancer detection rate are calculated in the screening and Sur-C individuals. Conclusion: Two kinds of circulating miRNAs are identified to separate normal people, benign adenomas, and colon cancer, which has the potential as biomarkers for early colon cancer.

Keywords: colorectal cancer, screening, surveillance, fecal immunochemical test
OE-0954 (PE-0632) The association between carotid atherosclerosis and colorectal tubular adenoma in health checkup examinees

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Background and Aim: Colorectal tubular adenoma (TA) suggested to be associated with cardiovascular risk which can be assessed non-invasively and easily by using carotid Doppler ultrasound (CDU). We aimed to evaluate the association between carotid atherosclerosis and colorectal TA in health checkup examinees. Methods: We retrospectively reviewed the medical records of 13,671 health checkup examinees who had undergone both CDU and colonoscopy at a single hospital from January 2012 to December 2016. Results: The median age of 6,640 eligible patients was 54 years (range, 17–89). TAs were observed in 2,725 patients (41.0%) with a median number of 1 (range, 1–21). In patients (n = 2,211, 33.3%) with abnormal results of CDU such as abnormal intima-media thickness (IMT, ≥10 mm, n = 1,930), presence of significant carotid artery stenosis (n = 223) or plaques (n = 1,484), TAs were more frequently observed with greater number and larger size compared to the patients with normal results. Moreover, visceral histology and high grade dysplasia were also more common. In multivariate analysis, age ≥50 (odds ratio [OR] 2.20; 95% confidence interval [95% CI] 1.94–2.49, P < 0.001), waist circumference ≥90 cm (OR 1.26; 95% CI 1.08–1.47, P = 0.003), hypertension (OR 1.28; 95% CI 1.14–1.46, P < 0.001), smoking (OR 1.77; 95% CI 1.58–1.98, P < 0.001), HDL cholesterol < 50 mg/dL (OR 1.21; 95% CI 1.08–1.36, P = 0.001), IMT ≥10 mm (OR 1.58; 95% CI 1.33–1.88, P < 0.001), and presence of plaque (OR 1.51; 95% CI 1.28–1.79, P < 0.001) were significant predictors for TAs. Conclusion: Abnormal IMT and the presence of plaque assessed by using CDU were significant predictors of colorectal tubular adenoma.

Keywords: tubular adenoma, carotid atherosclerosis, intima-media thickness, plaque, stenosis

OE-0994 (PE-0633) Risk of colorectal neoplasms in first-degree relatives of individuals with non-advanced adenomas: A cross-sectional study

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Background and Aim: The risk of colorectal neoplasia associated with family history of non-advanced adenoma (non-AA) is unknown. We determined the prevalence of colorectal neoplasm in subjects who have first-degree relatives (FDR) with non-AA compared to individuals who do not have FDR with adenomas. Methods: In this blinded, cross-sectional study, consecutive patients with newly diagnosed non-AA were identified from our colonoscopy database. FDRs of patients with non-AA age 40–70 years were invited for a colonoscopy (known as exposed FDRs). Our controls (known as unexposed FDRs) were FDRs aged 40–70 years of individuals who had received a normal screening colonoscopy. FDRs with a FH of colorectal cancer were excluded. The primary outcome was rate of AA. Secondary outcomes included rates of non-AA and all colorectal adenomas.

Results: Six hundred twenty-seven consecutive patients with newly diagnosed non-AA were recruited. A total of 414 FDRs from 414 effected families underwent colonoscopy. These 414 exposed FDRs were age and sex-matched with 1 unexposed FDRs each; 414 unexposed FDR from 414 affected families participated in a colonoscopy. Baseline characteristics were comparable between exposed and unexposed FDRs. Prevalence of AA was 3.9% in exposed FDRs and 2.4% in unexposed FDRs (matched odds ratio [mOR] = 1.87; 95% CI 1.32–2.66; P = 0.001). Prevalence of AA was 0.9% in exposed FDRs and 0.6% in unexposed FDRs (mOR = 1.87; 95% CI 1.32–2.66; P = 0.001). Conclusion: A positive family history of non-AA is a risk factor of adenomas. It will have implications towards earlier screening for individuals with family history of non-AA.

Keywords: adenoma, family history, colorectal cancer
**OE-0816 (PE-0635) Effect of exercise on the risk of recurrent or incident colorectal neoplasm**

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**Background and Aim:** Previous studies have shown an inverse relation between physical activity and risk of colorectal neoplasm. In this study, we aim to determine the association of colon neoplasms, metabolic syndrome, physical activity/exercise, and important factors related to the risk of recurrent and incident colorectal neoplasm. **Methods:** Average-risk subjects who participated in health checkup including screening colonoscopy during 2003 to 2008 and followed up until 2012 were enrolled. The metabolic factors and exercise habit at baseline were recorded, and the findings of initial and surveillance colonoscopy were also recorded. The risk of incident and recurrent neoplasm after negative colonoscopy or colonoscopic polypectomy was calculated, and its association with exercise habit was evaluated. Univariate analysis with Kaplan–Meier analysis was used to assess the impact of exercise habits on the occurrence of colorectal neoplasms. Multivariate analyses with Cox model analysis were conducted. **Results:** A total of 7770 subjects comprised the study population for final analysis. Among all study subjects, 1745 subjects (22.5%) were diagnosed with metabolic syndrome, and 1358 subjects (17.5%) was found to have colonic neoplasms. Colonic neoplasms were more commonly found in subjects with metabolic syndrome ($P < 0.001$). Subjects with exercise habits have a significantly higher cumulative colon polyp free rate, that is, lower colon polyp recurrence rate, as compared with those without ($P = 0.03$). Subjects with metabolic syndrome had higher incident or recurrent colorectal neoplasms (HR = 1.45, 95% CI: 1.28–1.62, $P < 0.001$). Subjects with exercise habits had a lower risk of recurrent or incident colorectal neoplasm as compared with those without (ADJUSTED HR = 0.88, 95% CI: 0.78–0.99, $P = 0.031$) after adjusting for age, gender, smoking, alcohol, baseline colonoscopic findings, and metabolic syndrome. **Conclusion:** Subjects with exercise habits have a lower risk of incident or recurrent colorectal neoplasm as compared with those without.  

**Keywords:** colorectal neoplasm, exercise, metabolic syndrome

**EE-0146 (PE-0637) The predictive factors of favorable outcomes in biofeedback therapy in defecatory dysfunction and fecal incontinence patients**

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**Background and Aim:** Dyssynergic defecation and fecal incontinence are significantly associated with a poor quality of life. The purpose of this study is to evaluate the predictive factors prior to the initiation of biofeedback therapy in patients with dyssynergic defecation or fecal incontinence. **Methods:** We retrospectively reviewed patients who underwent biofeedback therapy at Yonsei University Hospital, Seoul, Korea, between October 2004 and April 2015 for symptoms of defecatory dysfunction and fecal incontinence. Clinical response was recorded after a course of biofeedback therapy and response rates based on patient opinion. **Results:** A total of 238 patients underwent biofeedback therapy at Severance Hospital, Seoul, Korea, between October 2004 and April 2015. One hundred sixty-nine (71%) were responder and 69 (29%) were not. Of those who underwent at least 4 BF sessions, subjective short-term response rates were 113/167 (67%) in the constipation group and 27/39 (69%) in the FI group, 26/29 (89%) in the combination group and 3/3 (100%) in the anal pain group. Multivariate analysis was performed for those variables significant in the univariate analysis. The global bowel satisfaction score before biofeedback therapy (odds ratio [OR]: 0.718, 95% confidence interval [CI]: 0.583–0.860, 95% CI: 0.764–0.968, $P = 0.012$), rectal volume for constant sensation (OR: 0.860, 95% CI: 0.764–0.968, $P = 0.002$) were significantly associated with a poor quality of life. The purpose of this study is to evaluate the predictive factors prior to the initiation of biofeedback therapy in patients with dyssynergic defecation or fecal incontinence. **Conclusion:** Our data show that higher global bowel satisfaction score, higher bowel movement frequency before biofeedback therapy, higher rectal volume for constant sensation, and higher pelvic floor descent are associated with poor response to biofeedback therapy for patients with dyssynergic defecation or fecal incontinence.  

**Keywords:** biofeedback, dyssynergic defecation, functional incontinence, anorectal manometry, defecogram
EE-0158 (PE-0638) Appendiceal mass with a palpable nodule on the thigh

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Background and Aim: A 70-year-old man was referred for the evaluation of an appendiceal mass that was incidentally detected on CT. He denied any symptoms, vital signs were normal, and physical examination revealed no abdominal or rebound tenderness. A nontender palpable nodule measuring 10 mm in size was observed on the right thigh. Laboratory tests showed normal. Eosinophilia was not detected. CT showed the mass measured approximately 27 mm in length with segmental enhancement and luminal obliteration in the proximal appendix. Additionally, a right retroperitoneal serpiginous opacity with surrounding fat infiltration was observed near the appendix. He underwent a colonoscopy; however, no abnormal mucosal lesion was identified.

Methods: We re-evaluated the patient’s history and discovered that he occasionally consumed raw fish, frogs, and snakes from stream water. He underwent IgG antibody testing, and the results were positive for clonorchiasis and sparganosis. The patient refused surgery and was treated with praziquantel. However, follow-up CT showed persistence of the appendiceal mass. He underwent appendectomy with dissection of retroperitoneal fat, which was clinically suspicious for a migration tract. Additionally, we excised the nodule on his right thigh.

Results: Histopathological examination of the resected appendix and the migration tract revealed chronic nonspecific inflammation and calcifications with granulomatous inflammation, respectively, and resected thigh nodule showed an abscess with granulomatous inflammation and perivascular lymphoplasmacytic inflammation suggesting a parasite migration tract.

Conclusion: Sparganosis is diagnosed based on the identification of larva in tissues. However, in the absence of larvae, the diagnosis can be confirmed based on histopathological findings of chronic granulomatous inflammation with central necrosis and calcifications, and a positive ELISA test for Sparganum with a relevant history of Sparganum transmission. Treatment involves the surgical resection of larva. Although praziquantel is useful in patients in whom surgical treatment is unavailable or those with multi-site infection, medical treatment shows high recurrence rates and unfavorable outcomes.

Keywords: Sparganosis

EE-0170 (PE-0639) Comparison of staining techniques and multiplex nested PCR for diagnosis and treatment of acute diarrhea

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Background and Aim: Although mortality is declining globally, acute diarrhea is a leading cause more than 2 million deaths annually and is a major cause of outpatient visits, hospitalizations, and reduced quality of life for domestic setting and traveling abroad. We aimed to investigate whether stool PCR could have a beneficial effect on the duration of hospitalization induced by acute diarrhea.

Methods: Between March 2015 and February 2018, patients were admitted with acute diarrhea; stool PCR was performed in 116 patients. Patients were divided into two groups: stool PCR (n = 58) and non-stool PCR (n = 58). The positive rate in stool PCR and the change in treatment modality were examined, and the prognosis was compared between groups.

Results: Overall, 29 (50.0%) of 58 samples was positive for pathogen at stool PCR. The positive rate for virus was 1.7% and positive rate for bacteria was 48.3% (28/58). Additional endoscopy and image study (CT) were significantly higher in stool PCR positive group (P = 0.018, P = 0.027) and hospital of day decreased significantly in stool PCR positive group (P = 0.032). On multivariate analysis, stool PCR positive was associated with increased rates of history of diabetes mellitus type 2 (HR, 8.357; 95% CI 2.381–29.328; P = 0.001), and hospital of day was significantly decreased in stool PCR positive groups.

Conclusion: With stool PCR positive, antibiotic changes and drug modifications are associated shortening of hospitalization period, especially in patients with diabetes.

Keywords: acute diarrhea, stool multiplex nested PCR, staining technique, diabetes mellitus type 2

Table 1. Patient demographics and clinical characteristics n (%)

| Age at diagnosis in year | Stool PCR positive, n = 27 | Stool PCR negative, n = 31 | P-value | non-stool PCR positive, n = 58 | non-stool PCR negative, n = 58 | P-value |
|-------------------------|--------------------------|---------------------------|---------|-----------------------------|-----------------------------|---------|
| 0 - 4                   | 3                        | 0                         | 0.397   | 5                           | 0                           | 0.234   |
| 5 - 14                 | 3                        | 2                         | 0.399   | 0                           | 2                           | 0.328   |
| 15 - 64                | 13                       | 18                        | 0.702   | 19                          | 20                          | 0.901   |
| > 65                   | 9                        | 11                        | 0.591   | 12                          | 13                          | 0.584   |
| Sex                     |                          |                           |         |                             |                             |         |
| Male                   | 13                       | 17                        | 0.056   | 12                          | 17                          | 0.060   |
| Female                 | 14                       | 14                        |         | 12                          | 11                          |         |
| Abdominal pain or cramp (yes) | 11                      | 11                        | 0.075   | 5                           | 5                           | 0.869   |
| Nausea vomiting (yes) | 4                        | 4                         | 0.803   | 1                           | 1                           | 0.033   |
| Fever (>38°C (98.6°F)) | 8                        | 5                         | 0.259   | 11                          | 4                           | 0.547   |
| Smoking                |                          |                           |         |                             |                             |         |
| Never-smoker            | 19                       | 23                        | 0.365   | 49                          | 49                          | 0.955   |
| Ex-smoker               | 4                        | 7                         | 0.786   | 5                           | 5                           | 0.023   |
| Current smoker          | 2                        | 1                         | 0.200   | 4                           | 4                           |         |
| Alcohol                |                          |                           |         |                             |                             |         |
| None                   | 28                       | 23                        | 0.47    | 47                          | 47                          |         |
| 1 drink/day            | 5                        | 1                         | 0.10    | 10                          | 10                          |         |
| > 1 drink/day          | 2                        | 7                         | 0.35    | 3                           | 3                           |         |
| Hypertension (mm)      | 7                        | 12                        | 0.683   | 15                          | 15                          | 0.537   |
| Diabetes mellitus type 2 (yes) | 5                      | 7                         | 0.333   | 11                          | 11                          | 0.333   |
| History of cerebrovascular accident (yes) | 0              | 3                         | 0.087   | 6                           | 6                           | 0.298   |
| History of chemotherapy (yes) | 3                      | 7                         | 0.289   | 12                          | 12                          | 0.563   |
| History of radiation therapy (yes) | 3                      | 2                         | 0.526   | 2                           | 2                           | 0.247   |
**EE-0201 (PE-0640) The delta neutrophil index as a prognostic marker in patients who underwent emergent abdominal surgery**

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**Background and Aim:** The delta neutrophil index (DNI) is the fraction of circulating immature granulocytes provided by a routine, complete blood cell analyzer, which has been reported as a useful prognostic marker of sepsis. The aim of this study was to evaluate the role of the DNI in the diagnosis and prognosis of patients who had undergone emergent surgery for an acute abdomen.

**Methods:** A total of 694 patients who had visited the emergency room for acute abdominal pain and undergone emergent abdominal surgery from May 2015 to September 2016 were retrospectively reviewed. Clinical characteristics, laboratory findings on the day of hospital visit, hospital stay, postoperative complications, and the 30-day mortality were investigated.

**Results:** In the analysis of the patients who underwent an operation for acute peritonitis, the DNI was a good predictor for predicting the 30-day mortality rate (Area under the curve [AUC] 0.826) and was not inferior to other laboratory values, including the activated partial thromboplastin time (AUC 0.729), C-reactive protein (AUC 0.727), albumin (AUC 0.834), prothrombin time (AUC 0.816), and creatinine (AUC 0.837) that are associated with sepsis. The patients with a high DNI (≥0.9%) displayed a higher incidence of bacteremia and sepsis, longer hospital stay, and higher postoperative complication and 30-day mortality rate than the patients with a low DNI (<0.9%). Among the patients diagnosed with acute appendicitis, the DNI was a useful marker for differentiating appendiceal perforation.

**Conclusion:** The DNI was a practical and useful marker for predicting the prognosis in patients who needed emergent abdominal surgery.

**Keywords:** delta neutrophil index, acute abdomen, mortality, predictive value

**EE-0229 (PE-0641) Forty-four patients with intestinal spirocheteosis: A case series**

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**Background and Aim:** Human intestinal spirocheteosis (HIS) is a rare disease defined by the presence of a layer of spirochetes attached by one cell end to the colorectal epithelium. *Brachyspira pilosicoli* and *Brachyspira aalborgi* are causal bacteria for HIS. Most patients are diagnosed by colonoscopic biopsy and some have symptoms such as chronic diarrhea or bloody stool, but most are asymptomatic.

**Methods:** We retrospectively reviewed the clinicopathological features of 44 patients with HIS from January 2008 to March 2017. All patients were diagnosed with HIS by colonoscopic biopsy. Histopathological examinations were performed at Jichi Medical University Hospital.

**Results:** Of 44 patients, 36 were male and eight were female. HIS was detected in normal mucosa in eight patients, in eroded and reddened mucosa in 21, and from colonic polyps in 15. Eleven patients had diarrhea, eight had bloody stool, two had diarrhea and bloody stool, and one had constipation. We administered *Brachyspira* eradication therapy (metronidazole 0.5 g or 1 g/day for 10 days) to 21 patients, based on the results of sensitivity to metronidazole (E-test). Seven patients had no symptoms, and 14 patients had some symptoms. After eradication therapy, diarrhea or bloody stool improved in 11/14 symptomatic patients (79%). There were no adverse events associated with eradication therapy.

**Conclusion:** A 10-day course of metronidazole for *Brachyspira* eradication therapy is effective in improving intestinal symptoms in patients with HIS. Patients with HIS who have intestinal symptoms should be treated with metronidazole.

**Keywords:** spirocheteosis, diarrhea
EE-0291 (PE-0642) A case of eosinophilic gastroenteritis with prominent rectal involvement
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Background and Aim: Eosinophilic gastroenteritis (EGE) is an inflammatory disorder characterized by eosinophilic infiltration of the gastrointestinal tract without any known cause. It is a rare disease, and symptoms and endoscopic findings can be non-specific. Peripheral blood eosinophilia may be mild or absent. Radiologic findings often show non-specific bowel wall thickening in the mucosal disease and ascites in the serosal disease. However, rectal involvement has rarely been reported.

Methods: Here, we report EGE with prominent rectal involvement. Results: An 18-year-old woman presented with abdominal pain and diarrhea for 3 weeks. Initial laboratory findings showed elevated white blood cell counts (26,480/μL) and serum eosinophil count (18,986/μL). Abdominopelvic computed tomography showed diffuse bowel wall edema from the esophagus to the rectum and mild ascites. Upper and lower endoscopy showed no significant mucosal change. Random mucosal biopsies were performed from the esophagus to the rectum, which revealed significant eosinophil infiltration with cluster and degranulation in each segment, especially in the rectum (Fig. 1). There was no other cause of eosinophilia, and the serologic tests for parasitic infection and autoimmune disease showed negative results. Based on these findings, the patient was finally diagnosed with EGE and was administered oral corticosteroid on an outpatient basis. After 2 weeks, the patient showed significant improvement in symptoms, and steroid dose was successfully tapered over 2 months. During the 10-month follow-up period, the patient continued to be stable without recurrence. Conclusion: We report a patient who was diagnosed with EGE with remarkable rectal involvement and successfully treated with oral steroid.

Keywords: eosinophilic gastroenteritis, eosinophil, ascites, corticosteroid

Figure 1

EE-0321 (PE-0643) A 10-year comparison of right versus left colonic diverticulitis in an Asian center
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Background and Aim: The incidence of right-sided diverticulitis is much higher in Asians compared to Caucasians. The aim of this study was to determine and compare the outcome of right colonic diverticulitis with those of left-sided disease.

Methods: Retrospective review of patients admitted with diverticulitis from 2004 to 2014 to a tertiary referral unit. Patient demographics, Hinchey classification, need for emergency surgery, and perioperative outcome were analysed and compared. Results: In total 360 patients presented with diverticulitis, of which 260 (72%) were right-sided disease. The mean age was 61 years, 159 (44.2%) patients were male; 201 (55.8%) were female. All patients complained of abdominal pain while leukocytosis and fever were present in 73% and 36% of patients, respectively. The mean hospital stay was 9.4 days. The majority of patients (93%) were Hinchey grade I and II. There was no significant difference in sex, Hinchey class, or the need for emergency surgery between the 2 groups. One hundred patients (28%) underwent emergency surgery. Sixty-seven (25.7%) right-sided patients required emergency surgery; however, 54 (81%) of these were based on a presumptive clinical diagnosis of acute appendicitis. Postoperative morbidity was significantly higher in left-sided diverticulitis (70.6% vs 29.4%, P = 0.001). There was no significant difference in operative mortality. Conclusion: Right-sided diverticulitis is an important clinical diagnosis in the Asian population. Clinical presentation can often mimic acute appendicitis. When emergency surgery is required, right-sided diverticulitis is associated with a lower operative morbidity compared to left-sided disease.

Keywords: diverticulitis, colonic
**EE-0334 (PE-0644) Clinical characteristic of dasatinib-induced hemorrhagic colitis: Single-center experience**

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**Background and Aim:** Dasatinib is a tyrosine kinase inhibitor used for secondary treatment for chronic myeloid leukemia (CML) and acute lymphoblastic leukemia (ALL) patients who are imatinib-intolerant or -resistant. One of the adverse events of dasatinib is hemorrhagic colitis. Cases of dasatinib-induced hemorrhagic colitis have been rarely reported. Severe bleeding is one of the rare complications. The aim of this study is to evaluate the clinical characteristics of dasatinib-induced colitis.  

**Methods:** This retrospective analysis of prospectively collected data was performed using information from the endoscopy, clinical records, and pathology database system of Seoul St. Mary’s Hospital. Consecutive patients on dasatinib who underwent colonoscopy between January 2012 and June 2018 were enrolled.  

**Results:** Of the 624 patients who were treated with dasatinib during the study period, 148 patients underwent colonoscopy. Forty-five cases showed abnormal features. Excluding other diseases such as CMV colitis, PMC, GVHD, a total of 7 patients were diagnosed with dasatinib-induced colitis (15.5%). The mean age was 55 years. Two patients were male (28.5%). Five patients were CML and 2 were ALL Ph (+). The median time was 4 months from the dasatinib initiation to the time of colonoscopy/sigmoidoscopy (range from 3 months to 3 years). Endoscopic findings were various (angiodysplasia, inflammatory polyps, ulcers, erythema, edema, mucosal bleeding). In 4 cases with bleeding, hemorrhage improved after discontinuation of dasatinib, but re-bleeding was observed in all patients when the dasatinib was used again in a reduced dose. Only in cases without active bleeding, there was no problem in maintaining or reducing the dose of dasatinib related to re-bleeding.  

**Conclusion:** Dasatinib-induced hemorrhagic colitis is not uncommon. When bleeding occurs, cessation of dasatinib is the only effective treatment to prevent re-bleeding. Further study is needed for screening and diagnosis criteria for hemorrhagic colitis.  

**Keywords:** dasatinib, hemorrhage, colitis

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**EE-0358 (PE-0645) Neutropenic enterocolitis mimicking acute appendicitis managed conservatively in a patient with B cell acute lymphoblastic leukemia**

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**Background and Aim:** Neutropenic enterocolitis or typhlitis, a life-threatening necrotizing enterocolitis occurring primarily in neutropenic patients post chemotherapy. Reporting severe complications will help in unifying a general approach to this condition.  

**Methods:** We report a case of a 23-year-old, male, with B cell acute lymphoblastic leukemia, who had re-induction chemotherapy and developed fever, diarrhea, and right lower quadrant pain mimicking appendicitis. Computed tomography scan revealed thickened cecal walls and matted terminal ileum with reactive appendiceal inflammation. Patient was diagnosed as typhlitis and treated conservatively by placing him on nothing per orem, decompression, and parenteral nutrition. *Clostridium difficile* and other infectious causes were ruled out. Supportive transfusion, G-CSF injections, and IV antibiotics were given with note of resolution of symptoms. Repeat imaging after 1 week showed resolution of bowel edema with normal looking appendix. Patient was discharged and was able to continue his chemotherapy.  

**Results:** More common in adults with hematologic malignancies as well as other immunosuppressive causes, this condition is now well recognized as an important cause of morbidity and mortality.  

**Conclusion:** Given the need for use of systemic chemotherapy, patients are at risk for this potentially lethal complication and that timely diagnosis and recognition is needed to curtail its high mortality rate.  

**Keywords:** typhlitis, neutropenic enterocolitis, febrile neutropenia
**EE-0365 (PE-0646) Genetic polymorphisms in the WNT, RHOU, and OAS genes are associated with right-sided colonic diverticulosis in a Korean population**

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**Background and Aim:** Diverticulosis is a disease that results from complex interactions among the aging process, multiple environmental factors, and genetic predisposition. Despite epidemiologic evidence of genetic risk factors, no attempt has been made to identify genes that confer susceptibility to colonic diverticulosis. **Methods:** We performed the first genome-wide association study (GWAS) on susceptibility to diverticulosis in a Korean population. A GWAS was conducted among 7,948 healthy individuals; among these cases, the test set comprised 893 cases and 1,075 controls, and the replication set comprised 346 cases and 305 controls. Diverticulosis was diagnosed by colonoscopy during comprehensive medical checkups, and single-nucleotide polymorphisms (SNPs) related to diverticulosis were detected with the Affymetrix Axiom™ KORV1.1-96 Array. **Results:** In total, 9 SNPs were identified in three SNP aggregates in the test set ($P < 10^{-3}$, within 200 kb) after adjusting for sex. All the SNPs were near the WNT4 gene, four SNPs were near the RHOU gene, and two SNPs were in the OAS1/3 genes. The top SNP associated with right-sided colonic diverticulosis was rs22538787, located near the WNT4 gene (combined set, $P = 3.128 	imes 10^{-6}$, odds ratio = 1.415 [95% confidence interval: 1.223–1.637]). **Conclusion:** We found 9 novel SNP alleles associated with colonic diverticulosis that implicated three gene loci: the WNT4, RHOU, and OAS1/3 genes, as being involved in the underlying genetic susceptibility to right-sided diverticulosis. Our results could provide new genetic insights into the development of diverticulosis in Asian populations. **Keywords:** polymorphism, diverticulosis, genome-wide association study, single nucleotide

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**EP-0030 (PE-0647) Mesenteric inflammatory veno-occlusive disease in a patient with rapid progress of bowel obstruction**

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**Background and Aim:** Mesenteric inflammatory veno-occlusive disease (MIVOD) is very rare cause of ischemic bowel diseases, which is affecting the veins of bowel and mesentery. It is important to differentiate from other disease such as mesenteric venous thrombosis, and systemic disease. We describe a 76-year-old male who presented with sign of bowel obstruction and required surgical resection. **Methods:** We report a case in a 76-year-old Asian male who rapidly progress the symptom of abdominal pain and bloody stool. Computed tomography showed edema of distal descending colon with mild ascites. Colonoscopy revealed edematous and erythematous mucosa from the distal descending colon to the sigmoid colon. Initial clinical impression was that of type 4 colon cancer, lymphoma, recurrence of phlebo sclerosing colitis, or ischemic colitis. Colon biopsy specimens showed any pathology. After 43 days of treatment and total parental nutrition, repeated CT scan and colonoscopy finding were excruciating to previous examinations and that last colonoscopy couldn’t be completed because of severe edematous. Also 3 times of biopsies revealed only focal active colitis of uncertain etiology. Faced with his persistent abdominal pain and weight loss without any precise diagnosis, surgical consultation was obtained. **Results:** The diagnosis of MIVOD was made after histopathological surgical specimens. Our patient completely recovered and no recurrence during the follow-up period more than over 13 months. **Conclusion:** MIVOD is difficult to diagnosis at the early stage because it needs pathohistological findings in the submucosal lesion. Therefore, distinguish from other disease such as thrombostatics, systemic disease, inflammatory bowel disease, and vasculitis is important. We present a case of MIVOD leading to ischemic colitis. MIVOD, in spite of its rarity, should be considered as a differential diagnosis of unexplained severe abdominal pain with edematous colon. After common pathological causing was excluded, physician has to bear in mind the surgical resection. **Keywords:** MIVOD, ischemic colitis
EP-0035 (PE-0648) Possibility of same-day colonoscopy after CT colonography using barium sulfate

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Background and Aim: CT colonography (CTC) using Barium Sulfate Oral Suspension makes it possible to alleviate pretreatment and contributes to alleviating discomfort in colon examination. However, colonoscopy (CS) on the same day has been considered difficult due to the use of barium sulfate. We therefore validated whether same-day CS can be performed after CTC with barium sulfate fecal tagging. Methods: Of the 7508 patients who underwent CTC with barium sulfate fecal tagging between June 2016 and March 2018, a total of 111 patients who also underwent same-day CS were investigated. The physician performing CS endoscopically examined and classified the status of residual barium as “good,” feasible to perform total CS without problems; “satisfactory,” feasible to perform total CS without issues even with the presence of barium; “poor,” feasibility of total CS after multiple washings to clear the large amount of residual barium; or “unsatisfactory,” infeasibility of completing total CS due to excessive residual barium. Results: Among the 111 patients who underwent same-day CS, CS did not pass through due to constriction in 8 patients, and the procedure was withdrawn by the endoscopist due to a lesion in 22 patients. Of the 81 patients who underwent total CS, the status of residual barium was determined as good in 46 patients, satisfactory in 20 patients, poor in 4 patients, and unsatisfactory in 11 patients. Excellent CS observation was feasible up to the cecum in 80% of these patients. Half of the unsatisfactory status reached the sigmoid colon, and it became difficult to implement CS with barium residuals. Endoscope failure did not occur after CS in any patients. Conclusion: CS can be performed even after CTC with barium sulfate fecal tagging. However, some patients require endoscopic washing of barium for detailed observation, indicating that the procedure should be limited to histological tissue collection or verification of treatment method.

Keywords: CT colonography, barium sulfate oral suspension

EP-0047 (PE-0649) Malignant atrophic papule with rash accompanied by abdominal pain and diarrhea as the main clinical manifestations: A case report

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Background and Aim: Malignant atrophic papule (MAP), otherwise known as Degos disease, is a rare and progressive arterial mesenterial vascular occlusive disease. It is mainly manifested in the skin, gastrointestinal tract, and nervous system which associated with a poor prognosis. We report a case of malignant atrophic papule presenting with the skin lesion, abdominal pain, and diarrhea as the main clinical manifestations to illustrate the clinical course, endoscopy findings, and diagnosis. Methods: A 37-year-old man was admitted to our hospital with generalized abdominal pain and diarrhea. The patient had presented initially with multiple skin lesions 4 years earlier and arthralgia 1 year earlier. Abdominal computed tomography (CT) revealed evidence of ileocolonic inflammation. Colonoscopy revealed multiple distal ileal and colonic ulcers with a diameter of 0.5 cm to 0.7 cm, central depression, slight uplift of surrounding mucosa, hyperemia, and edema. Treatment with topical corticosteroids was initiated with-out benefit. Histopathologic examination of a skin punch biopsy specimen revealed focal lichenoid dermatitis with hyperkeratosis, thickened basement membrane, superficial and deep perivascular chronic inflammation, hemosiderin deposition, and increased dermal mucin. Degos disease was diagnosed. During the hospitalization, the patient developed slow speech, incomplete motor aphasia, atrophy of the left temporal muscle, left opening of the mouth, left side facial hypoesthesia. Head CT revealed an abnormality, and the diagnoses of meningiomephalitis, right frontal, and temporal subdural effusion were considered. Results: Two weeks later, the patient developed small intestinal perforation, continuous high fever, and lethargy died on the 20th day of hospitalization. Conclusion: This case illustrates a rare disease which is a combination of neurological and gastrointestinal manifestation with a skin rash that manifests with porcelain white scars suggests systemic MAP. Many medications have been tried but are mostly without success, and the treatment for systemic disease is supportive. The morbidity and mortality of MAP depend upon the extent of disease involvement.

Keywords: malignant atrophic papule, ileocolonic inflammation, colonoscopy, rash, meningiomephalitis
**EP-0059 (PE-0650)** An uncommon cause of severe intractable diarrhea in a patient with a malignant thymoma

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**Background and Aim:** A 55-year-old Chinese lady with myasthenia gravis and metastatic malignant thymoma with previous thymectomy presented with a 3-week history of diarrhea. Stool microbiological studies were negative. She continued to have severe diarrhea despite empirical treatment with antibiotics and anti-diarrheal agents. Stool fat globule tests were normal. Serum Immunoglobulin A (Good Syndrome was a differential) and chromogranin A levels were normal. Methods: Her colonoscopy revealed erythema in the ascending and descending colon. Biopsies showed an increase in apoptosis. Her gastroscopy showed corpus gastritis, and biopsies revealed acute inflammation. A capsule endoscopy done was normal. It was discussed with the pathologist and with her history; the possibility of thymoma-associated multi-organ autoimmunity (TAMA) was raised. A repeat colonoscopy performed 1 month later showed an endoscopically normal colon. Repeat biopsies showed apoptotic colonomaly with increased apoptotic bodies in the crypts compared to previous biopsies, and features were consistent with TAMA. Immunohistochemical staining for Cytomegalovirus was negative. Results: However, she developed a severe pneumonia. A decision was made after discussion with neurology to give intravenous immunoglobulin (IVIG) and intravenous steroids. A splenic volume for different sensory thresholds were 33), 93.5 mmHg (42), and 10 s (15). The medians (IQR) of the rectal balloon volume for different sensory thresholds were first sensation 20 mL (10); desire 50 mL (33); urgency 110 mL (75); and pain 130 mL (80). The median duration (IQR) for BET is 10 s (22). One patient (5.6%) had rectal hyposensitivity. Three patients (16.7%) had prolonged BET; while another three (16.7%) had delayed colonic transit, with the markers predominantly accumulated in the rectosigmoid area. Six patients (33%) had dyssynergic defecation, of which 50% were type 2 dysynergia. Comparison of demographic, HRAM, BET, and CTS characteristics between elderly patients with and without FC is summarized in Table 1. Conclusion: No difference in anoerctal function and colonic transit time was observed from this interim analysis.

**Keywords:** functional constipation, elderly, high-resolution manometry

**Comparison of characteristics**

**Table 1.** Comparison of demographic, HRAM, BET and CTS characteristics between elderly patients with and without FC in Kelantan, Malaysia. Data presented as median (IQR) or number (percentage).

|                       | FC (n = 8) | No FC (n = 10) |
|-----------------------|-----------|---------------|
| Age *                 | 68 (7)    | 65 (8)        |
| Female gender, n (%) *| 6 (75)    | 9 (90)        |
| Mean anal resting pressure, mmHg * | 57 (42) | 36 (16) |
| Mean anal squeeze pressure, mmHg * | 81.5 (45) | 96.5 (37) |
| Squeeze duration, s * | 8.5 (14) | 14 (15) |
| Rectal balloon volume  |           |               |
| First Sensation, ml * | 20 (10)   | 25 (30)       |
| Desire, ml *          | 50 (25)   | 55 (40)       |
| Urge, ml *            | 105 (93)  | 115 (55)      |
| Pain, ml *            | 90 (105)  | 130 (55)      |
| Prolonged CTS, n (%) *| 3 (16.7)  | 0 (0)         |
| Abnormal BET, n (%)   | 1 (5.6)   | 2 (11.1)      |
| Dyssynergic defecation, n (%) * | 4 (22.2) | 5 (11.1) |
| Rectal hyposensitivity, n (%) * | 0 (0) | 1 (5-6) |

* P > 0.05

**EP-0158 (PE-0651)** Comparison of high-resolution anorectal manometry (HRAM), balloon expulsion test, and colonic transit time in elderly patients with and without functional constipation (FC) in Kelantan, Malaysia: An interim analysis

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**Background and Aim:** We aimed to assess the anoerctal function and colonic transit time in elderly patients with and without functional constipation (FC) in Kelantan, Malaysia. Methods: Patients aged > 65 years completed a ROME III screening questionnaire for functional constipation and subsequently underwent HRAM using the Mcompass™ portable system (Medspira, MN, USA), balloon expulsion test (BET), and colonic transit study (CTS) with Sitzmarks® radio-opaque markers (Konsyl, MD, USA). Data were then analysed using SPSS version 20.0 (SPSS, Chicago, IL). Results: Eighteen patients (mean age 67 years, 83% female gender, 89% Malay ethnicity) were recruited into this ongoing study. Eight patients (44%) had FC. The medians (IQR) for the mean anal resting pressure, mean anal squeeze pressure, and mean squeeze duration were 42 mmHg (33), 93.5 mmHg (42), and 10 s (15). The medians (IQR) of the rectal balloon volume for different sensory thresholds were first sensation 20 mL (10); desire 50 mL (33); urgency 110 mL (75); and pain 130 mL (80). The median duration (IQR) for BET is 10 s (22). One patient (5.6%) had rectal hyposensitivity. Three patients (16.7%) had prolonged BET; while another three (16.7%) had delayed colonic transit, with the markers predominantly accumulated in the rectosigmoid area. Six patients (33%) had dyssynergic defecation, of which 50% were type 2 dysynergia. Comparison of demographic, HRAM, BET, and CTS characteristics between elderly patients with and without FC is summarized in Table 1.

**Conclusion:** No difference in anoerctal function and colonic transit time was observed from this interim analysis.

**Keywords:** Diarrhea

**Data presented as median (IQR) or number (percentage).**
OE-0140 (PE-0652) A randomized, clinical trial of bismuth subsalicylate as adjunctive treatment in non-Clostridium difficile infection, nosocomial diarrhea

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Background and Aim: Non-Clostridium difficile infection, nosocomial diarrhea (non-CDI-ND) is an important problem in hospitalized patients. Bismuth subsalicylate (BSS) has been used for various types of diarrhea; however, evidence in effectiveness and safety of BSS in non-CDI-ND is limited. The aim of this study was to determine whether BSS was able to alleviate diarrhea in patients with non-CDI-ND when compared to standard care. Methods: A randomized, open-label controlled trial in non-CDI-ND patients was conducted in 48 hospitalized patients, from August 2016 to February 2018 in Siriraj Hospital. The study protocol was approved by Institutional Review Board. Patients were randomly assigned to ingest BSS (1048 mg, N = 24) capsule orally twice daily for 5 days or standard care (N = 24). Data of stool volume, frequency, and consistency were collected. Results: BSS when compared to standard care, there was no difference of stool volume, frequency, and consistency were collected. Median stool volume change was -156 (IQR = -1.95, -2.18 times) in standard care group vs -0.95 (IQR = -0.08, -1.73 times) in BSS group, P = 0.103. Median of stool frequency change was -1.58 (IQR = -0.93, -2.18 times) in standard care group vs -0.95 (IQR = -0.08, -1.73 times) in BSS group, P = 0.602. Conclusion: BSS adds no benefit to standard care. This might reflect the complexity in pathogenesis of non-CDI-ND.

Keywords: Clostridium difficile infection (CDI), nosocomial diarrhea (ND), bismuth subsalicylate (BSS), standard care (SC)

OE-0540 (PE-0653) Role of screening by fecal calprotectin in patients with spondyloarthritis without known inflammatory bowel disease (IBD)

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Background and Aim: IBD is an extra-articular manifestation in patients with spondyloarthritis (SpA). Asymptomatic disease is common, warranting screening for IBD in SpA patients. Fecal calprotectin (FC) is a surrogate marker for colonic inflammation and is useful in IBD. We aim to investigate the role of screening by FC in SpA patients without known IBD. Methods: Adult SpA patients (ankylosing spondylitis [AS] or other types of SpA) were recruited from our rheumatology clinic. Stool samples were saved for FC quantification. Ileocolonoscopy would be arranged for patients with repeated elevation of FC (≥ 150 µg/g for 2 times) or for lower gastrointestinal (LGI) symptoms. Results: Eighty-four patients (70.2% male, mean age 48.4 years old, 17.8% smokers, 75% AS, 92.6% seropositive for HLA-B27) were recruited. LGI symptoms were reported in 15 (17.9%). Isolated elevation of FC and repeated elevated of FC were seen in 29 (34.5%) and 9 (10.7%) patients, respectively. Ileocolonoscopy was performed in 17, but none of them had endoscopic features of IBD. Patients with elevated FC were older (52.4 vs 46.3 years old), had more AS than other types of SpA (89.7% vs 67.3%), and showed a trend for elevated C-reactive protein (> 0.5 mg/dL; 41.4% vs 25.5%). Binary logistic regression showed that age (OR 1.043, 95% CI 1.003–1.085, P = 0.034) and diagnosis of AS (OR 4.216, 95% CI 1.125–15.801, P = 0.033) were associated with elevated FC in patients with SpA. Conclusion: Despite the association between SpA and IBD, the yield of screening by FC in our SpA patients for undiagnosed IBD was low. However, longitudinal follow up including repeat ileocolonoscopy might be needed to detect subsequent IBD development. FC was elevated in one third of SpA patients and was associated with older age and diagnosis of AS.

Keywords: inflammatory bowel disease, seronegative spondyloarthritis, ankylosing spondylitis, fecal calprotectin, screening
OE-0549 (PE-0654) HbA1c levels and their impact on presentation and outcomes in abdominal tuberculosis

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Background and Aim: Diabetes is a risk factor for tuberculosis and may be associated with a severe course in pulmonary tuberculosis. The relation between HbA1c levels and outcomes in extrapulmonary tuberculosis are less certain. We studied the prevalence and clinical impact of elevated HbA1c levels and their impact on presentation and outcomes in abdominal tuberculosis.

Methods: Retrospective analysis of the data of HbA1c in patients with abdominal tuberculosis. We compared between 2 groups, i.e., group A with HbA1c < 5.7% and group B with > 5.7%. Results: Of the 84 patients of abdominal tuberculosis with complete data, the mean age of the study subjects was 35.52 (range 14–80) and 42 were males. Sixty-five were probable and 19 confirmed cases of abdominal tuberculosis. Thirty-eight patients had intestinal, 27 peritoneal, 12 both, 3 lymphnodal, 2 intestinal + lymphnodal, 1 peritoneal + lymphnodal, and 1 hepatic involvement. The mean HbA1c was 5.46% (range 3.3–12.2) and 24 patients had HbA1c > 5.7% (28.57%). The mean age in higher HbA1c group were more than the other group (47 ± 13.98 and 30.93 ± 13.91, respectively). Males (18) had more tendency for HbA1c < 5.7% than females (6) P = 0.004. However, all the other parameters that were compared, i.e., types of involvement (intestinal, peritoneal, both, lymph-nodal, and hepatic), extra-abdominal involvement, clinical presentation (abdominal pain, diarrhea, fever, loss of weight/appetite, subacute intestinal obstruction, lump abdomen, and bleeding per rectum), outcome parameters like need for intervention (surgery, drainage, and dilatation), ATT induced hepatitis were comparable among both the groups. Conclusion: HbA1c values were higher in male patients with abdominal tuberculosis, and those with higher values had a greater mean age. The HbA1c values did not impact the clinical presentation or the outcomes in abdominal tuberculosis.

Keywords: tuberculosis, diabetes, surgery, outcomes

OE-0603 (PE-0655) Diagnostic evaluation of functional anorectal disorders in a conservative Asian society: Early experience and limitations

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Background and Aim: Anorectal disorders are common but underreported. Investigations beyond endoscopy are limited by costs and sociocultural reasons. Report our early experience with functional diagnostic tests in patients with lower GI symptoms. Methods: Prospective study of patients referred for anorectal manometry (ARM) at Changi General Hospital between January 2015 and May 2018. ARM was performed with the high definition probe (HDAM-3D) (Given Imaging, Yoqneam, Israel) with manometric and topographic images displayed using specialized software (Motility Acquisition AR System v.2.2; Given Imaging). Measurements were performed using computerized software (Manoview Analysis; Given Imaging) for maximal anal resting and squeeze pressures. The short protocol, hand held barostat technique involved insertion of a silicon catheter attached to a polyethylene barostat bag (Mui Scientific, Canada) to obtain measurements for first sensation, urgency, and discomfort thresholds. Adjunctive investigations included small bowel transit markers and magnetic resonance defecography (MRD). The hospital anxiety and depression scale (HADS) questionnaire was completed in English-speaking patients. Results: Sixty-one patients (54.0 ± 17.5 years; N = 36 Female [59%]) underwent ARM for fecal incontinence (n = 22 [36%]), constipation (n = 30 [49%]), and others (n = 9 [15%]). ARM abnormalities included external anal sphincter (EAS) dysfunction: 4 (6.6%); combined EAS/IAS dysfunction: 3 (4.9%); rectal hypersensitivity: 4 (6.6%); rectal hyposensitivity: 19 (31.1%); and dyssynergic defecation (DD): 9 (14.8%). Transit markers were performed in 9/30 with constipation. Majority had normal transit (6/9 [66.7%]). Correlation of DD on HRM and MRD was significant (r = 0.7785, P < 0.05). Twenty-nine (47.5%) patients completed HADS questionnaires. Anxiety and depression were present in 16/29 (55.2%) and 3/29 (10.3%), respectively. Conclusion: Objective studies of anorectal function provide a pathophysiologic basis for patients’ symptoms and facilitate treatment. ARM findings should be interpreted in conjunction with other diagnostic tests and underlying psychological comorbidities.

Keywords: anorectal, manometry, dyssynergic defecation
OE-0611 (PE-0656) Systemic lupus erythematosus presenting as chronic diarrhea: Rare presentation of a common disease

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Background and Aim: Systemic lupus erythematosus is a chronic inflammatory disease commonly present with musculoskeletal, skin, renal, or hematological manifestations. Involvement of the intestinal tract is recognized but a rare occurrence. Chronic diarrhea is a very rare presentation of SLE.

Methods: A 28-year-old Sri Lankan lady with autoimmune thyroiditis taking thyroxine presented with diarrhea for 4 weeks with LOA, LOW, vomiting, and abdominal pain. Examination only revealed lower abdominal tenderness. Results: Her thyroid profile was normal. Stool examination, serum calcium, LDH, protein, albumin, urine examination, liver, and renal panel were within normal range. Mantoux and Quantiferon GOLD tests were negative. Ileocolonoscopy, enteroscopy, OGD, and biopsies were unremarkable. Laparoscopy and peritoneal biopsies were also normal. CECT abdomen showed thickened small bowel loops and mild ascites. Peritoneal fluid analysis revealed exudative ascites with WBC 185 (L-55%), RBC 3440/mm³. Her ESR was 25, CRP 3.3 mg/dL, ANF highly positive (> 1/100), anti U1 RNP positive and complement levels were low (C3: 28.4 [90-180], C4: 4.8 [10-40] mg/dL) but dsDNA, anti-smith, and anti-cardiolipin antibodies were negative. Her initial FBC and blood picture were normal but later in the course of the disease had leucopenia (2.2*10⁹). Depending on those, she was diagnosed as having SLE and started on steroids and hydroxychloroquine. Her diarrhea and vomiting improved, and ascites disappeared with treatment. Conclusion: Our patient fulfilled the 2012 SLICC criteria as she had two clinical criteria, serositis (ascites) and leucopenia and two immunologic criteria, positive ANA and low complement levels. In addition to that, there were other supportive evidences such as high ESR with normal CRP, positive U1RNP. It was concluded that if a common cause for chronic diarrhea is not identified, rare presentations of common diseases such as SLE should be considered as in this case.

Keywords: diarrhea, systemic lupus erythematosus, SLE

OE-0698 (PE-0657) Gastrointestinal histoplasmosis: Series of 6 cases from North India

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Background and Aim: Gastrointestinal histoplasmosis (GIH) is an uncommon disease with myriad of manifestations. We report a series of cases of gastrointestinal histoplasmosis including two of esophageal involvement from a tertiary center in North India. Methods: Retrospective analysis of patients with primary asymptomatic GIH admitted in tertiary care center in last 1 year was done. Data regarding mode of presentation, clinical and imaging findings, endoscopic and histological findings were retrieved. Risk factors for primary GIH were assessed. Results: Six patients with symptomatic GIH were identified. Mean age of patients was 43 ± 13.08 years. Half of the patients were male. The clinical features included abdominal pain (83%), weight loss (83%), fever (66%), diarrhea (33%), and dysphagia (33%). None of the patient presented with intestinal obstruction. Colonic was involved in 67% of patients, and 33% of patients had esophageal involvement. The diagnosis was established by using histology and PAS staining which showed multiple intracellular as well as extracellular small organisms with peripheral halo. Risk factors for GIH were identified and were HIV with low CD4 counts (143 and 125 cells/mm³) in two patients, primary gastrointestinal lymphoma, disseminated tuberculosis with severe malnutrition, isolated CD4 lymphocytopenia (16 cells/mm³) and diabetes mellitus. All patients were given amphotericin B followed by itraconazole. All patients responded to treatment and in 4 cases mucosal healing was also documented. Conclusion: GIH is not uncommon even in countries endemic with tuberculosis like India. Early diagnosis and differentiation from tuberculosis and Crohn’s disease will help in institution of prompt treatment which is associated with good outcome.

Keywords: gastrointestinal, esophagus, colon, HIV, diabetes