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Autofluorescence Imaging Is Useful to Assess the Severity of Ulcerative Colitis

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BACKGROUND: Autofluorescence imaging (AFI) is a novel technology which can capture the fluorescence emitted from intestinal tissues. While AFI is useful for diagnosing colorectal neoplasms, it is unclear whether AFI can assess the severity of ulcerative colitis (UC). The aim of this prospective study was to evaluate the efficacy of AFI and its quantification in patients with UC.

METHODS: Sixteen patients diagnosed with UC who underwent an AFI examination at Asahikawa Medical University Hospital between 2007 and 2010 were enrolled in this prospective study. Fifty photographs of the lesions in the enrolled patients were randomly selected. Twelve endoscopists separately evaluated the images obtained by white light endoscopy (WLE) and AFI (vAFI), and quantified the intensities of fluorescence. Biopsy specimens were evaluated according to Matt's criteria. Active inflammation was defined when Matt's grade was 2 or more. 1) A WLE image which corresponded to Mayo endoscopic subscore 0 or 1 was categorized as inactive. AFI images were visually categorized into 2 groups, green dominant (G) and magenta dominant (M). 2) AFI images were quantified using an image-analysis software program. The ratio of the reverse gamma value of green (fluorescence) divided by that of red (reflex) was defined as the fluorescence index (F index). These endoscopic assessments and F indexes were compared with the histological findings. A cutoff value of the F index for active inflammation was determined using a ROC analysis. 3) The inter-observer consistency of the WLE, vAFI and quantified AFI by twelve endoscopists was calculated. 4) A multivariate analysis was performed to determine which histological findings, including the presence of a crypt abscess, mucin depletion, crypt distortion, neutrophil infiltration, lymphocyte infiltration and an irregular surface, were related to the F index.

RESULTS: 1) The average diagnostic accuracy of WLE and vAFI for the histological activity was 69.8% and 67.2%, respectively. No significant difference was observed between these modalities. 2) The correlation coefficient between the F index and histological findings was closely associated with the inflammatory grade ($r = -0.641$, $P < 0.0001$). The ROC analysis showed that the optimized range of the F index corresponding to active inflammation was less than 1.3. The average diagnostic accuracy of the F index (87.8%) for histologically active lesions was significantly higher than that of the WLE and vAFI ($P < 0.0001$, $P < 0.0001$). 3) The kappa value for the interobserver agreement of the WLE, vAFI and quantified AFI were 0.60, 0.68 and 0.97, respectively. 4) The multivariate analysis showed that lymphocyte infiltration was the only histological finding affecting the F index.

CONCLUSIONS: The quantified AFI is considered to be a useful and objective measure to the activity of ulcerative colitis, and can predict the degree of histological lymphocyte infiltration.

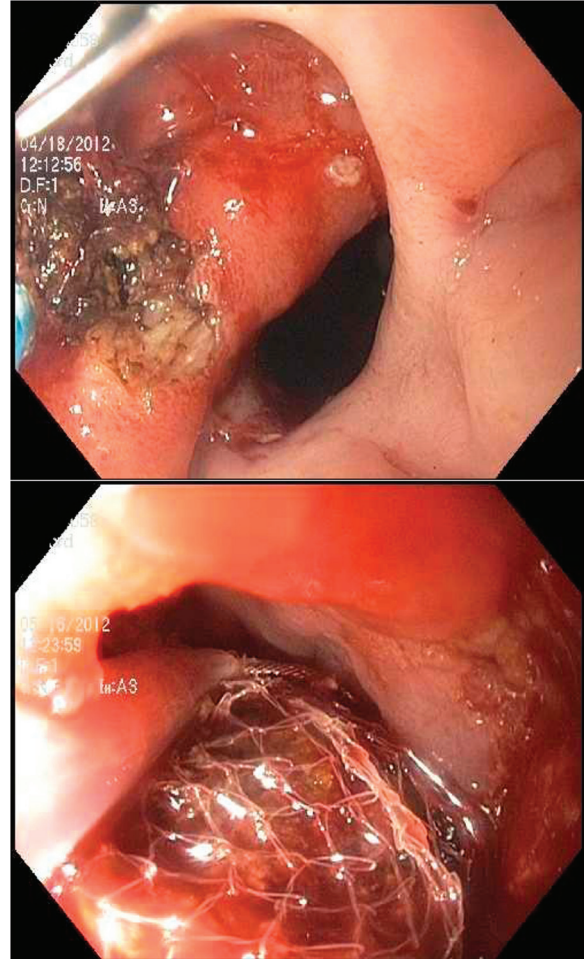


Figure.

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Successful Endoscopic Treatment of Fecalith Blocking Sinus in a Patient with Ileal Pouch-anal Anastomosis

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BACKGROUND: Ulcerative colitis patients who underwent restorative proctocolectomy with ileal pouch-anal anastomosis can develop various mechanical and inflammatory complications. Among them is pouch sinus resulting from chronic anastomotic leak, commonly located at the presacral space. We recently published an article on endoscopic needle-knife therapy in pouch sinus (We X, Wong R, Shen B. *Gastrointest Endosc* 2013). Here we present a symptomatic patient with a large fecalith blocking the sinus which was successfully treated with ultrasound-guided endoscopic needle-knife sinusotomy.

METHODS: Multiple attempts were made to remove the fecalith with RothNets, tripods, and baskets. Following the removal of the fecalith, the sinus cavity was treated using an ultrasound-guided needle-knife sinusotomy.

RESULTS: A 67-year-old female with ulcerative colitis and underwent total proctocolectomy with ileal pouch-anal anastomosis in 1999. The first pouchoscopy at our institution 4 years ago, showed mild ulcerated pouch inlet stricture with pseudopolyps and scattered ulcers in the pouch body as well as active cuffitis. Later on she was found to have a tight anastomotic stricture. She presented with chronic-worsening symptoms of abdominal pain, bloating, diarrhea, and perianal pain. A repeated pouchoscopy discovered a fecalith blocking a presacral sinus cavity at the distal pouch. The fecalith was removed using 2 baskets and 2 RothNets (Fig. 1). After the procedure, her symptoms improved. In a subsequent pouchoscopy 7 months later a compartmentalized sinus developed at the presacral area, which was treated with Doppler ultrasound-guided endoscopic needle-knife sinusotomy with a setting of ERCR EndoCut (Fig. 2). A pouchoscopy 5 months showed a completely healed and epithelialized pouch sinus (Fig. 3).

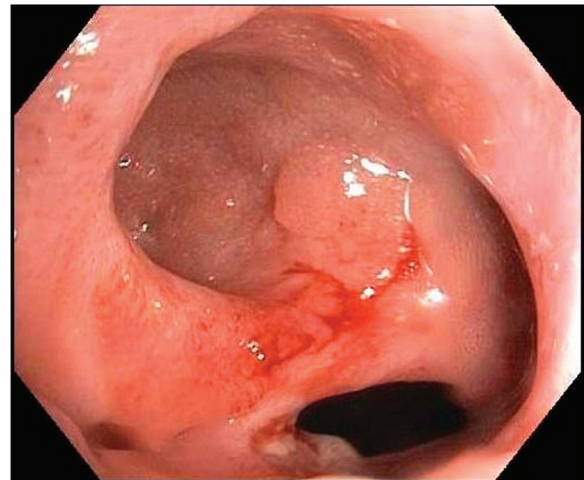


Figure.

CONCLUSIONS: Fecalith blocking pouch anastomotic sinus is a rare complication in patients with restorative proctocolectomy. In our case, this surgical complication was successfully treated with a carefully planned, stepwise endoscopy approach.

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Utility of Chromoendoscopy Assisted Small Bowel Capsule Endoscopy in the Calculation of Lewis Score

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BACKGROUND: Small bowel capsule endoscopy (SBCE) is an important imaging modality for the evaluation of isolated small bowel Crohn's disease. Computed virtual chromoendoscopy, both flexible spectral color enhancement (FICE) and blue filtering, were recently included in the workstation of video capsule system (Given Imaging Ltd, Yoqneam, Israel), with the expectation of highlighting lesions. The aim of our study was to assess the usefulness of FICE1 in Lewis score (LS) calculation, by comparing it with respective LS results obtained with white light (WL) SBCE.

METHODS: Thirty-six SBCE examinations were retrospectively analyzed with FICE1, by 3 gastroenterologists. LS was calculated for each tertile, and it was compared with WL evaluation performed by other 2 gastroenterologists. Statistical analysis was done with SPSS 18.0 and $P < 0.05$ was considered significant. Statistical associations between categorical and quantitative variables were tested by Fisher exact test and Student t test, respectively.

RESULTS: In the evaluation of SBCE examinations with FICE1 there was a significant increase in the number of ulcers observed. According to the LS, the classification of the number of ulcers visualized with FICE1 versus WL in the first tertile was: none 37.2% versus 62.8%, single 75.0% versus 25.0%, few (2-7 ulcers) 72.7% versus 23.3% and multiple (≥ 8 ulcers) 50% versus 50%, $P = 0.039$. In the second tertile the number of ulcers observed with FICE1 versus WL was: none 31.3% versus 68.8%, single 50% versus 50%, few 75.0% versus 25.0% and multiple 60% versus 40%, $P = 0.017$ and in the third tertile was none 2.6% versus 71.4%, single 62.5% versus 37.5%, few 40.0% versus 60.0% and multiple 75.0% versus 25.0%, $P = 0.022$. There was no significant difference in villous swelling identification between FICE1 and WL visualization (first tertile $P = 1.000$; second tertile $P = 0.346$; third tertile $P = 1.000$). The number of stenoses observed and the respective score were similar with FICE1 and WL evaluation. There was no significant difference between the LS-FICE1 and LS-WL, for each tertile (first tertile: 292,81 versus 186,03, $P = 0.206$; second tertile: 478,44 versus 294,72, $P = 0.182$; third tertile: 858,19 versus 677,44, $P = 0.290$) and the global LS (1208.3 versus 867.2, $P = 0.210$).

CONCLUSIONS: Although the SBCE evaluation with FICE1 increases the number of ulcers observed, it did not result in a significant modification of in the final LS.

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Shear Wave Velocity Measurement in Bowel Wall Using ARFI Ultrasound for Prediction of Response to Medical Therapy in Crohn's Disease

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BACKGROUND: Crohn's disease (CD) is a chronic inflammatory disease necessitating surgical bowel resection in 60% of patients due to stricturing. CD stricturing is the result of bowel wall thickening composed of a mixture of inflammatory and fibrotic intestinal wall changes. Over time, cycles of inflammation and healing shift the stricture pathology from largely inflammatory to primarily fibrotic. Predominantly fibrotic strictures are unresponsive to anti-inflammatory therapies and require endoscopic dilation or surgery. Decisions between medical and surgical therapy are plagued by the difficulty of determining whether bowel wall thickening is the result of inflammation or fibrosis. The current practice of empirically using anti-inflammatory therapy in most patients with CD-related bowel wall thickening and obstructive symptoms in the hope of success leads to many unnecessary side effects, infections, worse surgical outcomes, and long delays of appropriate surgical intervention when significant fibrostenotic disease is already present. Ultrasound stiffness imaging, using acoustic radiation force impulse imaging (ARFI), provides real-time non-invasive bedside elastography of bowel wall reported as shear wave velocity (SWV). We hypothesize that ARFI SWV of luminal stricturing disease will stratify medically responsive (inflammatory) from non-responsive (predominantly fibrotic) ileal Crohn's disease; we present the interim analysis.

METHODS: Subjects with established ileal Crohn's disease hospitalized for small bowel obstruction (defined as CT evidence of small bowel dilation >3.5 cm) and scheduled to receive methylprednisone were enrolled. Within 48 hours of admission subjects underwent bedside ultrasound using Acuson S3000 with ARFI Virtual-Touch software package (Siemens, USA). SWV of the lateral, anterior, and medial portions of diseased ileum at 0% and 10% strain were collected in triplicate at baseline and Day 3. Subject demographic data, medical history, laboratory values and Harvey Bradshaw Index (HBI) were assessed at both time points. Ultrasound SWV values were compared to a primary outcome of surgical bowel resection for obstructive disease within 90 days. **RESULTS:** In 10 subjects with complete follow up to date, 4/10 have undergone surgical bowel resection within 90 days. Patient demographics, BMI, anti-TNF and immunomodulator use, and prednisone use prior to hospitalization did not significantly differ between surgical and non-surgical groups. Mean SWV at 0% strain (no freehand force) did not discriminate those requiring surgery within 90 days (1.42 [1.28-1.53] versus 1.56 [1.44-1.73] m/s, $P = 0.154$). When applying 10% freehand strain to the affected

Figure 1. Shear Wave Velocity (SWV) Stiffness Imaging in CD-Related Small Bowel Obstruction

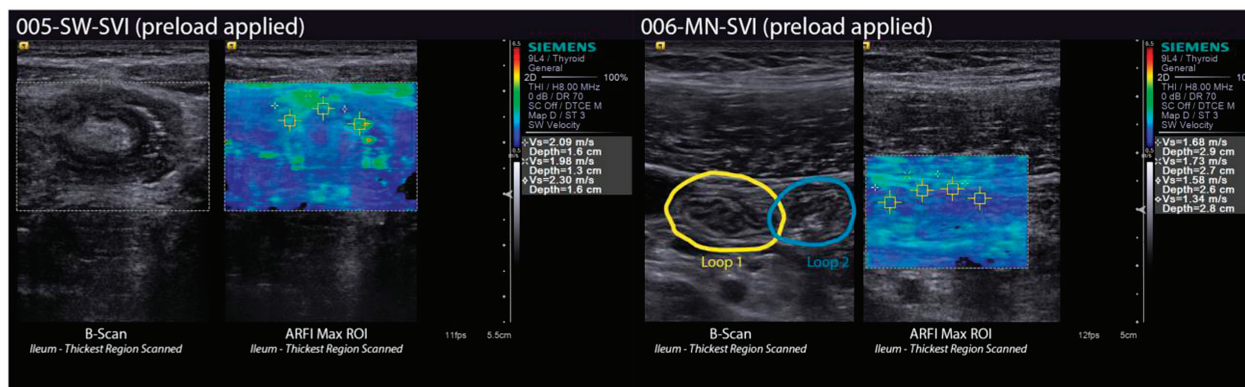


Figure 1. Representative images of baseline ultrasound scans of diseased ileum with SVI imaging performed with 10% applied strain (preload) in subjective with CD-related small bowel obstruction. SVI stiffness measurements are taken at the ultrasonographically thickest cross section of diseased ileum. In both panels display B-scan gray scale images of thickened ileum (left) and stiffness imaging color map with anterior, left-lateral and right-lateral measurements are shown (right). Quantitative values at each point are displayed within each ROI. The left image (a) measured left-lateral bowel wall stiffness at 2.09 m/s, anterior wall 1.98 m/s, and right lateral wall 2.18 m/s; this subject was insufficiently responsive to methylprednisone and underwent surgical resection during hospitalization. The right image (b) demonstrates two thickened loops of ileum within the scan field, stiffness range of the bowel wall was 1.34-1.72 m/s, this subject was responsive to medical therapy.