

Gastrointestinal Intervention

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Complication Forum

Large-sized iatrogenic colonic perforation during diagnostic colonoscopy



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ABSTRACT

Summary of Event: A 2 cm-sized colonic perforation occurred during diagnostic colonoscopy. Endoscopic closure was performed immediately using detachable snare and conservative management with intravenous antibiotics was followed for several days. However, abdominal computed tomography showed huge abscess and its connection to the sigmoid colon. The patient underwent segmental colectomy, which revealed the incomplete closure of perforated lesion with severe serosal fibrotic change.

Teaching Point: Endoscopic treatment of large-sized colonic perforations should be undertaken with caution since the possibility of incomplete closure is high. For large-sized colonic perforations, early surgical treatment should be preferentially considered over endoscopic treatment.

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Keywords: Colon; Endoscopic closure; Iatrogenic perforation; Surgical treatment

Event Details

A 76-year-old female visited our institution for surveillance colonoscopy. The patient had undergone polypectomy for colon polyps diagnosed as tubular adenoma with low-grade epithelial dysplasia 4 years ago. She was diagnosed with hypertension and was taking calcium channel blockers. Performing the colonoscopy was technically challenging because of severe pelvic adhesion possibly resulting from a previous surgical history of hysterectomy several decades ago. During colonoscopy insertion, acute angulation was observed at the sigmoid colon, making the insertion procedure more difficult. When the scope passed the mid-sigmoid colon, approximately 2-cm-sized bowel perforation was identified. Endoscopic perforation closure was attempted immediately. After suctioning luminal air, we replaced the colonoscope with a two-channel endoscope (GIF-2T240; Olympus Co., Tokyo, Japan) and re-approached the perforation site using carbon dioxide. The primary closure of the perforation site was attempted using a detachable snare. A detachable snare was placed in position using one of the endoscope channels and the other channel positioned using hemoclips. The detachable snare was then fixed on both

sides of the mucosa around the perforation introduced by hemoclips. After detachable snare fixation, it was tied to approximate perforation site. A total of three detachable snares and several hemoclips were applied to ensure closure of the perforation. Endoscopically the perforation lesion appeared to be closed well (Fig. 1). Although C-reactive protein levels were elevated up to 275.5 mg/L, and abdomen x-rays showed pneumoretroperitoneum on the next day, the patient was afebrile with stable vital signs and did not show clear signs of peritoneal irritation (Fig. 2). She complained of mild lower abdominal pain. The patient fasted the following days and was treated with intravenous antibiotics and conservative management. Her abdominal pain was gradually improved, C-reactive protein was decreased to 6.8 mg/L, and abdominal x-rays showed reduced pneumoretroperitoneum on hospital day 9. We then expected the perforated site to be sealed off and planned to perform abdominal computed tomography (CT). On hospital day 10, the patient underwent an abdominal CT scan after running gastrograffin from the rectum to sigmoid colon via an endoscope without applying pressure. The abdominal CT scan showed leakage of contrast at the perforated site and a 10-cm-sized abscess combined with pneumoperitoneum at the same site. Percutaneous

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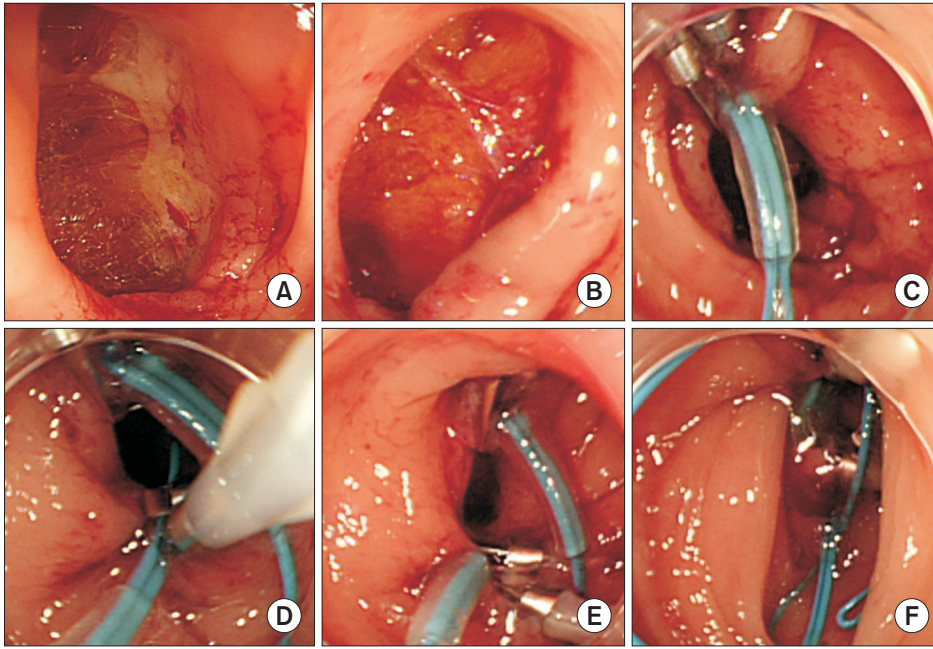


Fig. 1. Perforation and Endoscopic closure. (A, B) About 2-cm-sized perforation was identified at mid-sigmoid colon. (C) Partial closure of upper side of perforation was done using detachable snare and hemoclips. (D) Same procedure was performed at the lower side. (E, F) After performing approximation of each side, central part of perforation was closed by the same procedure.

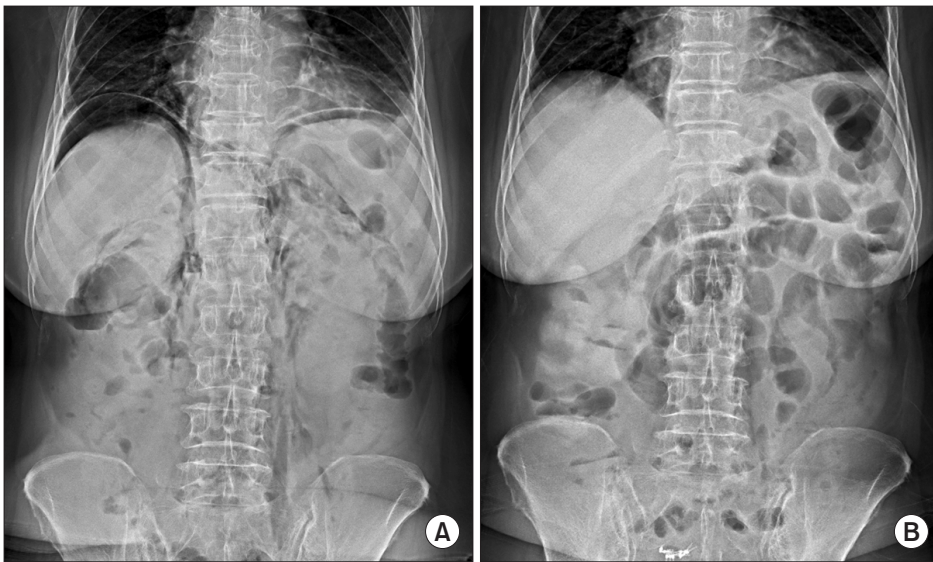


Fig. 2. Abdominal X-ray. (A) Pneumoretroperitoneum on hospital day 1. (B) The amount of pneumoretroperitoneum was almost disappeared on hospital day 10.

abscess drainage was subsequently attempted and a 10-Fr pigtail catheter was inserted successfully. After the procedure, a definite fistula was detected between the abscess and sigmoid colon (Fig. 3). Although there was no persistent fluid drainage the following 2 days, it was judged that healing of the perforation would be difficult with non-surgical treatment. Therefore, an operation was performed on hospital day 17. Surgical findings included an incompletely sealed off perforation site and severe adhesion between the small bowel and distal sigmoid colon. Because severe bowel wall thickening and serosal fibrotic changes were observed around the perforated lesion, primary repair was not possible, and thus a laparoscopic segmental resection of the sigmoid colon was performed (Fig. 4). The patient recovered after the operation and was discharged on hospital day 23. She was followed up at an outpatient clinic 6 months later and was in good condition.

Discussion

Colonic perforation is a rare but serious complication that may be encountered during colonoscopy. It is estimated that the frequency of iatrogenic perforation is 0.02% to 0.23% in diagnostic colonoscopy, with generally higher perforation rates found in the sigmoid colon.¹ The treatment options for colonic perforations include conservative management with or without endoscopic or surgical treatment. The management choice of conservative versus surgical treatment for this complication still remains controversial, and the size of the perforation and the degree of bowel cleanliness at the time of perforation are factors that should be considered in determining the best treatment method.

Prompt surgical intervention is usually recommended once perforation has occurred.² Surgical treatment is the main treatment for patients with a large perforation or diffuse peritonitis

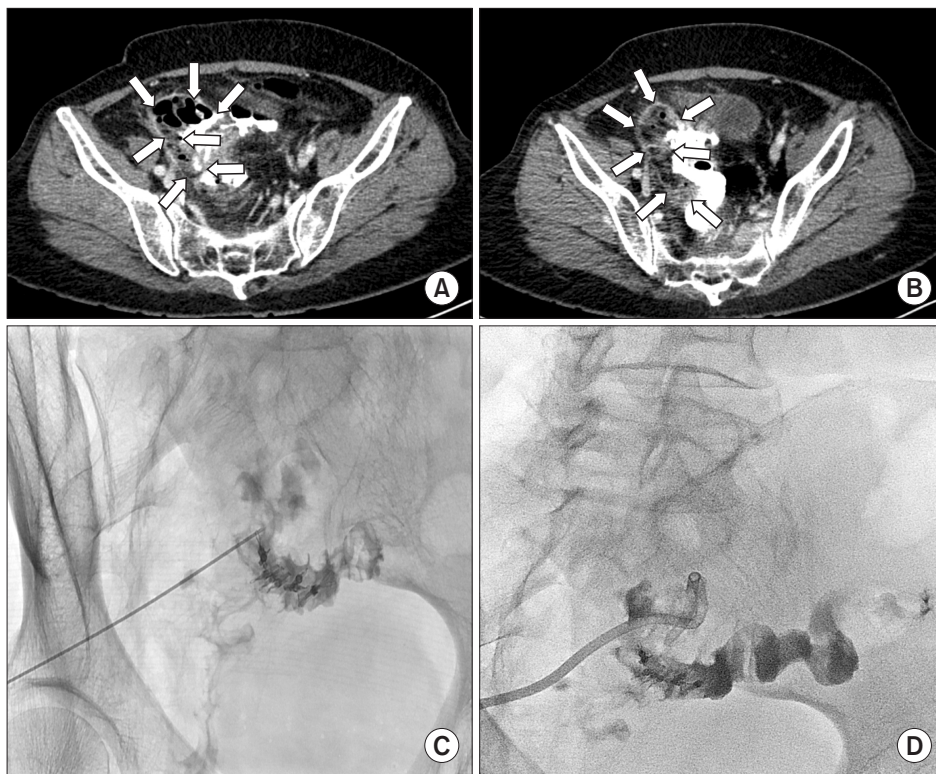


Fig. 3. Computed tomography (CT) scans after running gastrograffin from the rectum to sigmoid colon on hospital day 10. (A) CT scan shows leakage of contrast through clipping site at sigmoid colon (arrows). (B) About 10-cm-sized abscess with entrapped air around the sigmoid colon (arrows). (C) Percutaneous abscess drainage was done under fluoroscopic guidance. (D) Tubogram shows abscess cavity and associated fistula to sigmoid colon.

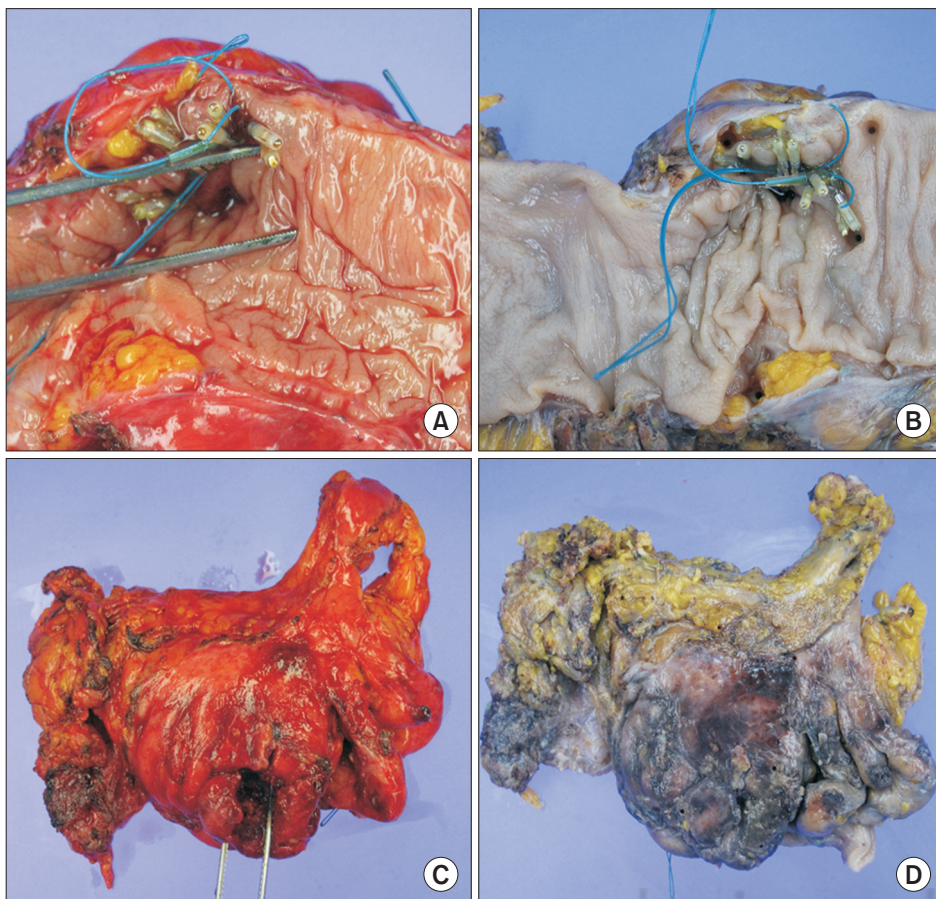


Fig. 4. Photographs of the surgical specimen. (A, B) 1.5-cm × 1-cm-sized perforation lesion was observed with previously applied clips and detachable snares. (C, D) The serosal surfaces around the perforation lesion are grossly thickened with hardening change. Because of these inflammatory change, primary repair of perforation was not impossible, and segmental resection of sigmoid colon was performed.

as well as for patients who fail observational management.³ A primary repair of the perforated site or a segmental colectomy are usually performed. However, thanks to the increasing experience and skill of endoscopists in using endoscopic closure devices and advancement in technologies such as endoclips, suturing devices, and over-the-scope clips, there is an increasing potential to treat perforations endoscopically. Endoscopic closure may be feasible in cases with well prepared colon and relatively small-sized perforations. Several studies have reported a high technical success rate (71%–92%) with a relatively low rate of conversion to surgery (11%–22%).^{4,5} Other studies have also shown improved outcomes such as decreased length of hospital stay, and lower cost.^{6,7} Recently, the over-the-scope-clip (OTSC) system, which allows full thickness closure, has shown high success rates up to 90% in various gastrointestinal tract perforations including colon, and it has been suggested as an effective endoscopic method for gastrointestinal defect.⁸ However, there have been some limitations to endoscopic management. Precise evaluation of the completeness of closure after endoscopic treatment is difficult. If the endoscopic closure is incomplete, leakage of bowel contents may develop, which may result in peritonitis and necessitate surgical intervention.

Regarding endoscopic treatment of iatrogenic perforations, several factors including small perforation size, clean contents of the gastrointestinal lumen and adequate expertise of endoscopist are considered as a prerequisite for a successful procedure.⁹ In general, a colonic perforation less than 10 mm in size is deemed suitable for endoscopic closure.¹⁰ If endoscopic closer is performed for larger perforations, the risk of requiring surgical treatment within 24 hours after colonoscopic closure increases.⁵ Cho et al⁵ showed that intra-abdominal abscess formation developed in 50% of cases after large perforation treated by endoscopic clips. In our case, there was a 2-cm-sized perforation, and complete seal off was not achieved despite endoscopic closure. This incompletely repaired perforation resulted in a huge pelvic abscess that necessitated segmental colectomy.

Prevention

The sigmoid colon has the greatest risk of perforation in diagnostic colonoscopy. The surgical history of the abdomen and/or pelvis has been reported as a risk factor for perforation in diagnostic colonoscopy.¹¹ Therefore, careful endoscopic manipulation is required, because excessive manipulation and force during colonoscopy insertion can increase the risk of colonic perforation

in patients with severe bowel adhesion caused by previous abdominal and/or pelvic surgery. Beginners and trainees who have little experience with colonoscopy should especially be aware of this.

Teaching Point

Endoscopic treatment of large-sized colonic perforations should be undertaken with caution since the possibility of incomplete closure is high, and precise evaluation of procedural completeness cannot be achieved at the time of endoscopic management. For large-sized colonic perforations, early surgical treatment such as primary repair should be preferentially considered over endoscopic treatment.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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