

Endoclip Closure of a Large Colonic Perforation Following Colonoscopic Leiomyoma Excision

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ABSTRACT

Background and Objective: Endoscopic removal of large colonic submucosal lesions can lead to a higher risk of perforation. Although not as common following diagnostic and therapeutic colonoscopy, it does occur more often following therapeutic colonoscopy. We present a case of a large submucosal mass excised endoscopically, resulting in a large perforation that was closed using endoclips. While endoclips are typically used for smaller perforations, we have found that they can be used safely on a larger defect.

Methods: A 68-y-old woman presented with a 2.9-cm benign submucosal mass found in the hepatic flexure. It was removed via endoscopic polypectomy, leaving a perforation of 3cm x 3cm. The perforation was closed with endoscopic clips.

Results: Histology of the specimen showed clear margins. At 4-wk follow-up, the patient had no complications. A colonoscopy at 6-mo follow-up showed only a scar at the procedure site with no complaints.

Conclusions: Large iatrogenic colonic perforations can be managed successfully using endoclips, particularly in a prepped colon.

Key Words: Colonic submucosal lesions, Perforation, Therapeutic colonoscopy, Endoclip.

INTRODUCTION

Surgical resection has been the mainstay of treatment for large colonic lesions. Unfortunately, even with the introduction of laparoscopy, significant morbidity still exists. Endoscopic removal of large benign colonic submucosal lesions has been successfully performed, although it brings with it an increased risk of bleeding and perforation. In fact, reports show significant operative morbidity (36%) and mortality (7%).¹ Traditionally, these complications have been addressed with a laparotomy,¹ but recently laparoscopic² and endoscopic techniques^{3,4} have been used successfully to close perforations.

The incidence of colonic perforation following colonoscopy can vary between 0.03% and 2%.^{4–6} Perforation rates increase with therapeutic interventions⁷ and the size of the polyp.⁶ We present a case of a large submucosal mass that was excised endoscopically, resulting in a 3-cm x 3-cm perforation that was closed using endoclips. Typically, these clips are used for smaller perforations²; however, we have found that they can be used safely on a larger defect. Endoclips have been used to clip a vessel in a bleeding ulcer or to achieve hemostasis from the base of a polyp after polypectomy.

MATERIALS AND METHODS

A 68-y-old woman presented with a 3-cm mass at the hepatic flexure (**Figure 1**), which was found during a routine outpatient colonoscopy. The mass was submucosal and the overlying mucosa was ulcerated. The lesion was firm. Biopsy of the lesion showed colonic mucosa with inflammatory changes. A subsequent CT scan of the abdomen confirmed that it was a 3-cm submucosal mass with benign features. The patient was taken for planned endoscopic resection with primary closure. The operating room was on standby in the event the resulting defect could not be closed endoscopically. A snare polypectomy was successfully performed that resulted in a 3-cm perforation (**Figure 2**). Seven endoclips (Resolution Clip; Boston Scientific, Natick MA) were placed in order to seal the colotomy (**Figure 3**). A frozen section of the specimen showed a benign stromal neoplasm.

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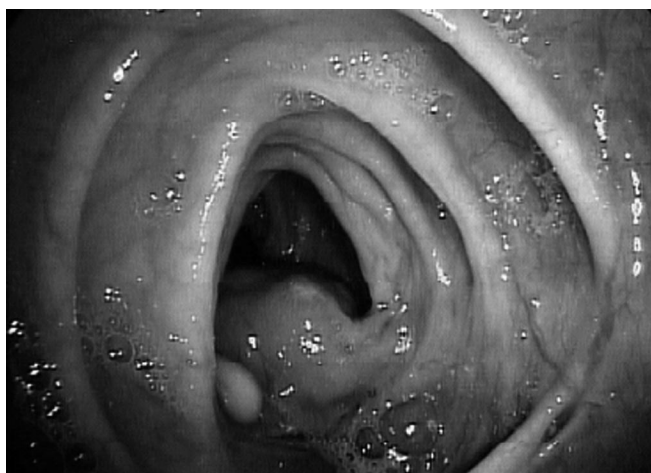


Figure 1. Hepatic flexure mass as seen on colonoscopy.



Figure 3. Endoclips closing the perforation site.

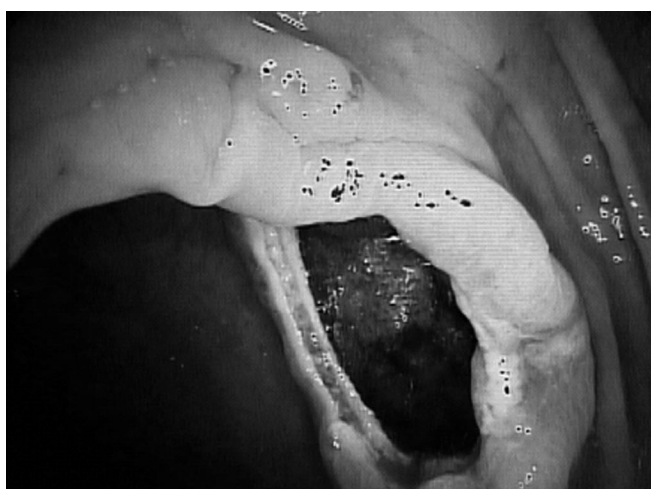


Figure 2. Perforation after Snare Polypectomy.

RESULTS

A postprocedure abdominal X-ray revealed expected free air (**Figure 4**), and the patient was admitted for observation. On postprocedure day 1, the patient's examination was unremarkable. She was started on a clear liquid diet. On postprocedure day 2, she advanced to a soft diet and was discharged home.

Final pathology revealed a 2.9-cm submucosal leiomyoma with clear margins. The patient returned to the office 4 wk later without complaints. A colonoscopy at 6 mo showed a scar at the site.

DISCUSSION

Colonic leiomyomas are rare benign stromal tumors that can cause gastrointestinal bleeding,⁸ obstruction,⁹ and, in

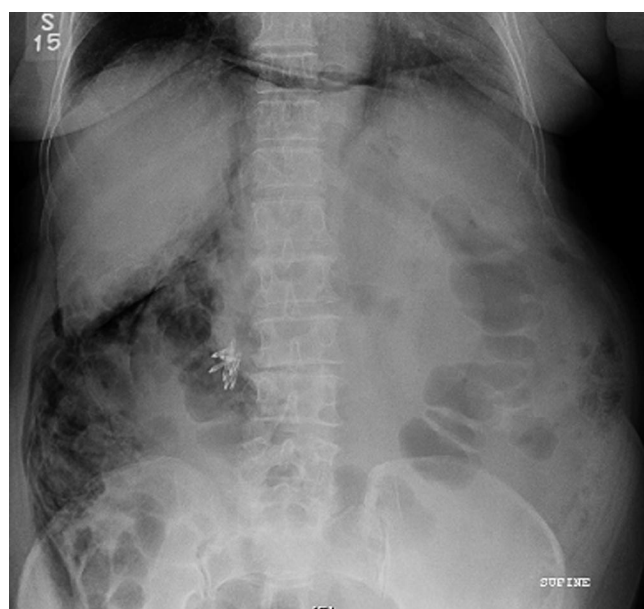


Figure 4. Postprocedure X-ray showing free air. Note the endoclips in the right upper quadrant.

rare instances, progress to a sarcoma.¹⁰ Large benign colonic lesions have been removed by colonic resection and anastomosis, although recently they have been managed via an endoscopic mucosal resection¹¹ and endoscopic polypectomy.¹² The size, type (pedunculated or sessile), configuration, and site of the lesion all determine the type of procedure to be performed.

Pedunculated lesions¹³ and those over 2cm¹² have been dealt with using endoloops or hemoclips. One report¹² showed a 3.5-cm lipoma that was excised by endoscopic

polypectomy with no complications. Endoloops can also be used to resect large colonic lipomas to prevent bleeding and perforation.¹⁴ Perforation risk increases with therapeutic colonoscopy,^{4,7,15} polyps > 2cm,¹⁶ in the elderly (>75yrs),¹⁵ and in female patients.¹⁷ Full-thickness endoscopic removal should be contemplated only after the lesion is proven benign either by imaging or histopathology, as a malignant lesion can potentially convert an early disease to stage 4 disease leading to bad prognosis.

Depending on the size of the perforation and clinical condition, treatment strategies vary. Small perforations can be managed conservatively with a success rate of 33% to 73%.¹⁸ Operative intervention can be managed by simple closure of the perforation¹⁵ or via a bowel resection with or without anastomosis.¹ Colonic perforations have been dealt with laparoscopically leading to shorter hospital stay and decreased postoperative morbidity.¹⁹

Endoscopic closure of colonic perforation has been performed using endoclips, particularly when the perforation is < 1cm.⁴ Few authors^{3,20} have used the endoclips for perforations > 1 cm. Trecca et al.³ reported 2 perforations > 3cm that were managed using endoclips successfully. In both patients, 3 TriClips (Cook Medical, Bloomington, IN) were used. In our case, the perforation was 3cm in size, and 7 clips were used to close the defect. The patient was discharged on the second day. Of course, the number of clips used can vary, depending on the size of the perforation.³

Endoscopic closure of an iatrogenic colonic perforation at colonoscopy is feasible, because it is a prepped colon and there is minimal contamination. Closure should, however, be undertaken using minimal to no air insufflation.³ This helps with approximation of the edges and prevents fecal spillage. An experienced colonoscopist is the most important factor as the endoclip application can be technically challenging, and also depends on the site (hepatic flexure in our case) and size of the perforation.

Reports^{21,22} have shown clip closure to be successful in 69.2% to 92.6% of cases. Still, 2 of 27 patients who underwent clip application needed surgery, making it vitally important to monitor patients for complications following the procedure.²¹ We did not perform follow-up examination with X-ray for the clips³ or immediate colonoscopy,²³ because the patient was clinically well. A follow-up endoscopy 6 mo postprocedure revealed a scar. Intravenous antibiotics and serial examinations are paramount in the postprocedure period to identify any leaks that can lead to peritonitis. Our patient made a remarkable recovery and was sent home in 2 d.

In our practice, therapeutic colonoscopy for large polyps is managed in the operating room with the patient anesthetized. We often perform diagnostic laparoscopy in suspicious cases to confirm that there is no leak at the site. CO₂ colonoscopy is often performed to minimize intraabdominal free air, and to minimize distension of the colon, in the event that we need to convert to a laparoscopic procedure. Colonic perforations that are 3cm x 3cm following a benign excision can be closed using endoclips, which is possible in view of the prepped colon, with immediate identification of the perforation and with minimal contamination. Laparoscopic repair of an iatrogenic colon perforation has been shown to be feasible with decreased morbidity and shorter hospital stay compared to the open approach.²⁴ Delayed diagnosis is associated with higher morbidity¹ and can be dealt with by laparoscopy or with laparotomy.

To date, 3 cases have been reported in the literature with successful outcomes for perforations of 3cm^{3,20} that have been closed with endoclips. The case reported herein is about the largest perforation managed following a leiomyoma excision from the colon.

Immediate identification of the perforation is critical to using the endoscopic technique. Endoclip application can be challenging, and the success rate can depend on the colonoscopist, presence of fecal contamination, and the size and site of the perforation. An experienced colonoscopist with vast experience in therapeutic procedures is the most important factor for a successful outcome. Other factors are clean bowel with minimal contamination, the site of the perforation, and the availability of operating room facility. While endoscopic removal of 1-cm to 2-cm lesions has been reported, we believe this is the first reported case of an endoscopically resected 3-cm leiomyoma leading to perforation that was successfully repaired using endoclips. Immediate thorough evaluation of the polypectomy site for both bleeding and perforation is a good practice, particularly in high-risk cases and this avoids delayed diagnosis. Serial clinical examination following the procedure is very important to help identify any signs of sepsis. As endoscopic technology continues to evolve, and its use increases, we believe this method will become the standard of care.

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