



Endoscopic repair of rectal perforation due to colonoscopy with a clamp method

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ABSTRACT

Colon perforation during colonoscopy is a rare complication that usually requires surgical intervention. Traditionally, primary repair by laparoscopy, laparotomy, resection, and anastomosis is performed for such perforations. More recently developed minimally invasive endoscopic instruments have also been used in the repair of these perforations; this is becoming increasingly common. An endoscopic over-the-scope clip clamp was used in a 59-year-old male patient who suffered a rectum perforation in connection with a diagnostic colonoscopy. He was referred to our clinic. A colonoscopy was performed in our clinic to assess the rectal perforation caused by a diagnostic colonoscopy 2 h after the initial colonoscopy, with the concurrent therapeutic purpose of repairing the perforation using an endoscopic clamping method. Oral feeding was started 24 h after the procedure. After three days, the patient was discharged. An endoscopic clamping method in appropriate cases can be a safe and appropriate alternative therapy in the management of colonoscopic perforations.

Keywords: Colonoscopy, clamp, perforation

INTRODUCTION

Colonoscopy is a commonly used method in the diagnosis and treatment of lower gastrointestinal system diseases. The most common complications in colonoscopy are bleeding and perforation. Less often, pneumothorax, pneumomediastinum, colonic volvulus, hernia incarceration, retroperitoneal abscess, and mesenteric tears may occur. The risk of perforation during a diagnostic colonoscopy is 0.2% to 0.5% (1), while the risk of perforation in therapeutic colonoscopy is approximately 2% (2). In terms of anatomical location, iatrogenic perforation occurs most commonly in the sigmoid colon. Extraperitoneal injuries are rare. Colonic perforation during colonoscopy can occur by several mechanisms. These include the application of heat energy during polypectomy, direct mechanical trauma from the endoscope tip, application of increased lateral pressure during the spinning of the endoscope, and pneumatic injury through overinsufflation (3). While injuries due to mechanical trauma are usually noticed during endoscopic procedures, perforations due to pneumatic injury and excessive energy may be overlooked. The most common physical examination findings in perforation cases are persistent abdominal pain and distension (3). If perforation is detected late, peritonitis may develop. Indeed, delay in treatment may lead to septic shock and even death.

The most advantageous aspect of colonic perforation after colonoscopy is that it can be noticed immediately; this situation may allow more frequent use of minimally invasive procedures. Currently, endoscopic perforations are commonly repaired by laparoscopy or laparotomy. Endoscopic repair of perforations due to colonoscopy is being increasingly discussed in the literature (4). Here we present a case in which the patient suffered a rectal perforation during colonoscopy and was treated with an endoscopically placed over-the-scope clip (OTSC) clamp.

CASE PRESENTATION

A 59-year-old male patient who had undergone a colonoscopy at another center because of abdominal pain and constipation suffered a perforation during retroflexion to examine the rectum; he was admitted to our emergency clinic 2 h after the perforation. The patient was hospitalized with a diagnosis of rectal perforation. The patient's general condition was good: he was conscious, cooperative, and oriented. His BP was 120/70 mmHg, pulse: 70/min, temperature: 37°C, and BMI: 35. There was tenderness in the abdomen on physical examination, and there was no defense or rebound. Other systemic examinations were normal. Upon digital rectal examination, sensitivity in the rectum and hematochezia were present. White blood cells and CRP were normal. A plain X-ray showed no free air. Intravenous fluid therapy, ceftriaxone, ornidazole, and famotidine were begun simultaneously. The patient was scheduled for a colonoscopy.

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The patient was transferred to the interventional procedure room. The patient underwent sedoanalgesia with 20 mg pethidine and 2 mg midazolam, and treatment began. A 1.5 cm rectal perforation was seen in the proximal rectum (Figure 1). With aspiration, air was evacuated in the lumen. After the perforated edges shrank, and while maintaining the wound edges with an endoscopic grasper, one endoscopic OTSC clamp was used (Figure 2). The process was ended after the perforation was totally closed using the clamp. An oral diet (regimen 1) was begun 24 h after the procedure. After three days in hospital, the patient was discharged.

DISCUSSION

Colonoscopy remains the gold standard for the diagnosis and treatment of diseases of the colonic mucosa. Diagnostic and interventional endoscopic procedures have become increasingly common with the development of new endoscopic techniques. Today, many colon lesions, including some tumors, are treated with endoscopic surgery. With the increasingly widespread use of colonoscopy, the incidence of complications has also increased. The most serious complications of colonoscopy are bleeding and perforation. Perforation risk is especially increased by lack of experience with interventional procedures. However, perforations may still occur even with experienced endoscopists and the use of advanced endoscopes.



Figure 1. Rectal perforation



Figure 2. Application of an endoscopic OTSC clamp in rectal perforation

The traditional treatment of perforation due to colonoscopy is laparotomy, although treatments are being performed more frequently with laparoscopic methods. Although primary repair is usually preferred, resection and anastomosis or stoma are also among the treatment options. To decide on which treatment to use, the size of the perforation, the detection time of the perforation, and the intraperitoneal contamination rate must be considered. Perforation due to a colonoscopy is usually detected during the colonoscopy, and bowel preparation has usually already been performed prior to the perforation in these cases. Early detection of colonic perforation and clearing of content before the procedure have brought endoscopic perforation repair to the forefront in recent years. Recently, several case reports or small case series have been reported on treatment methods for perforation due to colonoscopy.

Colonoscopic procedures must be performed carefully and by experienced endoscopists; otherwise, colonoscopic perforations can result in malpractice allegations and lawsuits. Early detection of the perforation and early treatment reduce the risk of patient morbidity and mortality. Lohsiriwat divided colonoscopic perforation treatment into three categories: conservative management, endoscopic repair, and operative repair (5). A conservative approach may be applicable in selected cases of colonoscopic perforations. Especially, lower rectum injuries can be monitored non-operatively with good follow-up and with close monitoring of clinical laboratory values and radiological imaging.

Today, minimally invasive surgical treatment of colonoscopic perforations is preferred. Minimally invasive methods are being increasingly used for the management of colonic perforation, with corresponding decreases in the use of conventional laparotomy techniques. With the prominence of laparoscopic treatment, some algorithms related to laparoscopic repairs have been reported (6). Zhang et al. (7) indicated a mean operation time of 2.3 ± 0.6 h for perforation repair using a laparoscopic suture, whereas in our case, the endoscopic clamping process required 15 min and resulted in no perioperative bleeding. They stated that oral intake was started 3.9 ± 2.0 days later, whereas we began an oral diet (regimen 1) within the first 24 h. Their hospitalization was 6.8 ± 4.2 days, whereas our patient was discharged at 3 days. The major disadvantage associated with laparoscopy is the learning curve; in small centers, this technique may be difficult, especially in emergency cases, due to lack of equipment. Laparotomy is still used in the management of perforation in large-scale perforations, in delayed cases, in small centers where laparoscopy is contraindicated, or in the absence of adequate surgical experience and equipment.

The development of endoscopic instruments similar to laparoscopic instruments in modern surgery has made endoscopic therapy possible in the same session. Colonoscopy preparation had been performed in our case, and the perforation was identified during a colonoscopy. Perforation of the rectum was below the perineal reflex, and findings of peritonitis were not noted. Radiological and laboratory findings were normal. Our clinic was experienced in the use of endoscopic clips in colonic perforations. However, in this case, a perforation of ~ 1.5 cm was present. We decided to use an endoscopic OTSC clamp on this patient. The endoscopic clip method is especially used in

small perforations. A greater number of clips may be necessary with increasing diameter of the perforation. This increases the time and cost of the process and also reduces the technical success rate.

Trecca et al. (8) stated in a review that an endoscopic clip was used in 55% to 96% of colonic perforations during therapeutic colonoscopy and that the success rate was 69% to 93%. However, they reported that perforations greater than 10 mm and perforations occurring during diagnostic endoscopy created contraindications to endoscopic closure. Thus, in large perforations, endoscopic clamping methods may be more appropriate. Clips and clamping applications associated with iatrogenic perforation are being increasingly reported. A metallic clip was previously used for hemostasis in gastrointestinal bleeding. Kim et al. (9) reported 27 colon perforations in 115,285 diagnostic colonoscopies over 12 years. In total, 16 patients underwent endoscopic clipping; of these, three patients underwent surgery. None of the patients suffered major morbidity or mortality. Repair of a perforation with an endoscopic clamp may be applicable at any location in the colon. This method can be applied in therapeutic endoscopy applications relatively easily by experienced endoscopists.

It may be difficult to repair all colonoscopic perforations endoscopically. Endoscopic surgical repair should be reserved for centers where experienced practitioners and adequate infrastructure are available and, if necessary, surgical treatment should be administered without delay. We anticipate that in the future, endoscopic clips and clamping methods, which are minimally invasive, will become widespread at many centers.

Sagawa et al. (10) reported no perforation in their series of diagnostic colonoscopies and reported colon perforation in 8 (0.3%) patients undergoing therapeutic colonoscopies. The most common perforation was reported during endoscopic submucosal dissection (3.8%). CRP also had a lower value in those endoscopic clippings. They stated that the average CRP level in patients with clips was 2.9 ± 1.6 mg/dL; the level was 9.7 ± 6.2 mg/dL in those without clips.

In the management of perforation due to colonoscopy in selected patient groups (bowel preparation prior to colonoscopy, perforation localization, perforation diameter, peritoneal contamination degree, general condition of the patient, and endoscopist experience), if it is inappropriate to treat the patient conservatively, an endoscopic clamp method should be considered before surgery. Treatment of patients with non-operative methods, in addition to reducing mortality and morbidity, provides advantages such as shorter hospital stay, reduced infection risk, quicker restoration of quality of life, and reduced overall cost.

There is not yet enough data to assess the implementation of endoscopic clamps in urgent cases or cases of delayed perforation. We believe that in such cases, if the endoscopy unit has adequate equipment and the endoscopist has sufficient experience, this endoscopic method can be attempted before surgical treatment. However, the patient's general condition should be taken into consideration, and delay should

be avoided in cases requiring surgery. If success cannot be achieved with endoscopic methods (primarily laparoscopic procedures), surgical treatment should be used.

CONCLUSION

Iatrogenic colon perforations are being encountered more frequently due to the increasing number of diagnostic and therapeutic colonoscopies. The ideal approach is the detection of this complication by endoscopists who are aware of all treatment methods and the use of minimally invasive methods where possible to treat the patient. We conclude that the use of non-operative treatments, such as endoscopic clamping, will increase in the future.

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