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Colonoscopy-assisted percutaneous sigmoidopexy (CAPS) for complete rectal prolapse treatment: Case series

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ABSTRACT

Background and study aims We have previously reported on the effectiveness of colonoscopy-assisted percutaneous sigmoidopexy (CAPS) for sigmoid volvulus treatment. This study describes the CAPS application to treat complete rectal prolapse by straightening and fixing the rectum. Complete rectal prolapse is common in older women. Due to their comorbidities, management must comprise a simple, safe, and reliable surgical method not involving general anesthesia or colon resection.

Patients and methods We enrolled 13 patients in our outpatient department diagnosed with complete rectal prolapse between June 2016 and 2021. The endoscope was advanced into the anterior proximal rectal wall, straightening the intussuscepted sigmoid colon and rectum to approximate the puncture site. The fixation sites were anesthetized with 1% xylocaine, and a 2-mm skin incision was made using a scalpel. A two-shot anchor was used to fix the sigmoid colon to the abdominal wall (Olympus, Tokyo, Japan).

Results The median patient age was 88 years (range: 50–94). The median CAPS procedure time was 30 minutes (range: 20–60). In one patient, the transverse colon was accidentally punctured and interposed between the abdominal wall and sigmoid colon, requiring a laparotomy to remove the causative fixation thread and provide re-fixation. Fecal incontinence was resolved in 10 of 13 cases.

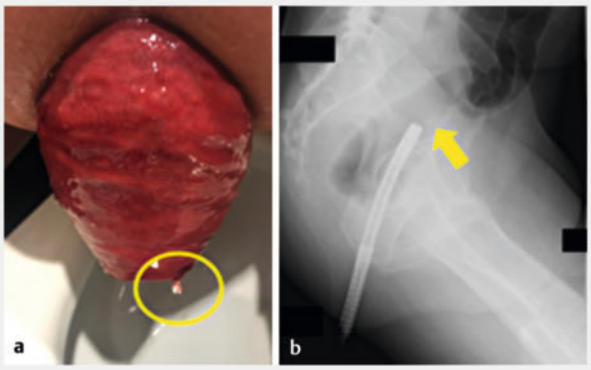
Conclusions CAPS is a quick and simple procedure. In addition, it is a treatment option for complete rectal prolapse that can be performed under local anesthesia.

Introduction

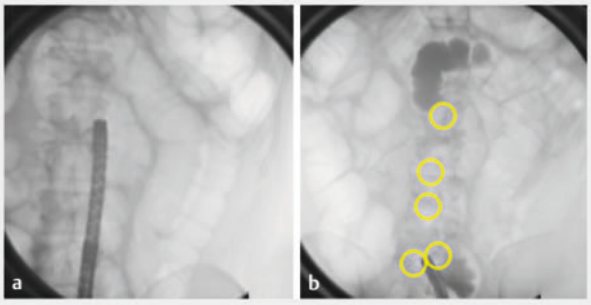
Complete rectal prolapse is a circumferential rectal prolapse from the anus. This condition is associated with fecal incontinence and is common among older women, especially those in the median age range of 80 years [1, 2, 3]. General anesthesia is risky for many of these patients due to their comorbidities.

The lack of consensus regarding the optimal surgical option for correcting underlying pelvic floor defects in full-thickness rectal prolapse cases is evident due to the wide range of available surgical modalities. Therefore, a simple, safe, and reliable surgical method is needed for complete rectal prolapse treatment without general anesthesia or colon resection.

We have developed a novel endoscopic technique for patients at high risk for prolonged surgical time and general anesthesia. Our method was performed endoscopically using a two-shot anchor and abdominal wall fixture to straighten the intussuscepted sigmoid colon and rectum. Specifically, this method involved pushing the sigmoid colon upward within the sigmoid colon itself (▶ **Fig. 1**). This technique applies colonoscopy-assisted percutaneous sigmoidopexy (CAPS), which we previously reported as a sigmoid colon volvulus treatment [4].



▶ **Fig. 1** **a** Complete rectal prolapse clinical findings. Endoscopic clips are placed at the tip of the prolapsed bowel (yellow circle). **b** A fluoroscopic image of a reflexed complete rectal prolapse. The clip is located at the border between the sigmoid colon and rectum (yellow arrow). In this case, this indicates that the rectal prolapse is consists of half sigmoid colon and half rectum. In addition, the rectum is straightened by advancing the sigmoid colon with the endoscope.



▶ **Fig. 2** **a** Endoscopically straightened rectum and sigmoid colon. **b** View of the sigmoid colon fixed with a two-shot anchor (yellow circle) with the rectum straightened.

This report describes the results of CAPS application in complete rectal prolapse cases.

Patients and methods

Study design

This study was a prospective case series, which received approval by the International University of Health and Welfare Hospital Ethics Committee (approval no. 13-B-97) and adhered to the Declaration of Helsinki. Written informed consent was obtained from the involved patients or their representative family members.

Patients

The study was conducted between June 2016 and 2021. We enrolled consecutive participants diagnosed with complete rectal prolapse at the International University of Health and Welfare Hospital outpatient department (Nasushiobara, Tochigi, Japan). The exclusion criteria involved patients who did not undergo the treatment procedure after receiving a detailed study explanation or those with difficult endoscopic treatment, including those with infectious enteritis.

Using medical records, this feasibility study assessed operative time, blood loss, complications, recurrence rate, symptom improvement, and postoperative constipation (defined as no bowel movement for > 3 days).

Procedures

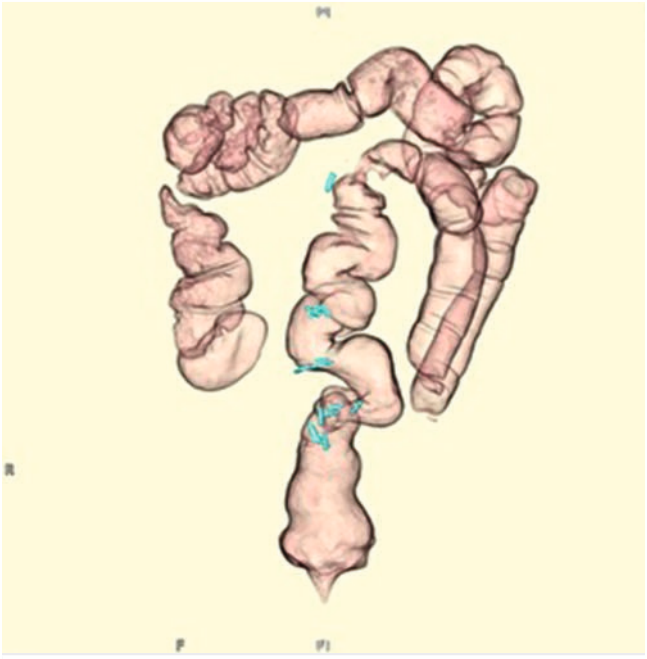
The procedure was performed in a fluoroscopy room rather than an operating room. The procedure was performed by two doctors, one conducting the endoscopy and the other handling the puncturing. A radiology technician and nurse assisted the procedure.

The following outlines the step-by-step operative process:

1. Bowel cleansing was performed 1 day before the surgery.
2. The prolapsed rectum and sigmoid colon were reduced during the operation through transanal colonoscope insertion under fluoroscopic guidance.
3. The endoscope was pushed against the anterior proximal rectal wall, straightening the intussuscepted sigmoid colon and rectum while also approximating the puncture site.
4. Following our previous sigmoid volvulus fixation report [1], several tests were conducted on the determined fixation site. These included a transmitted illumination test (where the abdominal wall was observed for transmitted light emitted from the endoscope tip to confirm non-diffusion), a puncture test using a 23G needle, and an abdominal wall finger push test (where finger pressure is applied on the abdominal wall to observe that a finger-shaped compressed image is on the endoscope). These tests confirmed that there was no other organ involvement, including the small intestine.
5. The fixation site was locally anesthetized with 1% xylocaine, and a 2-mm skin incision was made using a scalpel.
6. A two-shot anchor (Olympus, Tokyo, Japan) was inserted [1] into the sigmoid colon lumen (▶ **Fig. 2a**), and the nylon thread with a metal bar at the tip (T-bar) was detached and pulled toward the body surface (▶ **Fig. 2b**).
7. Following the same technique, the two-shot anchor punctured through the subcutaneous tissue at a 3-mm distance. The two nylon threads were ligated subcutaneously.
8. The sigmoid colon was anchored using the same technique to the abdominal wall in approximately six places with an approximate 3-cm distance on the distal side (▶ **Fig. 3**).

Results

During the study period, 13 patients (four men and nine women) were diagnosed with complete rectal prolapse. No patients met the exclusion criteria; therefore, all were treated with CAPS. The median patient age was 88 years (range: 50–94 years). The median body mass index (BMI) was 20.9 kg/m^2 (range: 18.1–25.8 kg/m^2). All patients had a fecal incontinence history (4, intermittent; 9, constant). Their medical history included myocardial infarction (n = 2), heart failure (n = 2), and



▶ **Fig. 3** Postoperative follow-up computer tomography imaging demonstrating the T-bars used for fixation, with their position remaining unchanged. The rectum is fixed to the sigmoid colon while straightening the rectum.

dementia (n = 3). No abdominal surgical history was noted in any patients.

The procedure was performed under local anesthesia. The median procedure time for CAPS was 30 minutes (range: 20–60 minutes); the median time limited to fixation was 18 minutes (range: 15–45 minutes); and the median fixation number was six (range: 3–10). One patient suffered a bowel obstruction on the postoperative day 7 a transverse mesocolon malpuncture. This malpuncture was treated by laparotomy with causative fixation thread removal and re-fixation. Fecal incontinence improved in 10 of 13 patients. No postoperative constipation was observed in any patients.

In this study, the median observation duration was 42 months (range: 12–54 months). Postoperative recurrence occurred in four of 13 patients (30%) at 2, 3, 15, and 48 months.

No complications were reported during the follow-up period. Simple abdominal computed tomography (CT) of the metal T-bar, securing the two-shot anchor, demonstrated no position change. No abdominal symptom worsening was reported among the patients, including diarrhea, constipation, or bowel obstruction.

Discussion

We performed CAPS in patients with rectal prolapse. In this case series, CAPS was found to be a quick and simple procedure.

Transabdominal and transperineal surgery are the surgical methods for complete rectal prolapse. Transabdominal surgery involves sigmoid fixation to the anterior sacrum and sigmoid colon resection. Moreover, transperineal surgery includes the Altemeier, Delorme, as well as Gant-Miwa method and is often used in cases in which general anesthesia or other perioperative factors pose a high risk. The perineal surgery recurrence rate ranges from 14% to 27% within 4 years postoperatively [5, 6, 7, 8, 9]. The Gant-Miwa operation is a simple procedure; however, it is associated with a 30% recurrence rate [6]. In addition, the Altemeier procedure has been suggested to decrease postoperative rectal compliance [9]. However, it poses a suture failure risk as it necessitates intestinal anastomosis. All these existing methods require approximately 100 surgical minutes [9]. Shen et al. [10] reported that the time required for the modified Gant-Miwa procedure and anal encircling was 75 minutes (range: 50–165 minutes). Similarly, Cirocco [11] stated that the Altemeier procedure took 97.7 minutes (range: 50–180 minutes). However, Ganapathi et al.[12] described that existing laparoscopic procedures (posterior mesh rectopexy or resection rectopexy) took 108 minutes (standard deviation [SD]: 24). Recent multicenter randomized clinical trials indicate that laparoscopic ventral rectopexy developed by Hoore et al. is a safe method with low recurrence and constipation rates [13, 14]. Furthermore, this procedure is recommended in current, complete rectal prolapse guidelines [15]. However, simpler procedures may be better for patients who cannot receive general anesthesia or those deemed high risk requiring a short procedure. CAPS does not require mesh suturing or general anesthesia.

In this study, CAPS was performed in a fluoroscopy room, which is more economical than an operating room. The CAPS procedure generally lasted 30 minutes (range: 20–60 minutes), demonstrating its swiftness and simplicity compared to other existing methods. There is no suture failure risk because no bowel resection is involved. In addition, due to its minimally invasive nature, the procedure is associated with virtually no bleeding as it is performed through a small epidermal incision and puncture method.

In this study, the CAPS recurrence rate was 30% (n = 4/13), which is comparable to existing transabdominal approaches and surgeries performed under local anesthesia. Because CAPS does not involve bowel resection, the serious complication likelihood is low, even with an increased case number.

The one bowel obstruction complication case due to transverse mesocolon malpuncture was thought to be due to abnormal transverse colon descent. Therefore, caution should be exercised when CT scans reveal such signs preoperatively. It is expected that malpuncture can be pre-emptively identified using CT imaging after conducting a series of cases. Therefore, careful consideration should be given to this issue in future cases.

The study limitations include that it was a single-center, Japanese case series and that many patients had a low BMI. In addition, this was a pilot study, and a detailed evaluation was not performed. For future research, a multicenter study is needed evaluating patient symptoms using symptomatic standardized questionnaires. This research should ideally examine the feasibility as well as validate the recurrence and complication rate.

Conclusions

CAPS is a simple as well as swift procedure and is a complete rectal prolapse treatment option under local anesthesia.

Conflict of Interest

The authors declare that they have no conflict of interest.

Clinical trial

Trial registry: UMIN Japan (http://www.umin.ac.jp/english/)
Registration number (trial ID): UMIN000049233
Type of Study: Interventional Study

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