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


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

Patients/ Materials 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 anaesthetised 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 years). The median CAPS procedure time was 30 minutes (range: 20–60 minutes). 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. Faecal incontinence was resolved in 10 of the 13 cases.

Conclusion: CAPS is a quick and simple procedure. Additionally, it is a complete rectal prolapse treatment option under local anaesthesia.

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Introduction

Complete rectal prolapse is a circumferential rectal prolapse from the anus. This
condition is associated with faecal incontinence and is common among older
women, especially those in the median age range of 80 years [1-3]. General
anaesthesia 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 anaesthesia or colon resection.

We have developed a novel endoscopic technique for patients at high risk for
prolonged surgical hours and general anaesthesia. 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 (Figure 1). This
technique applies colonoscopy-assisted percutaneous sigmoidopexy (CAPS),
which we previously reported as a sigmoid colon volvulus treatment [4]. This
report describes the results of CAPS application in complete rectal prolapse
cases.

**Patients/Materials 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 more than three 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 one 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 23 gauge needle, and an abdominal wall finger push test (where finger pressure is applied on the abdominal wall to observe 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 anaesthetised 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 (Figure 2A), and the nylon thread with a metal bar at the tip (T-bar) was detached and pulled toward the body surface (Figure 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 (Figure 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/m² (range: 18.1–25.8 kg/m²). All patients had a faecal incontinence history (4, intermittent; 9, constant). Their medical history included myocardial infarctions (n=2), heart failure (n=2), and dementia (n=3). No abdominal surgical history was noted among any patients.

The procedure was performed under local anaesthesia. 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 6 (range: 3–10). One patient suffered a bowel obstruction on the seventh postoperative day from a transverse mesocolon malpuncture. This malpuncture was treated by laparotomy with causative fixation thread removal and re-fixation. Faecal incontinence improved in 10 of the 13 patients. No postoperative constipation cases were observed in any patients.

In this study, the median observation duration was 42 months (range: 12–54
months). Postoperative recurrence occurred in 4 of the 13 patients (30%) at 2, 3, 15, and 48 months.

No complications were reported during the follow-up period. Simple abdominal computed tomography of the metal T-bar, securing the two-shot anchor, demonstrated no position change. No abdominal symptom worsening was reported among the patients, including diarrhoea, 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 where general anaesthesia or other perioperative factors pose a high risk. The perineal surgery recurrence rate ranges from 14% to 27% within 4-years post-operatively [5-9]. The Gant-Miwa operation is a simple procedure; however, it is associated with a 30% recurrence rate [6]. Additionally, 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
multicentre randomised 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 anaesthesia 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. Additionally, 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 anaesthesia. Since 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 pre-operatively. 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 is a single-centre, Japanese case series and that many patients had a low BMI. Additionally, this was a pilot study, and a detailed evaluation was not performed. For future research, a multicentre study is needed evaluating patient symptoms using symptomatic standardised questionnaires. This research should ideally examine the feasibility as well as
validate the recurrence and complication rate.

Conclusion

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

Figure 1A: Complete rectal prolapse clinical findings. Endoscopic clips are placed at the tip of the prolapsed bowel (yellow circle).

1B: 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.

Additionally, the rectum is straightened by advancing the sigmoid colon with the endoscope.

Figure 2A: Endoscopically straightened rectum and sigmoid colon.

2B: View of the sigmoid colon fixed with a two-shot anchor (yellow circle) with the rectum straightened.

Figure 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.