



## Percutaneous endoscopic sigmoidopexy for sigmoid volvulus: A case report



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### ABSTRACT

**INTRODUCTION:** Sigmoid volvulus often recurs and it is controversial whether preventive surgery should be performed in recurrent cases, especially in elderly and high-risk cases. Herein, we report a case of successful endoscopic sigmoidopexy using fixation to the abdominal wall.

**CASE PRESENTATION:** The patient was an 86-year-old woman with multiple system atrophy, cerebral infarction, and disuse syndrome. She was admitted to our hospital with a recurrent sigmoid volvulus. Since surgery was considered high-risk, percutaneous endoscopic sigmoidopexy with fixation to the abdominal wall was indicated.

**DISCUSSION:** Percutaneous endoscopic sigmoidopexy was performed for this high-risk case with recurrent sigmoid volvulus. This procedure is advantageous in that suture removal is not necessary because the fixation sutures are buried subcutaneously. Reviewing the relevant literature, we believe that this is the first case of percutaneous endoscopic sigmoidopexy using abdominal wall fixation with buried sutures.

**CONCLUSION:** Although further experience is necessary, percutaneous endoscopic sigmoidopexy may be an acceptable treatment for recurrent sigmoid volvulus in high-risk patients.

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### 1. Introduction

Sigmoid volvulus can cause large bowel obstruction in adults and may result in death due to necrosis and perforation. The mortality of elective surgery to prevent recurrence in elderly patients is approximately 10% [1]. It is controversial whether preventive surgery should be performed, especially for elderly, high-risk cases. Herein, we report a case of recurrent sigmoid volvulus treated with percutaneous endoscopic sigmoidopexy without open surgery.

### 2. Case presentation

An 86-year-old woman with multiple system atrophy, cerebral infarction, and disuse syndrome was admitted to our hospital with recurrent sigmoid volvulus. She had a history of repeated aspiration pneumonia, an old myocardial infarction, and chronic heart failure. The patient was bedridden, but she did not have dementia. An abdominal X-ray showed the coffee bean sign (Fig. 1). This was her third episode of sigmoid volvulus. There were no signs of necrosis or perforation; BP was 160/80 mmHg, HR was 70 bpm, BT

was 36.3 °C, and SpO<sub>2</sub> was 99% (ambient air). Blood tests revealed that WBC was 5270/μl, CRP was 0.40 mg/dl, TP was 6.1 g/dl, Alb was 3.3 g/dl, prealbumin was 12.7 mg/dl, and transferrin was 206 mg/dl. Because elective surgery was considered high-risk, we chose percutaneous endoscopic sigmoidopexy using the abdominal wall for fixation.

The day before the procedure, an endoscopic repositioning of the sigmoid volvulus was performed under radiographic contrast enema (Integris CV, Philips, Amsterdam, the Netherlands) with colonoscopy (PCF-260 AI, Olympus Medical Systems, Tokyo, Japan) (Fig. 2). After the reposition, we administered polyethylene glycol lavage via a naso-gastric tube for one day for mechanical bowel preparation. As we did not perform prophylactic urinary bladder catheterization, we administered cefmetazole (1 g) for prophylaxis before and after the procedure, 1% Xylocaine for local anesthesia and flunitrazepam (0.4 mg) for sedation.

The surgical team consisted of a doctor to perform the endoscopy, two surgeons to perform the fixation, a nurse and a radiological technician. We determined the optimum fixation points using four techniques: radiological colonography, transmitted illumination test, abdominal wall finger push test and exploratory puncture with a 23 gauge needle. The sigmoid colon was fixed at six points to the abdominal wall using 2–0 non-absorbable monofilament sutures. A sigmoidopexy created with the Ideal PEG kit (Olympus Medical Systems, Tokyo, Japan) was used to affix the sigmoid colon to the abdominal wall. The same PEG kit and fixa-

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**Fig. 1.** An abdominal X-ray shows the coffee bean sign. The diagnosis is sigmoid volvulus.



**Fig. 2.** The sigmoid volvulus has been repositioned under radiographic contrast enema, the optimum points of the sigmoidopexy determined, and metal markers placed at these points.

tion technique were used for all six points. The fixation knots were buried subcutaneously (Fig. 3). Finally, we checked that there was no bleeding under colonoscopy. The duration of the procedure was 45 min and blood loss was undetectably low.

After the procedure, we checked vital signs and abdominal pain and performed a blood test. Because there were no signs of peritonitis or bowel obstruction, the patient was started on a liquid diet the next day and discharged 11 days after the procedure. Thirty days after the procedure, she was admitted to our hospital with acute myocardial ischemia and died without recurrent sigmoid volvulus.

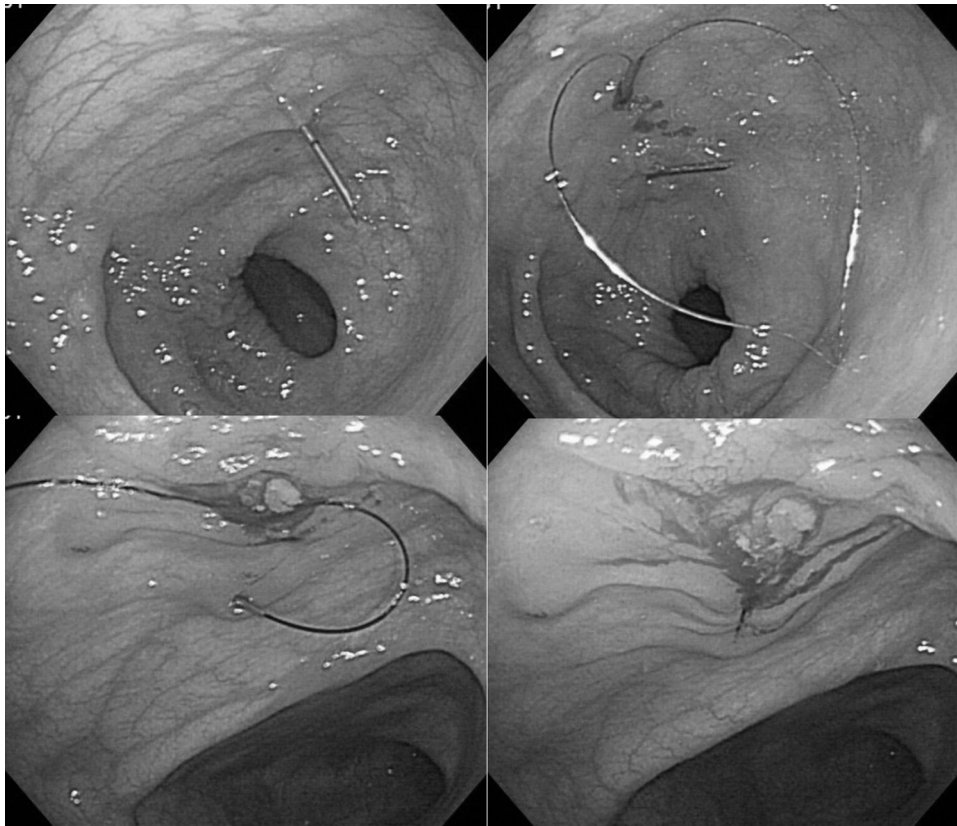
This case report was reviewed by the Institutional Review Board of the International University of Health and Welfare Hospital and informed consent was waived due to the retrospective nature of this case report.

### 3. Discussion

Sigmoid volvulus can cause adult large bowel obstruction and may result in death because of necrosis and perforation [1–3]. Once sigmoid volvulus with necrosis or perforation has occurred, emergency surgery with sigmoid resection is required. When there is no

necrosis or perforation, an endoscopic repositioning of the sigmoid volvulus is the first choice. However, if repositioning fails, emergency surgery becomes necessary. After successful repositioning, the recurrence rate of sigmoid volvulus is reported to range from 41.7% to 55% without elective surgery to prevent recurrence [2]. For low-risk cases, preventive surgery, including sigmoidectomy, mesocoloplasty, sigmoidopexy, and extraperitonealization, can be performed [3]. The mortality of these elective procedures to prevent recurrence in elderly persons is reported to range from 5% to 16%. Therefore, whether surgery should be performed to prevent recurrence in high-risk case is controversial [1].

Recently, PEC (percutaneous endoscopic colostomy) has been carried out to prevent recurrence of sigmoid volvulus [4–6]. PEC is performed using the PEG (percutaneous endoscopic gastrostomy) technique, which involves placing a decompression tube to the stomach. This treatment is indicated for recurrent sigmoid volvulus, functional constipation, neurological constipation, and colonic pseudo obstruction, and guidelines have been published in the United Kingdom [6]. Although this technique is considered safe, there are reports of two cases that developed peritonitis from PEC seven and eight weeks after the procedure [7,8]. In order to



**Fig. 3.** Sigmoidopexy has been performed with the Ideal PEG kit (Olympus Medical Systems, Tokyo, Japan) under colonoscopy. The fixation knots are buried subcutaneously.



**Fig. 4.** CT scan shows the sigmoid colon fixed to the abdominal wall after the sigmoidopexy.

minimize the risk of visceral injury, we identified the optimum fixation points using four techniques: radiological colonography, transmitted illumination test, abdominal wall finger push test and exploratory puncture with 23 gauge needle. This is standard technique for PEG [9–11]. Nevertheless, there was a risk of small bowel perforation with fixation. CT colonography was performed after the procedure in order to detect any small bowel injury, peritonitis or perforation (Fig.4). If there had been any small bowel injury, we were prepared to cut the fixation; if there had been any peritonitis, we would have treated it with abstinence from food, because the patient was still under bowel preparation conditions and the perforation hole would have been very small.

Our procedure is advantageous in that it provides several points of fixation, does not involve a decompression tube, and obviates the need for suture removal. In contrast, there are several problems with the PEC procedure: Only one fixation point may be insufficient for preventing sigmoid volvulus. Furthermore, while a decompression tube is useful when the sigmoid volvulus causes obstruction, it is not necessary after it has been treated. A case of percutaneous endoscopic sigmoidopexy using T-fasteners has been reported [12]. In this case, the fixations were removed after 28 days and the patient recovered without incident. It is often a matter of discussion when the sutures should be removed after fixation. In

our procedure, because the fixation sutures are buried under the skin, removal of the fixations was not necessary.

Finally, we consider percutaneous endoscopic sigmoidopexy to be less invasive than any other treatment, including sigmoid colon resection, extraperitonealization, mesocoloplasty and open sigmoidopexy. It is not indicated, however, for patients with sigmoid colon cancer, ascites or low risk for surgery. Because sigmoid colon with recurrent sigmoid volvulus is thought to cause severe chronic constipation and the loss of normal digestive function, we believe that sigmoid colon resection is the best treatment for recurrent sigmoid volvulus patients with low surgical risk. Patient risk should always be considered in choosing a treatment for recurrent sigmoid volvulus.

#### 4. Conclusion

Although further experience is necessary, percutaneous endoscopic sigmoidopexy may prove to be the optimal treatment for recurrent sigmoid volvulus in high-risk patients.

#### Conflict of interest

The authors declare no conflict of interests for this article.

#### Funding

None.

#### Ethical approval

This study was approved (approval No. 13-B-97) by the Research Ethics Committee at the International University of Health and Welfare, Tochigi, Japan.

#### Consent

Written informed consent was obtained from the patients for publication of these case reports and accompanying images.

#### Author contribution

Eisaku Ito performed the procedure, wrote the manuscript and is responsible for the information.

Hironori Ohdaira reviewed critically the manuscript.

Norihiko Suzuki performed the procedure.

Masashi Yoshida reviewed critically the manuscript.

Yutaka Suzuki reviewed critically the manuscript and performed the procedure.

#### Guarantor

Eisaku Ito and Yutaka Suzuki are the guarantor of this paper.

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