Massive Colostomy Prolapse with an Intrastomal Ileal Hernia: A Case Report

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Abstract
A 79-year-old man underwent sigmoid colostomy about 50 years previously and sought surgical reconstruction of the colostomy. He presented with 30 cm of prolapsed stoma accompanying an intrastomal hernia which contained ileum. The prolapsed stoma which led to the intrastomal hernia was made from the distal sigmoid colon, and the everted colon wall constituted the hernia sac. A computed tomography scan was useful to demonstrate the contents of the intrastomal hernia. Reconstruction with relocation of the colostomy was considered appropriate for the presented patient. The thickened and stretched distal sigmoid colon was resected with the stoma. A new end colostomy using the descending colon was seated in the left upper quadrant. The lateral pararectus muscles which formed the 8-cm hernia orifice were closed using tension-reducing incisions. The postoperative course was uneventful.

Introduction
Parastomal hernias and stoma prolapse are both common complications of intestinal stomas [1]. They make it difficult for a patient to manage a stoma, such as appropriately sizing and applying the stoma appliance or tolerating cosmetic disadvantages which may induce psychological problems.

A parastomal hernia is a type of incisional hernia related to creation of an enterostomy. Its incidence varies with the type of stoma and increases with the postoperative interval. The overall incidence of parastomal hernia is estimated to be over 50% with long-term
follow-up [2]. These hernias sometimes lead to intestinal obstruction due to incarceration which necessitates emergency surgery. The cumulative incidence of parastomal hernia-causing symptoms or requiring surgery is reported to be 7.7% within 5 years after colorectal cancer surgery in a nationwide cohort study in Sweden [3]. Parastomal hernias occur more frequently after colostomies than ileostomies. End colostomies have a higher incidence of parastomal hernia than loop colostomies and loop ileostomies [4].

Maneuvers to prevent the development of a parastomal hernia during stoma creation recommended in the European Hernia Society (EHS) guidelines include using an extraperitoneal route and prophylactic synthetic mesh placement [5]. The risk factors for parastomal hernia development are related to patient factors including obesity, malnutrition, advanced age, smoking, collagen abnormalities, corticosteroid use, postoperative wound sepsis, ascites, abdominal distension, chronic constipation, obstructive uropathy, and chronic obstructive lung disease. Several surgical technical factors are associated with an increased risk for parastomal hernia development such as inappropriate stoma site selection, an oversized fascial opening, excessive splitting and stretching of the abdominal rectus muscle, epigastric nerve denervation, and emergency stoma creation [1, 2].

The EHS advocates a simple classification of parastomal hernia based on the size of defect and a concomitant incisional hernia [6]. Four previous classifications were cited in the EHS classification, and intrastomal hernias are classified as a subgroup of parastomal hernias in two reports [7, 8]. However, intrastomal hernia is rarely reported when conducting a literature search using this as a keyword.

Stoma prolapse is a full-thickness protrusion of the bowel through a stoma [2]. Prolapse occurs more frequently with loop colostomies than end colostomies, especially transverse loop colostomies with an incidence of about 30% [2]. The efferent (distal) limb is most frequently involved in prolapse of a loop stoma [9]. The risk factors for stoma prolapse are almost the same as for parastomal hernias, and it is emphasized that improper stoma site (outside the rectal muscle), oversized opening, redundancy of the bowel at the stoma site, and space between the abdominal wall and the stoma are associated with a risk for developing this complication [2]. We present a patient with a massive stoma prolapse with an intrastomal hernia with an impressive clinical appearance.

**Case Presentation**

A 79-year-old man underwent sigmoid colostomy for an anal stricture after hemorrhoid surgery about 50 years previously and presented for elective colostomy revision. He had diabetes mellitus (HbA1c 6.8%) treated with a dipeptidyl peptidase-4 inhibitor and no other risk factors for development of a parastomal hernia such as collagen abnormalities, obstructive uropathy, chronic lung disease. Physical examination showed that he was 158 cm, 60 kg (body mass index 24) and had 30 cm of stoma prolapsed and covered with a self-made plastic bag (shown in Fig. 1). The prolapsed stoma was accompanied by an intrastomal hernia, and manual reduction was unsuccessful. His anus was completely closed by a scar. Computed tomography (CT) scan revealed that 1 m of terminal ileum herniated inside of the prolapsed stoma (Fig. 2).

Colostomy revision was performed under general anesthesia. A skin incision was made medial to the stoma, and the fascia of the external oblique muscle was exposed. The peritoneum next to the hernia was incised and the abdominal cavity opened. The previously fashioned stoma was a loop colostomy and seated in the left lower quadrant having been placed through the lateral pararectus muscles, not through the rectus abdominis muscle. The prolapsed intestine which created the intrastomal hernia was the distal portion of the
sigmoid loop colostomy. The stoma prolapse induced by the everted sigmoid colon was 30 cm long and constituted the hernia sac. The intrastomal hernia contained terminal ileum which was then reduced into the abdominal cavity. The wall of the collapsed sigmoid colon was thickened due to chronic eversion. The everted wall of the sigmoid colon was repositioned by applying traction from inside the abdominal cavity (Fig. 3a). The thickened and stretched distal sigmoid colon was resected with the previous stoma site to create a new end colostomy. The new colostomy using the descending colon was placed through the rectus abdominis muscle in the left upper quadrant (Fig. 3b), not extra-peritoneally because of the shortened descending colon. The lateral pararectus muscles with a hernia orifice approximately 8 cm in diameter were closed with sutures. Tension-reducing incisions were made in the fascia of the rectus abdominis muscle and the lateral aspect of the external oblique muscle. The postoperative course was uneventful. There are no signs of recurrence for a year after surgery, and the patient is satisfied with the result and function of the new stoma.

**Fig. 1.** The massively prolapsed stoma was covered with a self-made plastic bag.

**Fig. 2.** CT scan revealed 1 m of terminal ileum herniated inside the prolapsed stoma.
Discussion

The overall incidence of parastomal hernia is unknown because it depends on the length of follow-up and type of stoma. The incidence is estimated to be over 30% by 12 months, 40% by 2 years, and 50% with extended follow-up [6]. Parastomal hernias are more frequently associated with colostomies than ileostomies (18–40% vs. 9–22%) [10]. End colostomies are reported to have a higher incidence of parastomal hernias than loop colostomies and loop ileostomies [4, 5]. Four classifications had been proposed before release of the EHS classification which takes into account both the size of the defect and the presence of a concomitant incisional hernia [6].

Intrastomal hernias are rarely reported based on a literature search, and it is considered to be a subtype of parastomal hernia [7, 8]. The classifications proposed by Devlin and Kingsnorth [7] and Rubin et al. [8] classify intrastomal hernias based on intraoperative findings and are cited in the EHS classification [6], but this does not fulfill the definition of an intrastomal hernia. The intrastomal hernia in the presented patient was diagnosed by both preoperative CT scan and intraoperative findings. However, it was difficult to know based on physical examination that part of the hernia sac was the sigmoid colon distal to the loop colostomy. This patient had no risk factors for parastomal hernia development [2] except diabetes mellitus. The indications for repair of a parastomal hernia as enumerated by Krishnamurty et al. [1] include incarceration, prolapse, difficulty with appliance management, large size, and cosmesis, all of which were evident in the presented patient.

Extrapерitoneal stoma was initially described by Goligher in 1958 and was expected to decrease the incidence of parastomal hernia development. A retrospective meta-analysis showed a lower rate of parastomal hernias in patients with permanent extraperitoneal colostomies compared with those created with the intraperitoneal route (6.4 vs. 13.3%; OR: 0.41; \( p = 0.02 \)) [11]. A systematic review showed that extraperitoneal colostomies have a lower rate of parastomal hernia and stomal prolapse [12]. However, prospective randomized studies have not been conducted, and the preventive effect of this type of stoma is unclear [9]. For patients with a shortened descending colon, as in the presented patient, it is not possible to create an extraperitoneal colostomy, and use of the intraperitoneal route is inevitable. The end-loop colostomy is also expected to be effective. The end of the distal segment is sutured directly to the proximal segment and needs a smaller fascial opening than a conventional loop stoma [9]. However, this maneuver also depends on the length of the colon brought up to the skin to create the stoma.
The use of prophylactic synthetic nonabsorbable mesh during stoma creation of an elective permanent end colostomy is also recommended in the EHS guidelines to reduce the incidence of parastomal hernia formation [5]. A keyhole mesh technique, known as the Sugarbaker technique, and a sandwich technique that combines the keyhole and Sugarbaker techniques are described in the literature [13]. They are used both in open and laparoscopic intraperitoneal repair, and lower recurrence rates compared with suture repair are reported. A modified Sugarbaker technique with the non-slit mesh provided the best outcomes in a meta-analysis of laparoscopic parastomal hernia repair [13].

Regarding the ideal location to externalize the stoma through the abdominal wall musculature, there is no clear evidence that passing through the rectus abdominis is better than going lateral to the rectus abdominis muscle except for one study [9]. For obese patients, placement in an upper abdominal quadrant is suggested because of the thickness of the subcutaneous tissue and the distance from the vascular origins [9]. The recommended size of the fascial opening is smaller (2 cm for ileostomies and 1.5 cm for colostomies) than two fingerbreadths as is generally accepted [9]. The ideal size may depend on the patient’s physique. The opening through which the stoma is exteriorized should be as small as necessary to allow passage of the bowel without vascular compromise. Although reseating a stoma to repair a parastomal hernia was shown to be associated with a 30% chance of recurrence [14], it was thought to be appropriate for this patient because of the unsuitable location and enlarged fascial opening of the previous stoma.

Stoma prolapse is a common complication and its incidence ranges from 2 to 22% [9]. Loop colostomies have higher rates of prolapse than loop ileostomies (16–19% vs. <2%), and the distal limb of a loop stoma is the most common segment to prolapse [4, 5, 9] as found in the presented patient. A local revision with resection of the prolapsed intestine as an incarcerated segment with linear staplers outside of the abdominal cavity is a simple and useful procedure in appropriate patients [15]. However, for a patient with stoma prolapse and an intrastomal hernia, this approach may be contraindicated because there may be bowel present in the hernia sac of the prolapsed intestine. Before using this approach, it should be confirmed by CT scan that there is no intrastomal hernia present.

In conclusion, intrastomal hernias are rarely reported, and the appropriate surgical strategy is not well-described. In the presented patient, a CT scan was useful to demonstrate the contents of the intrastomal hernia. However, it was difficult to preoperatively identify on physical examination, and CT scan imaging of the hernia sac showed that it in fact contained the distal limb of the sigmoid loop colostomy. Although a relatively high incidence of parastomal hernias is associated with end colostomies, reconstruction with reseating of the colostomy was considered appropriate for the presented patient. The postoperative course was uneventful, and the patient is satisfied with the result.

**Statement of Ethics**

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. This case report was reviewed and the need for ethical approval was waived by the Ethical Committee in Yuki Hospital.

**Conflict of Interest Statement**

The authors have no conflicts of interest to declare.
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Author Contributions

Toru Zuiki performed surgery, wrote the paper, made literature review, and drafted the manuscript. Jun Ohki and Go Miyahara assisted the surgery and perioperative management. Alan Kawarai Lefor reviewed as a native speaker and revised the manuscript.

Data Availability Statement

All data that support the findings of this study are included in this article. Further inquiries can be directed to the corresponding author.

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