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Type IV Parastomal Hernia Repair and Simultaneous Colostomy Closure. Case Report

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ABSTRACT

Objective: To describe the repair of a complex parastomal hernia and simultaneous ileostomy closure using abdominal wall prehabilitation. **Case report:** A 53-year-old male patient with an ileostomy developed a parastomal hernia and a midline incisional hernia following a previous laparotomy. Abdominal wall prehabilitation was performed with botulinum toxin administration and abbreviated pneumoperitoneum. Subsequently, abdominal wall reconstruction and restoration of intestinal transit were performed in a single procedure. **Results:** The surgery was performed without complications. The patient presented good clinical evolution in the immediate postoperative period and at follow-up. **Discussion:** The treatment of complex abdominal hernias requiring restoration of intestinal transit represents a challenge. Prehabilitation with botulinum toxin and the use of pneumoperitoneum are useful tools to optimize abdominal closure and facilitate reconstructive surgery. The decision to use combined management should be individualized and carried out by a specialized team to ensure the best results

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Highlights:

1. Parastomal hernia is common, with a reported incidence of up to 58%.
2. The classification of parastomal hernias is vital for guiding surgical strategy.
3. Repair is technically challenging and carries significant morbidity.
4. Botulinum toxin and preoperative pneumoperitoneum reduce the risks of repair.
5. Successful single-stage management with intestinal restitution and hernia repair is presented.

The parastomal hernia is the most common complication following several types of stomas [1]. Systematic reviews report an incidence of up to 58% with a follow-up of up to 7 years [2]. In 2014, Szczepkowski proposed a classification system based on hernia size and the coexistence of an incisional hernia, categorizing them into four types: type I (<5 cm without incisional hernia); type II (<5 cm with incisional hernia); type

III (>5 cm without incisional hernia); and type IV (>5 cm with incisional hernia). This classification facilitates precise pathological identification and surgical planning [1].

Repair in specialized centers using techniques like the retromuscular Sugarbaker repair (compared to the keyhole technique) yields lower recurrence rates but is associated with significant wound morbidity and stoma-related complications [3]. When a concurrent ventral hernia (Type IV) necessitates a component separation technique, the presence of a stoma increases technical difficulty, requiring in-depth knowledge of abdominal wall anatomy and experience operating in previously manipulated surgical planes [4]. The forced reduction of herniated contents during the repair of a large ventral hernia can lead to catastrophic pathophysiological complications, such as abdominal compartment syndrome [5].

Abdominal wall prehabilitation has gained attention in recent years. Preoperative progressive pneumoperitoneum (PPP) allows gradual expansion of the abdominal domain, improving diaphragmatic and respiratory adaptation and reducing postoperative risks [6]. The use of botulinum toxin type A (BTA) to achieve chemical muscle relaxation preoperatively has also become more popular. BTA is a neurotoxin that blocks acetylcholine receptors, causing reversible paralysis of the abdominal muscles for 6 to 9 months [7]. Despite these adjuncts, repair of complex abdominal wall hernias carries risks of recurrence, compartment syndrome, and wall ischemia, as well as stoma-related complications like necrosis, obstruction, and perforation.

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Stoma reversal, when feasible, is the first-line treatment as it offers the lowest recurrence rate. Unfortunately, only about 25% of parastomal hernias are associated with a stoma eligible for reversal [8]. This case report describes the simultaneous management of a complex hernia and intestinal restitution in a single stage, highlighting the role of prehabilitation and the surgical team's expertise.

Case Report

A 52-year-old male with a history of seminoma treated with surgery and chemoradiotherapy in 2012 presented with a retroperitoneal recurrence in 2016, which was surgically resected. Two years later, he required surgery for intestinal obstruction and subsequently received an ileostomy. Urological evaluation confirmed no oncological recurrence. He reported no other comorbidities.

He presented to the general surgery clinic with persistent abdominal discomfort, low back pain, impaired work capacity, and a reliance on an abdominal binder due to a bulging, painful ileostomy. Physical examination revealed a BMI of 27.4 kg/m² and a globular abdomen with a midline scar. A 20 x 25 cm hernial sac was partially reducible in the supine position, alongside a functioning ileostomy with an associated parastomal hernia (Figure 1).



Figure 1: Type IV parastomal hernia. Complete midline herniation is observed, with the ostomy located on the left flank and the left subcostal pneumoperitoneum catheter visible.

Contrast-enhanced abdominal CT scan showed a midline fascial defect of 20 x 18 cm, through which the gastric antrum, small bowel loops, and transverse colon herniated during Valsalva. A separate 5 cm parastomal defect on the right flank contained small bowel loops. Significant bilateral retraction of the rectus, oblique, and transverse muscles was noted, with partial loss of the right rectus muscle adjacent to the stoma (Fig. 2).

Prehabilitation was initiated 42 days prior to surgery with ultrasound-guided injection of 500 units of botulinum toxin (Dysport®), distributed in 10 points (50 units each) into the oblique and transverse muscles bilaterally. Given a calculated Tanaka Index of 22%, preoperative progressive pneumoperitoneum (PPP) was also performed, with a total of 2.9 liters of air insufflated over the 10 days preceding surgery.

Surgery involved a midline laparotomy with adhesiolysis. The ileostomy was taken down, and bowel continuity was restored with a hand-sewn anastomosis. A left-sided posterior component separation (transversus abdominis release, TAR) was performed. The right parastomal defect was closed, and a retromuscular polypropylene mesh was placed. The anterior fascia was closed without tension. Redundant skin was excised, a neoumbilicus was fashioned, and closed-suction drains were placed (Figure 3). Total operative time was 3.5 hours.

The patient was hospitalized for 4 days, receiving ceftriaxone and metronidazole for prophylaxis. His recovery was uneventful, with return of bowel function prior to discharge. A small seroma at the umbilicus was managed conservatively, and drains were removed on postoperative day 10. At follow-up visits at 1, 6, 12, and 24 months, he had no complications, hernia recurrence, or functional impairment.

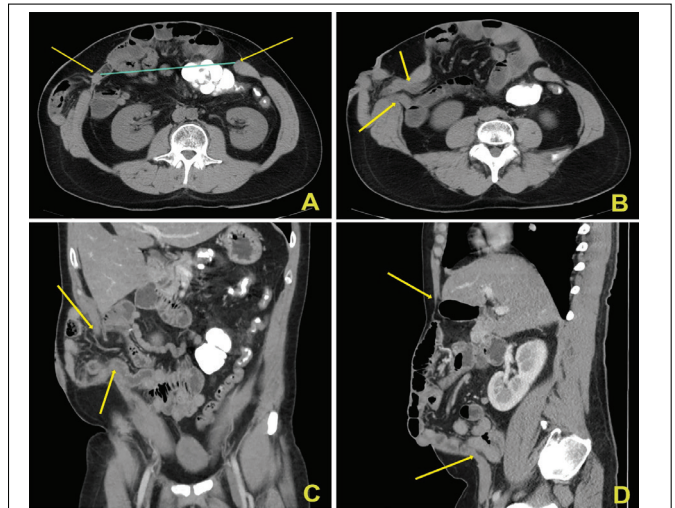


Figure 2: Preoperative abdominal CT with Valsalva maneuver. A: Midline defect; the light blue line marks the 20 cm maximum diameter. B: Parastomal defect on the right flank, with hernial sac containing small bowel loops. C: Coronal view showing the parastomal defect. D: Sagittal view showing the midline defect. Yellow arrows indicate the muscular edges defining the hernia orifices.

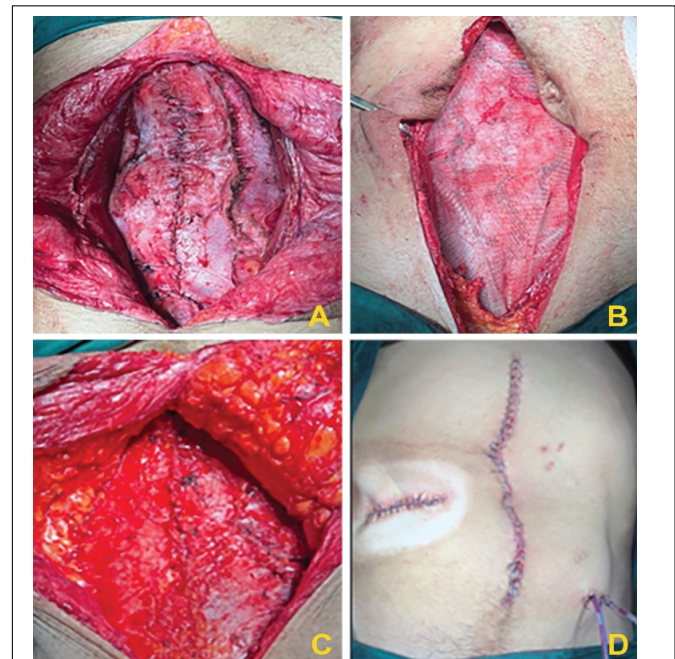


Figure 3: Abdominal wall repair. A: Dissection of fasciomuscular planes and closure of the posterior fascia. B: Placement of retromuscular mesh. C: Closure of the anterior midline plane. D: Final view of the repair, with closed-suction drains in the left iliac fossa.

Discussion

Performing intestinal restitution and complex ventral hernia repair in a single stage is controversial. Moazzez et al. found that mesh placement in such cases was associated with higher overall morbidity, short-term complications (particularly surgical site infections), longer hospital stays, and more reoperations [9]. Other studies report in-hospital morbidity rates around 9%, with a minority of patients (13%) requiring reoperation for complications graded Clavien-Dindo >III; at 11 months, 87% were complication-free [10]. Larger analyses indicate that concurrent colorectal and ventral hernia surgery, though rare (3.3%), is linked to higher complication scores and mortality [11]. A Danish study reported a 5.4% anastomotic leak rate requiring reoperation in patients undergoing combined procedures [12].

The decision to place mesh during concurrent bowel surgery must balance the increased short-term risks against long-term benefits. Forced reduction of herniated viscera in large hernias risks abdominal compartment syndrome [5]. Therefore, meticulous preoperative preparation is crucial. The combined use of PPP and BTA is now recommended to increase abdominal domain and mitigate these risks [13].

PPP and BTA are valuable adjuncts for repairing large parastomal hernias. They passively increase intra-abdominal volume, facilitating a tension-free reduction of contents. The muscle-relaxing effect of BTA lasts 6-9 months, promoting healing and potentially reducing recurrence [13].

Few reports describe these adjuvants in similar cases. Correia (2023) successfully managed a Type IV parastomal and ventral hernia in a single stage with preoperative BTA and PPP, noting an uncomplicated recovery and no recurrence at 6 months [14]. A Paraguayan series of 30 single-stage repairs using PPP reported only two anastomotic leaks requiring mesh removal [15].

Repairing concurrent incisional and parastomal hernias remains challenging. This report demonstrates that with careful patient selection and comprehensive prehabilitation, a single-stage procedure can be successful. However, a lack of standardized guidelines persists. Advances in surgical technique and prehabilitation—extending beyond BTA and PPP to include optimization of patient risk factors—offer a promising approach for managing these complex abdominal wall cases.

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