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Which Therapeutic Option Is Optimal for Surgery-Related Perineal Hernia After Abdominoperineal Excision in Patients with Advanced Rectal Cancer? A Report of 3 Thought-Provoking Cases

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Case series

Patient: Male, 72 • Male, 71 • Male, 76

Final Diagnosis: Postoperative perineal hernia

Symptoms: Perineal discomfort

Medication: —

Clinical Procedure: Hernia repair

Specialty: Surgery

Objective: Rare disease

Background: Although perineal hernia (PH) is considered a surgery-related complication after abdominoperineal excision, the optimal therapeutic option for PH remains controversial.

Case Reports: The first case involved a 72-year-old man in whom PH was diagnosed 6 months after surgery. Laparoscopic findings revealed moderate adhesion at the pelvic floor, and a perineal approach was added. The pelvic floor defect was repaired by composite mesh. Combined laparoscopic surgery with a perineal approach was effective. The second case involved a 71-year-old man in whom PH was diagnosed 7 months after surgery. Laparoscopic findings revealed severe adhesion of the pelvis, and a perineal approach was added. The pelvic floor defect was repaired by composite mesh. The seromuscular layers of the small intestine were injured, and the damaged small intestine was resected and anastomosed. Composite mesh did not cause postoperative infection even with simultaneous bowel resection. The third case involved a 76-year-old man in whom PH was observed 12 years after surgery. Combined laparoscopic surgery with a perineal approach was performed from the beginning of surgery. Laparoscopic findings clearly demonstrated an intractable adhesion. Unexpected injury of the small intestine caused intra-abdominal contamination; therefore, the pelvic floor defect was primarily closed by absorbable sutures. Combined laparoscopic surgery with a perineal approach was effective even in this patient with a huge PH and intractable adhesion.

Conclusions: The combination of laparoscopic surgery with a perineal approach is an adequate option for PH treatment, and the perineal approach should be added without hesitation if needed.

MeSH Keywords: Colorectal Surgery • Hernia • Laparoscopy • Postoperative Complications • Surgical Mesh

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Background

Multidisciplinary therapy has improved the oncological outcomes of patients with advanced rectal cancer. However, surgical resection still has an important role as a curative treatment [1]. Abdominoperineal excision (APE), which was first described by Miles [2] in 1908, is widely recognized as a radical procedure for locally advanced low rectal cancer (LRC). APE inherently requires advanced techniques, and the complicated procedures are therefore associated with a higher rate of postoperative complications. In particular, the incidence of perineal wound complications (e.g., perineal wound infection, dehiscence, and pelvic abscess formation) is relatively high. These surgery-related perineal complications often prolong wound care [3] and may cause delayed perineal complications such as perineal hernia (PH).

PH is defined as a pelvic floor defect through which the intra-abdominal viscera may protrude [4]. Surgery-related PH was first described in 1939 [5]. Few reports have focused on surgery-related PH after APE, and no large-scale studies of PH have been reported. The reported incidence of PH requiring surgical repair is <1% after APE and approximately 3% after total pelvic exenteration [6,7]. In recent decades, however, the number of reported cases of PH has gradually increased worldwide [8]. The optimal strategy for PH treatment remains controversial, although various strategies have been proposed [4,6,8,9]. We herein present 3 thought-provoking cases of PH after APE for LRC and discuss the surgical strategies for patients with PH.

Case Reports

Case 1

A 72-year-old man had a history of laparoscopic APE for LRC. The initial closure of the pelvic floor during APR was primary closure with interrupted absorbable sutures. His postoperative course was complicated by a perineal dehiscence that required a reoperation with interrupted absorbable sutures for closure of the pelvic floor. He reported discomfort and mild pain in the perineum 3 months after repair of the dehiscence and returned to the clinic approximately 6 months after the initial surgery. Abdominal contrast-enhanced computed tomography (CE-CT) revealed that part of the small intestine was slightly protruding from the bottom of the pelvis (Figure 1A, 1B); therefore, we diagnosed PH. We planned an elective surgery with laparoscopy for treatment of the PH. The patient was placed in the lithotomy position, and an umbilical port and 4 additional operating ports were placed in the lower abdomen (Figure 1C). The laparoscopic view revealed intra-abdominal adhesions between the small intestine and the bottom of the pelvis, and we therefore added a perineal approach to dissect the moderate adhesions of the pelvic floor. We closed the pelvic floor defect laparoscopically, fixing a composite mesh (Parietex™ Composite Mesh; Medtronic plc, Dublin, Ireland) over the defect with a hernia titanium stapler (Endo Universal™ Stapler; Medtronic plc) (Figure 1D). The postoperative course was uneventful, and no recurrence was observed for 36 months.

The combination of laparoscopic surgery with the perineal approach was effective for this patient with PH and moderate adhesion. Additionally, the composite mesh was useful for closure of the pelvic floor defect.

Case 2

A 71-year-old man underwent laparoscopic APE for LRC and no postoperative complications were observed. The initial closure of the pelvic floor during APR was primary closure with interrupted absorbable sutures. He developed a gradually an enlarging perineal bulge with discomfort 4 months postoperatively. He returned to the clinic approximately 7 months after surgery. Abdominal CE-CT showed that part of the small intestine was slightly protruding from the bottom of the pelvis (Figure 2A, 2B). We diagnosed PH following laparoscopic APE. We planned an elective surgery with laparoscopy for treatment of the PH. The patient positioning and port placement were the same as in Case 1 (Figure 1C). The laparoscopic view revealed intra-abdominal adhesion between the small intestine and the pelvic floor, as in Case 1. Therefore, we added a perineal approach to dissect the severe adhesion of the pelvis. The surgical procedures were performed under the combined approach from the abdominal and perineal sides. A small-bowel resection was needed because of serosal tears after adhesiolysis. We closed the pelvic floor defect laparoscopically, fixing a composite mesh (Parietex™ Composite Mesh; Medtronic plc) over the defect with a titanium hernia stapler (Endo Universal™ Stapler; Medtronic plc) (Figure 2C). The postoperative course was uneventful, and no recurrence was observed for 15 months.

This case shows that the surgeon should never hesitate to add a perineal approach if severe adhesion is observed laparoscopically. The composite mesh did not cause a postoperative infection, even in this case involving bowel resection.

Case 3

A 76-year-old man underwent APE with preoperative radiation therapy for LRC and no postoperative complications were observed. The initial closure of the pelvic floor during APR was primary closure with interrupted absorbable sutures. He developed a gradually enlarging perineal bulge approximately 1 year postoperatively. However, he did not visit the hospital because he had severe dementia and thus lacked disease

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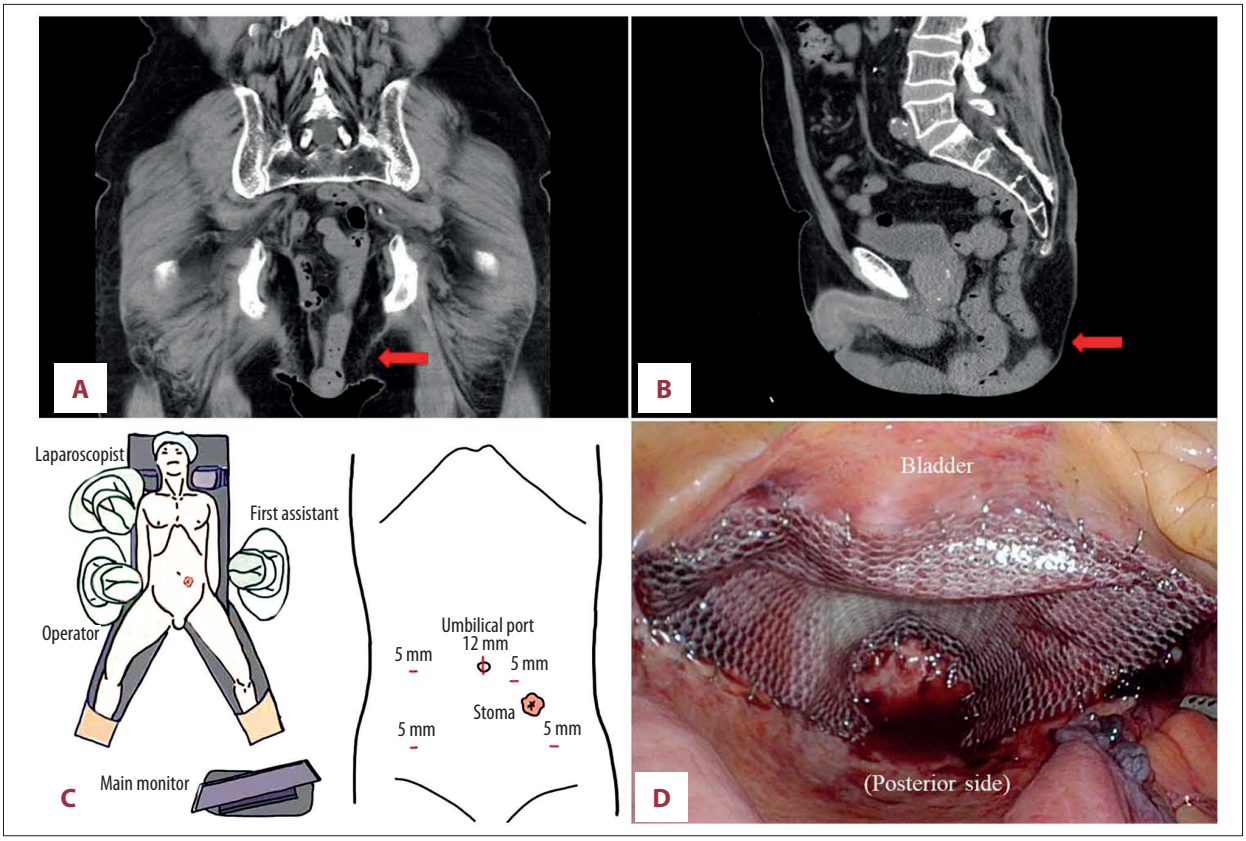

Figure 1. Abdominal contrast-enhanced computed tomography in the (**A**) coronal and (**B**) sagittal planes revealed that a part of the small intestine was slightly protruding from the bottom of the pelvis (arrows). (**C**) The patient was placed in the lithotomy position, and an umbilical port and 4 additional operating ports were placed in the lower abdomen. (**D**) Laparoscopic finding after fixing a composite mesh with a titanium stapler over the pelvic floor defect.

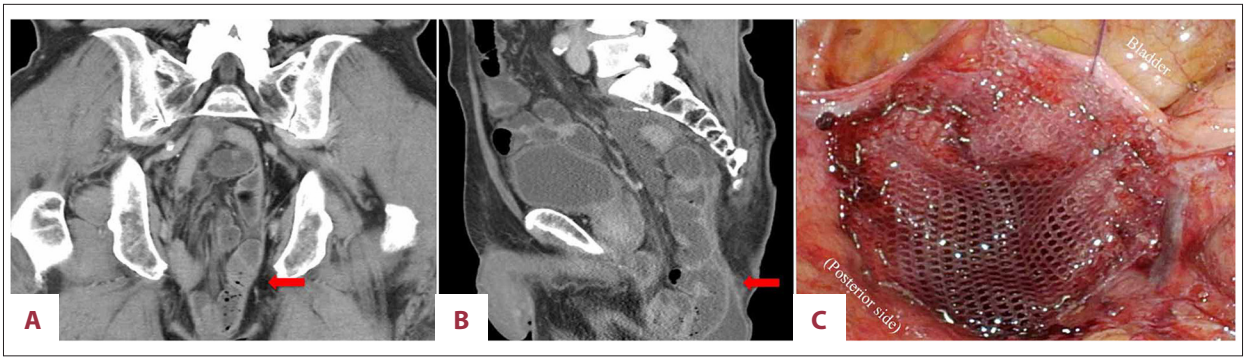

Figure 2. Abdominal contrast-enhanced computed tomography in the (**A**) coronal and (**B**) sagittal planes showed that part of the small intestine was slightly protruding from the bottom of the pelvis (arrows). (**C**) Laparoscopic finding after fixing a composite mesh with a titanium stapler over the pelvic floor defect.

recognition. He presented to our hospital 12 years after surgery with his daughter, complaining of abdominal pain and discomfort. Physical examination showed abdominal distention and a perineal bulge approximately 20 cm in diameter (Figure 3A). Preoperative laboratory tests showed evidence of an inflammatory reaction (white blood cell count, a 7290/μL; C-reactive protein level, 10.4 mg/dL). Abdominal CE-CT revealed that almost all of the small intestine was prominently expanded and that a large part had prolapsed from the bottom of the pelvis (Figure 3B, 3C). Chest CT showed an infiltration shadow at the right lower lung (Figure 3D). We diagnosed aspiration pneumonia followed by PH-induced small-intestine obstruction. The patient was first treated with antibiotics for the aspiration pneumonia, and we planned to perform a semi-elective

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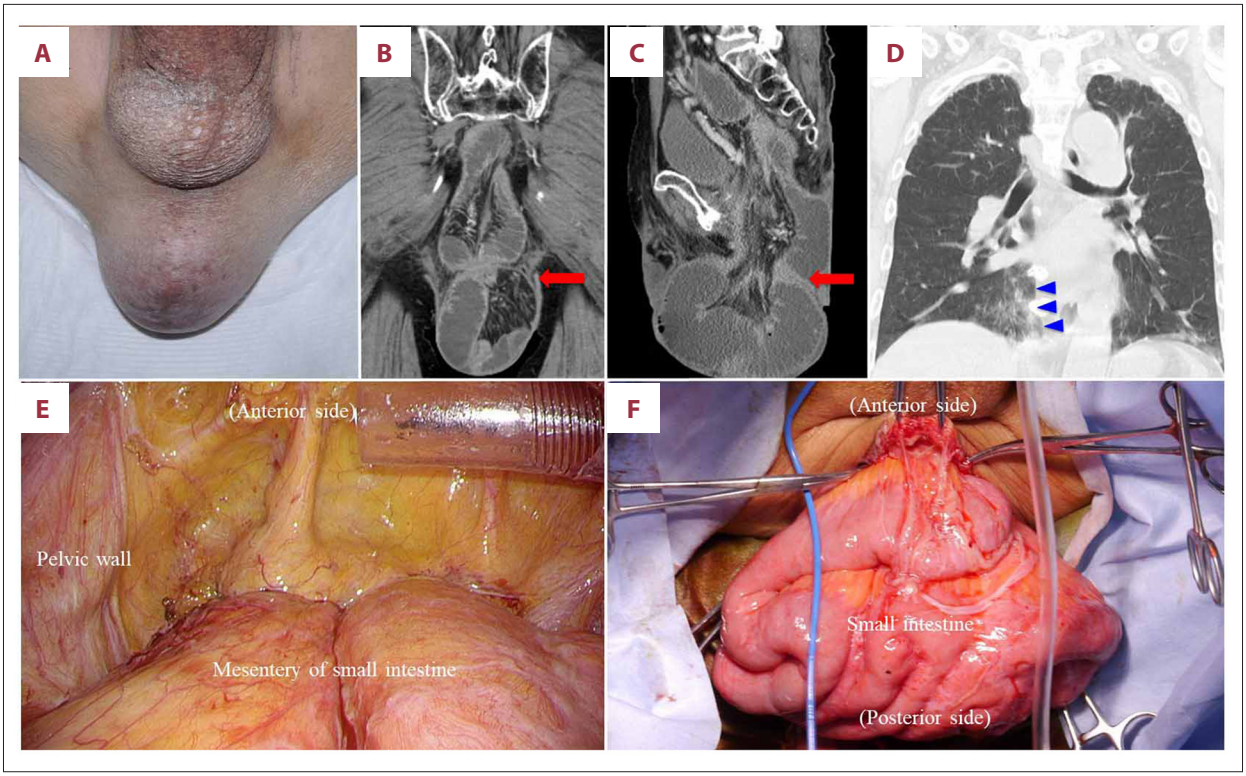

Figure 3. (**A**) Physical examination showed abdominal distention and a perineal bulge approximately 20 cm in diameter. Abdominal contrast-enhanced computed tomography in the (**B**) coronal and (**C**) sagittal planes revealed that almost all of the small intestine was prominently expanded and that a large part had prolapsed from the bottom of the pelvis (arrows). (**D**) Chest computed tomography showed an infiltration shadow at the right lower lung (arrowheads). (**E**) Laparoscopic findings clearly demonstrated an intractable adhesion between the small intestine and abdominal wall. (**F**) The perineal approach provided a better surgical field of the pelvic floor.

surgery for the PH thereafter. For radical treatment of the huge PH, we performed a combination of laparoscopic surgery with a perineal approach. A fully simultaneous bilateral approach was employed from the beginning of the surgery. The patient positioning and port placement were the same as in Case 1 and Case 2 (Figure 1C). The laparoscopic findings clearly demonstrated an intractable adhesion between the small intestine and abdominal wall (Figure 3E). The perineal approach provided a better surgical field of the pelvic floor (Figure 3F), but the one-sided surgical field provided only from the abdominal or perineal side was not adequate for perfect anatomical recognition in the abdominal cavity. Finally, we began dissection of the intractable adhesion by the fully simultaneous bilateral approach from both sides. Intra-abdominal contamination unexpectedly occurred during surgery because all layers of the small-intestine wall were injured during dissection of the tough, intractable adhesion. The damaged portion of the intestine was repaired with full-thickness interrupted sutures. To prevent postoperative infection, we performed primary closure of the pelvic floor defect from the perineal side using absorbable sutures. The postoperative course was uneventful, and no recurrence was observed for 8 months.

The combination of laparoscopic surgery with a fully simultaneous bilateral approach was effective, even in this patient with a huge PH sac and intractable adhesion.

Discussion

PH is defined as a pelvic floor defect through which the intra-abdominal viscera may protrude [4]. PH is classified as primary or secondary according to its etiology [10], and, in general, most cases are secondary. Laparoscopic APE, perioperative radiation, perineal wound infection, extensive levator muscle resection, and weakened pelvic floor muscles are considered risk factors for PH [4,11]. Some patients with PH have various symptoms, including perineal bulging with discomfort, intestinal obstruction, or skin erosion [4]; however, some patients are asymptomatic and are incidentally diagnosed at the time of their regular postoperative check-ups. PH has a unique physical appearance, and the definitive diagnosis is usually confirmed by abdominal CE-CT, although plain magnetic resonance imaging can easily detect stretching of soft tissues.

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Though PH has been considered an infrequent, long-term complication after APE, the number of reported cases has increased worldwide [8]. In terms of the types of closing pelvic floor during APE, various techniques have been reported. Primary closure, mesh placement (e.g., composite mesh or biological mesh), and reconstruction using myocutaneous flaps have been documented. Which technique is the most effective for perineal wound healing after APE remains controversial. A randomized controlled trial showed that biological mesh closure during extralevator APE with preoperative radiotherapy led to a significantly lower rate of PHs at 1 year after APE, compared with primary closure [12]. In contrast, a systematic review documented that the myocutaneous flap closure for pelvic reconstruction was more useful for reducing perineal morbidity after APE or pelvic exenteration with large pelvic defects, particularly in patients with prior irradiation to the pelvis, compared with primary closure [13]. Therefore, mesh placement or myocutaneous flap reconstruction should be considered for the patients with prior irradiation to the pelvis and/or an intra-operative large defect of the pelvic floor, although primary closure for pelvic floor during APE is still performed worldwide.

The most radical treatment for PH is surgical repair. Although various approaches and procedures have been documented [9,14], the optimal strategy for PH remains controversial. Surgical approaches for PH include an open abdominal approach, laparoscopic abdominal approach, perineal approach, and combined abdominal and perineal approach (e.g., laparoscopy surgery with a perineal approach) [9,14]. In a recent systematic review of reported PHs, perineal approach was employed in approximately 70%, laparoscopic approach was used in approximately 25%, and other approaches (open abdominal approach, laparoscopic surgery with the perineal approach, or open abdominoperineal approach) were each used in <3% [9]. Since the early 2010s, perineal and laparoscopic approaches have been increasingly indicated for the treatment of PH [9]. Each surgical approach has its own advantages and disadvantages. The open abdominal approach is conventional, and many surgeons are familiar with this approach to repair the pelvic floor. However, this approach is associated with a longer postoperative stay and more severe postoperative pain; therefore, it is considered more invasive than the other approaches. The laparoscopic approach provides an excellent magnified view of the surgical field, is less invasive for patients, and is associated with a shorter hospital stay [15]. However, the laparoscopic approach requires advanced techniques and proficiency in laparoscopic surgery. Especially during dissection of the pelvic floor adhesions, the laparoscopic approach is limited by the range of motion of the laparoscopic instrument at the pelvic floor. Addition of the perineal approach is a good solution to overcome this disadvantage of the laparoscopic approach. The perineal approach provides surgeons with an excellent view of the pelvic floor, and this approach may be employed even under spinal anesthesia. Routine general anesthesia is not needed, which may be beneficial for older patients with primary illnesses. From the perineal side, however, the surgical field is limited with respect to recognizing important anatomical structures and visualizing the abdominal cavity. Thus, the laparoscopic approach is a good solution to overcome these disadvantages of the perineal approach.

Various surgical techniques (e.g., primary closure, synthetic or composite mesh placement, and flap reconstruction) have been described as surgical options for PH repair [7,9,14,16]. A recent report documented that mesh placement using nonabsorbable mesh, composite mesh, or biological mesh was performed in approximately 75% of patients, and flap reconstruction with autogenous tissue was used in approximately 25% of patients [9]. Primary closure of pelvic floor defects has decreased [9,17]. From the viewpoint of reconstructive surgery, no high-quality research, including prospective studies or randomized controlled trials, has been performed to determine which procedure is most reliable for radical treatment of PH. A previous retrospective study suggested that the recurrence rate of PH treated by mesh placement was lower than that treated by primary suture closure [8]. Regarding the types of placed meshes, although several documents reported the utility of biological mesh, which type of placed mesh is the most useful remains controversial [8,9]. Because PH can be categorized as a type of incisional hernia, mesh placement is acceptable for both PH treatment and incisional hernia treatment. Flap reconstruction using autogenous tissues (e.g., gluteus muscle, gracilis muscle, tensor fascia lata muscle, and rectus abdominis muscle) has been proven to be a reliable option for reconstructive surgery of the pelvic floor [18]. Flap reconstruction has rapidly become more widely used, and a lower associated recurrence rate has been documented [9,19]. Flap reconstruction is advantageous in terms of infection prevention because no foreign bodies are used. Therefore, flap reconstruction of the pelvic floor could be a surgical option for patients with a risk of local infection [19] and may become more widely used as a PH treatment technique in the near future. In contrast, flap reconstruction often requires more advanced techniques, including microsurgery for perineal reconstruction.

In Case 2, we employed composite mesh for repair of the pelvic floor defect, because only seromuscular layers of the small intestine were injured. In contrast, in Case 3 we completed PH treatment not by mesh placement but by primary closure, because intra-abdominal contamination unexpectedly occurred due to injuries of all layers of the small-intestinal wall during surgery. Briefly, mesh placement for repair of the pelvic floor defect may be suitable for cases without intra-abdominal contamination during surgery. Intra-abdominal contamination has a large risk of postoperative mesh-related infection; therefore,

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primary closure or flap reconstruction should be considered in this unexpected situation.

In the present report, we have described 3 PHs following APE that were safely performed by a combination of laparoscopic surgery with a perineal approach (mesh replacement in 2 patients and primary closure in 1). The laparoscopic approach provides a wide surgical view to easily recognize important anatomical structures and visualize the abdominal cavity, but some difficulties may be encountered when dissecting adhesions because of the limited range of motion of the laparoscopic instrument at the pelvic floor. The perineal approach provides a direct magnified view of the pelvic floor and facilitates dissection of the adhesions. PH sometimes has severe or intractable adhesions, and we suggest that the one-sided surgical field provided only from the abdominal or perineal side is not adequate for perfect anatomical recognition in the abdominal cavity. The combination of laparoscopic surgery with a perineal approach may have some therapeutic advantages for PH treatment, especially for patients with a larger PH or a possibility of severe adhesions. Surgeons should not hesitate to employ a fully simultaneous bilateral approach from the laparoscope and perineal sides. Each approach can complement the other.

Conclusions

The combination of laparoscopic surgery with a perineal approach has some advantages, even in patients with complicated PHs. This technique can be an optimal therapeutic option for the treatment of all surgery-related PHs.

Conflict of interest

None.

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