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26-Year perspective on stapled hemorrhoidopexy – insights into managing severe complications. Two case reports and literature review

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Stapled Hemorrhoidopexy, first introduced by Longo in 1998, has become a widely adopted surgical method for treating hemorrhoidal disease. This innovative procedure gained popularity due to reduced postoperative pain, shorter hospital stays, and faster recovery. However, it is not without risk and is associated with rare but severe complications that can significantly affect patient outcomes. This study describes two illustrative clinical cases of such complications. The first case involves a 41-year-old male patient who developed a perirectal hematoma accompanied by acute abdominal bleeding caused by mesenteric vessel rupture at the rectosigmoid junction. Urgent surgical intervention and intensive postoperative care were required. The second case concerns a 49-year-old female patient who experienced anal stenosis and subsequent fecal incontinence, necessitating both surgical correction and prolonged rehabilitative therapy to restore bowel function and improve quality of life. These cases emphasize the critical importance of early recognition and effective management of complications associated with stapled hemorrhoidopexy. They also highlight the necessity of a multidisciplinary approach involving colorectal surgeons, general surgeons, and gastroenterologists to optimize patient care.

A comprehensive literature review identifies key risk factors for complications, including patient comorbidities, technical nuances of the procedure, and the careful selection of candidates. Best practices for preventing and managing complications are also discussed, focusing on surgical technique refinement, thorough preoperative evaluation, and enhanced staff training. These insights aim to equip clinicians with essential knowledge to minimize risks, enhance patient safety, and maintain the advantages of this innovative method.

Keywords
stapled hemorrhoidopexy, Longo procedure, perirectal hematoma, anal stenosis, rectal stenosis, complications management.

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Hemorrhoids, vascular structures in the anal canal, become symptomatic when swollen or inflamed. When conservative treatments fail, surgical intervention becomes necessary, particularly for grade 3 and 4 hemorrhoids, where prolapse and irreducibility are common. Stapled hemorrhoidopexy (SH), introduced by Antonio Longo in 1998, has now been used for over 26 years as a minimally invasive technique to treat hemorrhoids [11, 12]. Compared to traditional excisional hemorrhoidectomy, the procedure offers less postoperative pain and faster recovery [3, 7]. SH is recommended as a treatment option for patients with grades 2 to 4 hemorrhoidal prolapse that is unresponsive to medical therapy

(a strong recommendation (grade 1A) based on high-quality evidence) [3].

A variety of early and late complications have been documented in the literature following SH. In his pioneering study, Longo reported remarkably favourable outcomes, including minimal postoperative pain (mean visual analogue scale score: 2), a mean operative time of just 6 minutes, and an absence of postoperative rectal bleeding, sepsis, strictures, or incontinence among 186 patients [11]. However, contemporary data provide a more nuanced picture. According to recent literature, the overall perioperative complication rate following SH is reported at 16.9 %, with serious adverse events occurring in 5.1 % of cases and an equivalent reoperation rate of 5.1 % [17]. Early complications include perianal bleeding, hematoma formation at the stapling site, presacral hematoma, perirectal hematoma (PH), abdominal bleeding, urinary retention, sepsis, rectovaginal fistula, incomplete stapling, rectal perforation, and rectal necrosis [6, 8, 16, 18, 19]. These early complications often necessitate prompt diagnosis and management to prevent further morbidity. In contrast, late complications, such as anal stenosis, chronic anal pain, reduced rectal compliance, defecation disorders, and incontinence, may develop over time, impacting the patient's long-term quality of life. This evolving evidence highlights the need for a balanced assessment of SH, considering both its initial promise and the potential for significant complications.

Case presentation 1 from Fuerstenfeldbruck: perirectal hematoma

A 41-year-old male patient, father of eight children, who arrived in Germany as a refugee from Afghanistan, presented to our clinic with grade 4 hemorrhoids. His medical history included an unknown perianal surgery performed in Afghanistan 5 years prior and a long-standing history of anemia. Due to rectal bleeding and an acute exacerbation of anemia, the patient had received a rectoscopy and hemorrhoidal ligation procedure four months prior, along with a transfusion of two units of blood. Preoperatively, the patient underwent gastroscopy, which revealed *Helicobacter pylori*-positive gastritis, and colonoscopy for further evaluation of anemia.

The patient underwent SH and was discharged on the first postoperative day without any complaints. However, five hours after discharge, he presented to the emergency room following an episode of syncope. Postoperative computed tomography of the abdomen revealed a significant amount of free intraperitoneal fluid and distension at the rectosigmoid junction (Fig. 1). A diagnostic abdominal puncture confirmed the presence of fresh blood. An emergency laparotomy was performed, which identified a rupture of the mesentery and serosa at the rectosigmoid junction as the source of bleeding, resulting in intra-abdominal hemorrhage. Intraoperative proctoscopy confirmed an intact and normal suture line. The patient underwent hemostasis and oversewing of the rectosigmoid junction. Intraoperatively, due to hemodynamic instability and substantial blood loss, the patient received a cell saver transfusion along with a massive transfusion protocol.

Early outcome

In the immediate postoperative period, the patient developed acute kidney insufficiency, likely due to hemodynamic instability, fluid overload, and oxidative stress following massive blood transfusions during surgery. These factors contributed to reduced renal perfusion and subsequent kidney injury. As a result, the patient spent 21 days in the intensive care unit, requiring continuous veno-venous hemodialysis for 10 days. Given the suspicion of coagulopathy, the patient was treated with 4000 IU of Factor VIII, 9600 IU of von Willebrand factor concentrate, 4 units of packed red blood cells, 2000 IU of prothrombin complex concentrate, desmopressin, and intermittent tranexamic acid therapy. The patient's condition stabilized, and on postoperative day 34, he was transferred to a nephrology clinic for further management of his renal insufficiency and evaluation of any underlying coagulopathy contributing to the bleeding complications. Further testing revealed von Willebrand syndrome type 2N, with significantly reduced Factor VIII activity (12 %).

Follow-up

A follow-up assessment was conducted nine months after discharge when the patient returned to our clinic due to subileus, which was treated conservatively. The patient reported no local residual symptoms and had resumed normal daily activities. His recovery was considered complete, and no additional interventions were required. However, the patient subsequently developed chronic kidney insufficiency, classified as KDIGO (Kidney Disease: Improving Global Outcomes) stage G4A2, characterized by persistent proteinuria, metabolic acidosis, and multifactorial renal anemia. He is currently under regular nephrological and coagulation follow-up care.

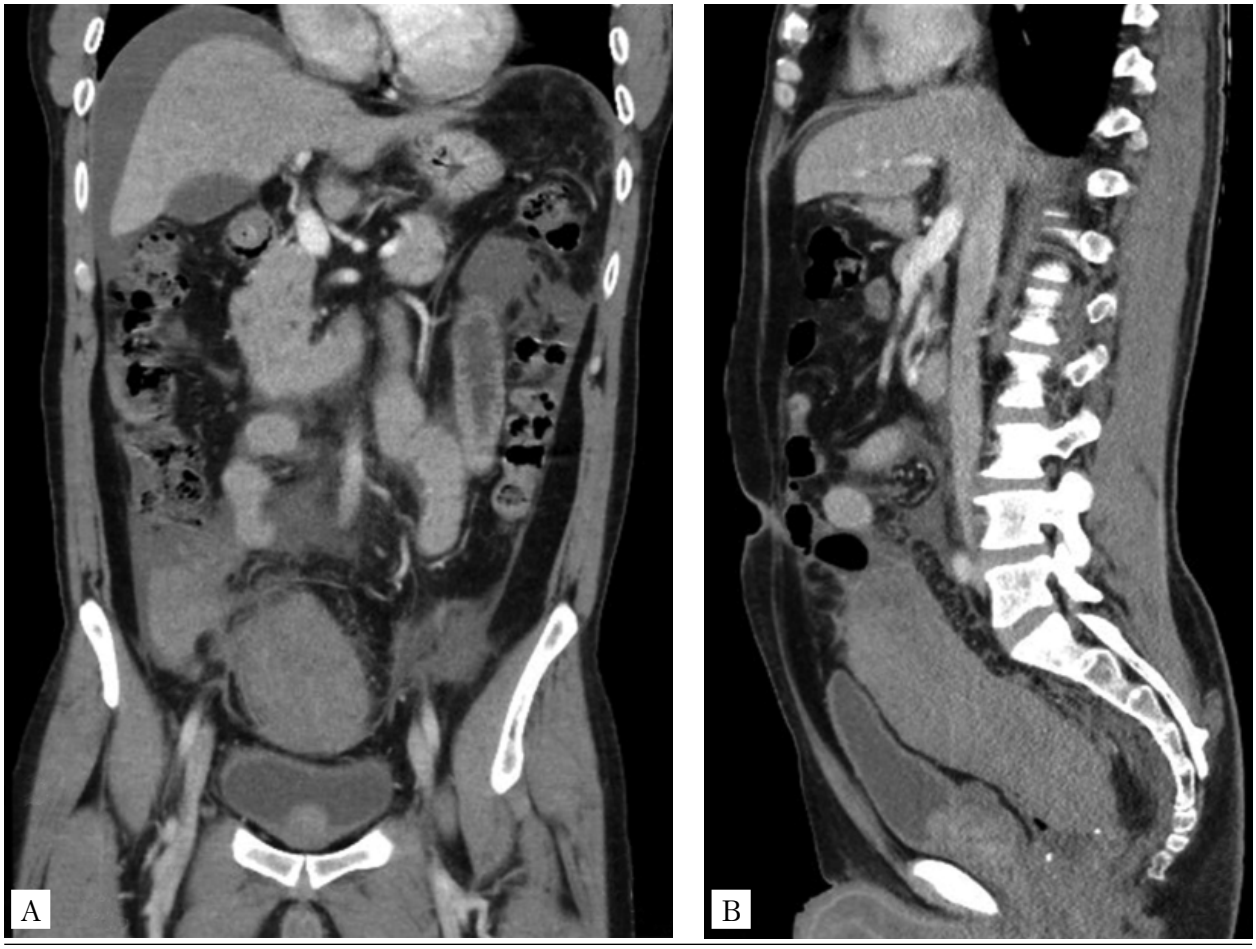

Figure 1. **Postoperative imaging: computed tomography scan of the abdomen revealed a significant amount of free fluid in the abdomen (A); distension of the rectosigmoid junction (B)**

Case presentation 2 from Munich: anal stenosis

A 49-year-old female patient presented to our surgical outpatient clinic with complaints of fecal incontinence, pelvic pain, and anal discomfort, two months after undergoing stapled hemorrhoidopexy for grade 3 hemorrhoidal disease and anal prolapse at an external medical facility. Her medical history included autoimmune thyroiditis, autoimmune gastritis, and migraine.

Preoperative history and surgery in an external clinic

The patient had a long-standing history of recurrent anal vein thrombosis, which was managed conservatively with heparin ointment. During her pregnancy, she developed hemorrhoidal prolapse, which was treated non-surgically. Preoperative rectoscopy confirmed grade 3 hemorrhoids and anal prolapse, leading to the decision to perform stapled hemorrhoidopexy. Postoperatively, she reported an immediate sensation of rectal pressure, described as a tampon-like feeling. Although her initial follow-up showed no significant findings, she later developed symptoms of incontinence, initially misinterpreted as diarrhea.

Clinical course and evaluation

Over time, her symptoms worsened, with persistent fecal incontinence, cramping rectal pain, and significant deterioration in quality of life. Despite her intact sensation of the urge to defecate, she struggled with stool control, resulting in frequent soiling. Attempts to manage her symptoms with increased doses of loperamide were only partially effective. She reported an inability to stand or sit for extended periods due to pelvic discomfort.

A comprehensive evaluation in our proctology clinic revealed a circular anal stricture approximately 1 cm from the anal verge (Fig. 2*A*), detected during digital rectal examination, with the area barely passable by finger. The rectal ampulla was completely filled with fecal stones, necessitating manual evacuation to relieve the impaction (Fig. 2*D*). Rectoscopy showed significant mucosal inflammation extending from the stapling line up to 7 cm above the anal verge

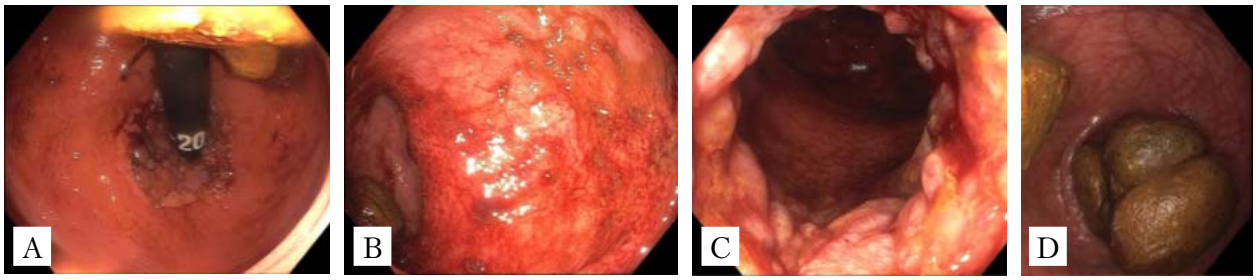

Figure 2. **Endoscopic imaging: rectoscopic evaluation revealed a circular anal stricture located approximately 1 cm from the anal verge (A); significant mucosal inflammation was observed, extending from the stapling line up to 7 cm above the anal verge (B); the staple line was covered with fibrin but showed no signs of dehiscence (C); fecal impaction in the rectal ampulla required manual evacuation (D)**

(Fig. 2*B*). Beyond this point, the rectal mucosa appeared healthy and pink, with additional fecal stones present. The staple line was covered with fibrin but showed no signs of dehiscence (Fig. 2*C*). Anal manometry confirmed impaired sphincter function. MRI of the rectum with contrast revealed significantly thinned musculature at the 7—8 o'clock position in the lithotomy position, approximately 4.5 cm from the anus, resulting in luminal bulging.

Management and outcomes

The patient was diagnosed with postoperative anal stenosis, fecal incontinence, and severe pain syndrome. Initial conservative management with biofeedback therapy was unsuccessful. Consequently, a laparoscopic loop sigmoidostomy was performed to alleviate symptoms and allow for rectal healing. Multiple sessions of anal dilation were conducted to address the stenosis.

Follow-up

Three months later, when the anastomosis maintained satisfactory passage following regular dilation, the patient underwent a sigmoidostomy reversal. Nine months after the initial creation of the stoma, she reported significant improvement in bowel function, with regular, pain-free defecation. Although she occasionally experienced a foreign body sensation in the anal region, this did not affect her daily activities. She resumed physical exercise and reported an almost complete return to her preoperative quality of life.

Discussion

The two case reports presented underscore the complexities and risks associated with SH as a treatment for high-grade hemorrhoidal disease. Both cases highlight rare but severe complications, namely perirectal hematoma and anal stenosis, which require careful management and a multidisciplinary approach.

The first case report focuses on a 41-year-old male patient who experienced intra-abdominal bleeding after SH involving a rupture of the mesentery and serosa at the rectosigmoid junction. According to the literature, postoperative bleeding following SH is rare, with an incidence of 0—10 % (Table 1). PHs are even less common; in a study of 3058 patients who underwent stapling procedures, only 14 cases (0.5 %) of large PHs were documented [13]. Although infrequent, these complications are among the most severe and concerning outcomes of SH [1, 2, 9, 16].

The possible pathomechanism of perirectal hematoma after SH is that it likely originates from damage to the blood vessels in the perirectal fat, which were partially transected by the stapling device [9]. A case of significant intra-abdominal bleeding following SH triggered by the intra-abdominal placement of the stapler due to an enterocele was described [2].

Key risk factors for acute bleeding following SH include patient comorbidities, such as the use of anticoagulants or pre-existing coagulopathies (like in our case report), inadequate hemostasis, surgical site disruption, or technical difficulties encountered during the procedure [13, 15]. A systematic review of 16 studies involving 37 patients with perirectal (12 cases) and intra-abdominal (6 cases) bleeding after SH and STARR stapled transanal rectal resection identified abdominal pain (43 %), pelvic discomfort without rectal bleeding (36 %), and external rectal bleeding (21 %) as the main symptoms, with a median onset of 1 day [15]. Notably, 57 % of patients with large PHs did not have rectal bleeding [13]. In our case, intraoperative proctoscopy confirmed the integrity of the staple line, suggesting that the bleeding originated from submucosal tissues, a phenomenon observed in rare cases of SH complications. The absence of rectal bleeding and chronic anemia complicated the diagnosis, highlighting the need to assess both intraluminal and intra-abdominal bleeding sources.

Table 1. **Bleeding complications, including perirectal hematoma, following stapled hemorrhoidopexy as reported in selected publications**

Patient cohort, n	Overall bleeding rate	PH	Treatment Approach	Re-operation rate	Year of publication	Country	Reference
1	N.ap.	1	Laparotomy	N.ap.	2024	Germany	Prokopchuk et al. (our case report)
3058	N.av.	14 (0.5 %)	Conservatively, embolization	0	2023	Italy	Mascagni et al. [13]
59	3 (5.1 %)	1 (1.7 %)	Conservatively	0 for PH 1 (1.7 %) for overall bleeding	2023	Italy, Jordan, Chile	Sturiale et al. [17]
646	64 (9.9 %)	N.av.	19 pts: band ligation 45 (7 %) pts conservatively	0	2023	Italy	Eminoğlu [8]
37 (16 studies)	N.ap.	12 pts: PH 6 pts: intra-abdominal bleeding	14 (38 %) non-operatively	23 (62 %)	2020	Different	Systematic review Popivanov et al . [15]
1	N.ap.	1	Laparotomy (Hartmann's operation)	N.ap.	2009	Croatia	Augustin et al. [1]
186	0	0	N.ap.	0	1999	Italy	Longo et al. [11, 12]

Note. N.av.: not available; N.ap.: not applicable; LA: local anesthesia, pts: patients; PH: perirectal hematoma.

Hemodynamic instability occurred in 19 %, and CT scans were used in 77 % of cases [15]. Treatment varied: 38 % were managed non-operatively with arteriography and embolization, while 62 % required surgery, including transabdominal procedures, transanal surgery, perineal access, and CT-guided paracoccygeal drainage [15]. Interestingly, a report from large-volume centers involving 3058 patients found that only 14 (0.5 %) developed PH, none of whom required abdominal surgery. Twelve were managed conservatively with antibiotics and monitored through CT scans and laboratory tests, while two patients with progressive PH underwent embolization [13], emphasizing that not all bleeding complications require invasive interventions. To reduce bleeding risk, extended compression time has been recommended. Specifically, a compression duration of 2 minutes, compared to the typical 30 seconds, was associated with a lower incidence of postoperative bleeding [20].

Our management approach for perirectal and intra-abdominal bleeding after SH is guided by hemodynamic stability and imaging findings (Fig. 3). Immediate surgical intervention is crucial for unstable patients, as illustrated by our case. For hemodynamically stable patients, conservative strategies like selective arteriography and embolization should be considered to avoid unnecessary surgery.

The second case highlights a 49-year-old female patient who developed severe anal stenosis, pain, and fecal incontinence following SH. Despite initial management attempts, including biofeedback and dilatation therapy, the patient's symptoms persisted, leading to the decision for surgical intervention. A laparoscopic loop sigmoidostomy was performed to relieve symptoms and allow for rectal healing. Additionally, multiple sessions of anal dilation were undertaken to address the stenosis. This treatment approach, though invasive, ultimately provided relief and allowed for recovery.

Anal stenosis is a rare complication of SH with an incidence of less than 0.5—7.0 % (Table 2). Strictures after SH are generally classified as high anal stenosis but are often considered rectal stenoses due to the resection of rectal mucosa [14]. Stenosis definitions vary, with Burke describing rectal stenosis as the inability to pass a 19 mm sigmoidoscope through an anastomosis, while others base it on digital examination difficulty [4, 14].

One primary cause of stenosis is the improper placement of the circular stapler, which can result in excessive resection or incorrect tissue capture [14]. Residual purse-string sutures that are not fully released postoperatively may also contribute to

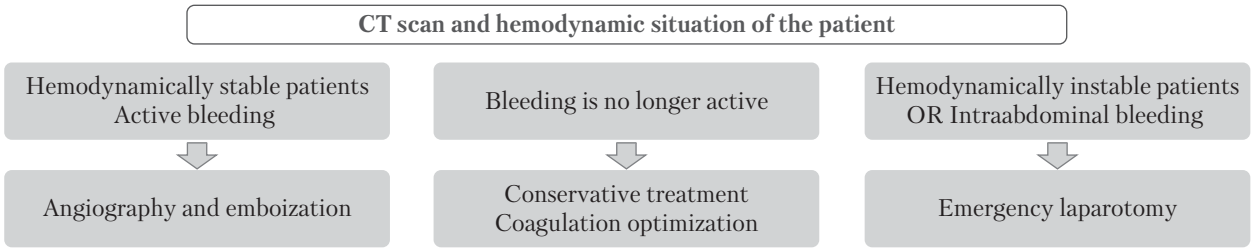

Figure 3. **Proposed algorithm for management of perirectal hematomas and intra-abdominal bleeding (modified after [3] and [15]).** The decision is made based on the contrast-enhanced CT scan and the patient's hemodynamic situation, similar to the algorithm used in pelvic trauma: in hemodynamically stable patients with active bleeding, angiography and embolization are performed; if the bleeding is no longer active, a conservative treatment with coagulation optimization is implemented. In cases of hemodynamically unstable patients or intra-abdominal bleeding, an emergency laparotomy is indicated

luminal narrowing, causing obstruction [5]. Studies highlight that inadequate dilatation before firing the stapler and excessive traction on the purse-string can increase the risk of strictures. Literature reports suggest that using a Hegar dilator during the procedure can help ensure proper lumen size, reducing the likelihood of stenosis. Additionally, it is crucial to avoid overlapping staple lines and to ensure that no residual tissue is entrapped. A modified stapled hemorrhoidopexy, which involves selectively removing staples at the 3-o'clock and 9-o'clock positions and placing a hemostatic suture to control bleeding, has been proposed to reduce lower postoperative stenosis [10] and may be validated in future studies.

These two cases, while distinct in their complications, underscore the importance of a proactive and individualized management approach following stapled hemorrhoidopexy. Both rectal hematoma and anal stenosis, though rare, can have serious implications and require prompt intervention. The key considerations for managing such complications include early recognition of symptoms, a structured evaluation of anal and rectal function, and a multidisciplinary treatment approach involving both surgical and non-surgical therapies. Both cases also highlight the need for thorough preoperative screening to identify potential risk factors, such as coagulation disorders in the case of bleeding complications. In both instances, a combination of conservative management and more invasive surgical procedures was required to achieve a favourable outcome. The importance of patient education cannot be overstated, as setting realistic expectations

Table 2. **Incidence of anal stenosis following stapled hemorrhoidopexy as reported in selected publications**

Patient cohort, n	Stenosis rate	Treatment approach	Re-operation rate	Year of publication	Country	Reference
1	N.ap.	Surgery (colostomy) and progressive dilatation therapy	N.ap.	2024	Germany	Prokopchuk et al (our case report)
313	21 (6.7 %)	Transanal stricture release surgery; dilatation by finger; Pratt speculum-based dilation	9 (42.9 %)	2024	China	Liu et al. [10]
59	1 (1.7 %)	Dilatation and redo surgery	100 %	2023	Italy, Jordan, Chile	Sturiale et al. [17]
646	3 (0.5 %)	N.av.	N.av.	2023	Italy	Eminoğlu [8]
289	9 (3.1 %)	Dilatation (n = 8); surgery for transanal strictureplasty with electrocautery (n = 1)	11.1 % %	2004	Germany	Petersen et al. [14]
1	N.ap.	Surgery: insertion of a Hegar dilator and release of the purse-string entrapped by the staples	N.ap.	2002	Italy	Cipriani et al. [5]

Note. N.av.: not available; N.ap.: not applicable; LA: local anesthesia, pts: patients.

about potential complications and recovery timelines can help mitigate patient anxiety and improve adherence to treatment plans.

Conclusions

These case reports demonstrate the complexity of managing severe complications after stapled hemorrhoidopexy. Although SH remains an effective treatment for high-grade hemorrhoidal disease, complications such as perirectal hematoma and anal stenosis must be carefully managed to optimize patient outcomes. A multidisciplinary approach, including prompt surgical intervention, structured diagnostic evaluation, and tailored therapies, was crucial in achieving favourable results for both patients. This report serves as a reminder of the need for vigilance, early intervention, and individualized care in colorectal surgery, particularly when rare but severe complications arise.

Declaration of interests

The authors declare that they have no conflicts of interest.

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Ethics approval and written informed consent statements

The written informed consent to participate in the study was obtained. The first case report was presented at the 141st German Surgery Congress on April 16, 2024 (DCK Digital 2024—141. Deutscher Chirurgenkongress).

Authors contributions

O. Prokopchuk: acquisition of data, analysis and interpretation of data, drafting of the manuscript; F. Fuchs: acquisition of data, critical revision of the manuscript; D. Nedic: critical revision of the manuscript; D. Quaiser: analysis and interpretation of imaging; critical revision of the manuscript; H. F. G. Novotny: critical revision of the manuscript; H. Friess: critical revision of the manuscript; J. Bachmann: analysis and interpretation of data, design of the study, critical revision of the manuscript; F. Spelsberg: design of the study, analysis and interpretation of data, critical revision of the manuscript.

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26 років досвіду застосування степлерної гемороїдопексії — підходи до ведення тяжких ускладнень. Два клінічні випадки та огляд літератури

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Степлерну гемороїдопексію, уперше запропоновану Лонго в 1998 р., широко застосовують для хірургічного лікування гемороїдальної хвороби. Ця інноваційна процедура стала популярною завдяки менш виразному післяопераційному болю, скороченню періоду госпіталізації та швидшому відновленню. Водночас вона не позбавлена ризику та пов'язана з рідкісними, але серйозними ускладненнями, які можуть суттєво впливати на здоров'я пацієнта. Описано два показові клінічні випадки таких ускладнень. У першому випадку в 41-річного чоловіка виникла перириктальна гематома, яка супроводжувалася гострою абдомінальною кровотечею через розрив мезентеріальних судин у зоні ректосигмоїдного з'єднання. Пацієнту була проведена невідкладна хірургічна операція та інтенсивна післяопераційна терапія. У другому випадку в 49-річної жінки мав місце анальний стеноз із фекальною інконтиненцією, що потребувало хірургічної корекції та тривалої реабілітації для відновлення функції кишечника й поліпшення якості життя. Ці клінічні випадки свідчать про важливість своєчасної діагностики й ефективного менеджменту ускладнень, які, хоча і трапляються рідко, можуть мати серйозні наслідки, а також про необхідність використання мультидисциплінарного підходу із залученням колопроктолога, загального хірурга та гастроентеролога для оптимізації лікування.

Аналіз літератури виявив основні чинники ризику, зокрема супутні захворювання, технічні особливості виконання операції та ретельний відбір кандидатів для процедури. Обговорюються найкращі практики, спрямовані на зниження ризику ускладнень, зокрема вдосконалення хірургічних технік, ретельне доопераційне обстеження та навчання персоналу. Наведена інформація покликана допомогти хірургам у зниженні ризиків та підвищенні безпеки пацієнтів при збереженні переваг інноваційного підходу.

Ключові слова: степлерна гемороїдопексія, операція за Лонго, перириктальна гематома, анальний стеноз, ректальний стеноз, менеджмент ускладнень.

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