BMC Surgery

CASE REPORT

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Multidisciplinary management of a patient with vesicosigmoid fistula and multisystem diseases undergoing stoma reversal: a case report

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Abstract

Background Vesicosigmoid fistula is a rare and complex pathological connection between the urinary and digestive systems, most often caused by calculi, diverticulitis, or malignancy. In elderly patients, surgical repair of the fistula and stoma reversal carry high risks, particularly when complicated by dysfunction of multiple organ systems such as the heart, lungs, and kidneys. This case aims to summarize the perioperative risk assessment and comprehensive management strategies for an elderly patient undergoing stoma reversal after vesicosigmoid fistula repair.

Case presentation A 73-year-old man was admitted for planned reversal of ileal and bladder stomas four months after initial diversion surgery. His medical history included hypertension for 10 years. Preoperative evaluation revealed severe urinary tract infection, bilateral hydronephrosis, severe aortic valve stenosis, and emphysema. After multidisciplinary consultation and optimization of infection control and cardiopulmonary function, the patient underwent sigmoid colon resection, excision and repair of the bladder fistula, and bilateral ureteral stent placement. Postoperatively, transient infection exacerbation, hypoxemia, and elevated cardiac enzymes were observed. The patient improved after targeted antibiotic therapy, respiratory support, cardioprotective treatment, and nutritional intervention, and was discharged uneventfully.

Conclusion This case highlights that in elderly patients with complex stoma reversal, comprehensive preoperative multisystem risk assessment and multidisciplinary team (MDT) collaboration are essential. Intraoperative attention to adequate fistula excision and watertight repair, together with intensified postoperative monitoring and dynamic management of infection, respiratory, and cardiac status, can substantially improve clinical outcomes.

Keywords Stoma reversal, Vesicosigmoid fistula, Urinary tract infection, Myocardial injury, Multidisciplinary collaboration

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Introduction

Enterovesical fistula is an abnormal communication between the intestine and the bladder, with colovesical fistula being the most common subtype, accounting for approximately 60%–70% of cases [1, 2]. The condition is rare in the general population and predominantly affects males (male-to-female ratio ≈ 3:1), possibly due to the natural anatomical barrier formed by the uterus and adnexa between the bladder and sigmoid colon in females [3]. The leading cause is diverticular disease (65%–79%), usually resulting from rupture or abscess erosion into the bladder. Other etiologies include malignancy (10%–20%), Crohn's disease (5%–7%), radiation enteritis, and iatrogenic injury, while trauma is relatively uncommon [4]. Clinically, the disease typically manifests as pneumaturia, fecaluria, and recurrent urinary tract infections, though early symptoms may be nonspecific and lead to delayed diagnosis [5]. The diagnosis of vesicosigmoid fistula typically relies on imaging studies. Computed Tomography (CT) scanning is the gold standard, as it can clearly visualize the abnormal passage between the colon and bladder and assess changes in surrounding tissues [6]. Cystoscopy allows direct observation of the fistulous opening or lesions within the bladder, providing key diagnostic clues, especially in suspected cases [7]. Contrast studies can reveal the abnormal connection between the intestine and bladder [2]. In recent years, Magnetic Resonance Imaging (MRI), with its superior soft tissue resolution, has gradually been used for diagnosing vesicosigmoid fistula, particularly in cases requiring high detail [8].

Surgical treatment remains the mainstay of management. When general condition allows, one-stage resection and repair is preferred, as it eliminates the infectious focus and avoids permanent stoma dependence [9]. However, elderly patients and those with multisystem comorbidities—such as impaired cardiac, pulmonary, or renal function—face markedly increased perioperative risks, including infection, cardiopulmonary failure, and mortality [10–12]. Even though stoma reversal is considered a restorative procedure, its complication rate can still reach 30%, underscoring the importance of careful patient selection and optimization [13].

Comprehensive preoperative evaluation and multidisciplinary team (MDT) collaboration are therefore crucial for improving outcomes in complex cases. Recent meta-analyses have shown that MDT participation significantly reduces hospital stay and perioperative mortality among patients undergoing high-risk surgeries [14]. This article reports a case of a 73-year-old male patient with a vesicosigmoid fistula, which was caused by a concealed fistula following percutaneous nephrolithotomy, a rare type of fistula. The patient had concomitant heart, lung, and renal dysfunction, as well as a urinary tract infection. After MDT evaluation, a successful one-stage stoma reversal surgery was performed. The article focuses on discussing the perioperative multisystem management strategies and experiences.

Case presentation

A 73-year-old male patient was admitted for planned stoma reversal. Four months ago, he underwent percutaneous nephrolithotomy for left kidney stones. After the procedure, he developed a vesicosigmoid fistula and subsequently underwent laparoscopic ileostomy and suprapubic cystostomy. His medical history included hypertension for 10 years with suboptimal control and appendectomy performed a decade earlier. He had no history of diabetes or coronary artery disease. On admission, his temperature was 36.5 °C, pulse 93 bpm, and blood pressure 135/68 mmHg. The right lower quadrant ileostomy appeared healthy, pink, and everted, with passage of gas and feces. The suprapubic catheter drained clear yellow urine, and mild bilateral renal percussion tenderness was noted. Laboratory results showed urine white blood cells 662/HP, protein 2+, serum creatinine 173 μmol/L, C-reactive protein 14.4 mg/L, and bicarbonate 17.2 mmol/L. Chest radiography revealed emphysema and chronic inflammatory changes. Echocardiography demonstrated severe aortic valve stenosis with diastolic dysfunction. Pelvic CT revealed an irregular sigmoid colon wall indistinct from the posterior bladder wall (Fig. 1). The admission diagnoses included bladder and ileal stoma status, hypertension, urinary tract infection, renal insufficiency, vesicosigmoid fistula, severe aortic stenosis, and emphysema.

A MDT discussion was convened led by the department of urology. The gastrointestinal surgery team considered that four months after diversion, inflammation around the fistula had resolved and reversal was indicated. Urologists recommended bilateral ureteral stent placement during surgery to prevent postoperative obstruction. The cardiology team emphasized strict intraoperative fluid and blood pressure control due to severe aortic stenosis and impaired left ventricular relaxation. The respiratory team advised preoperative pulmonary rehabilitation, including breathing exercises, and early postoperative interventions such as chest physiotherapy and nebulization to prevent atelectasis. The infectious diseases team recommended adjusting antibiotic therapy based on urine culture results and controlling infection prior to surgery. The nutrition team noted mild hypoalbuminemia and hypokalemia and suggested preoperative enteral nutritional support and electrolyte correction. The MDT reached consensus to initiate systemic anti-infective therapy before surgery. Based on urine culture and sensitivity testing, cephalosporins were replaced with piperacillin–tazobactam (4.5 g every 8 h),

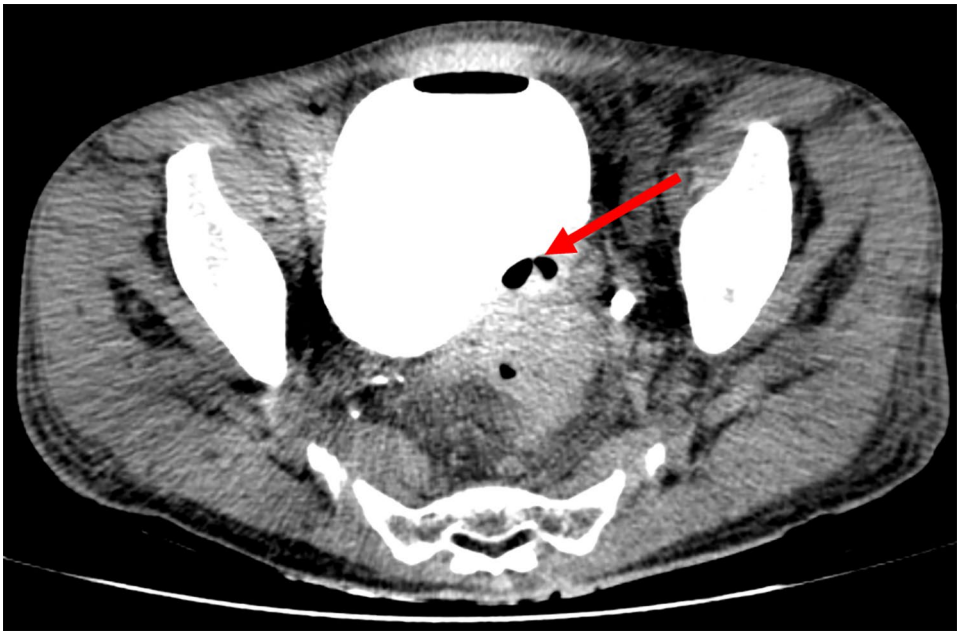

Fig. 1 Contrast-enhanced pelvic CT (axial view). Irregular thickening of the sigmoid colon wall is observed. Small gas bubbles are visible between the prostate and rectum, suggesting the possibility of a sigmoid–vesical (colovesical) fistula formation

along with albumin supplementation and enteral nutrition. Once the patient's systemic condition stabilized, elective stoma reversal was scheduled.

The patient underwent sigmoid colon resection, abdominal adhesiolysis, bladder repair, and bilateral ureteroscopic stent placement under general anesthesia. Intraoperatively, the sigmoid colon was densely adherent to the bladder (Fig. 2). Sharp dissection allowed removal of the affected bowel segment, followed by end-to-end anastomosis. The bladder was longitudinally incised, and the fistulous tract and surrounding inflammatory tissue were excised. The mucosal layer was closed with a continuous 4 – 0 absorbable suture, and the muscular layer with interrupted 3 – 0 sutures. A water test with 300 mL saline showed no leakage. Estimated blood loss was 100 mL, and no transfusion was required. On postoperative day 1, the patient developed fever (38.5 °C) with high-sensitivity C-reactive protein (hs-CRP) 173 mg/L and continued on piperacillin–tazobactam (4.5 g every 8 h). Infectious disease and urology teams jointly adjusted the antibiotic regimen. On day 7, urine white blood cells increased to 663/HP but improved after bladder irrigation, and infection was controlled by day 10. Early after surgery, oxygen saturation dropped to 58% and improved to 99% with 5 L/min oxygen via face mask. Arterial blood gas analysis showed PaO_2 70 mmHg. The respiratory and rehabilitation teams guided pulmonary care including nebulization, chest percussion, and bedside breathing exercises, leading to gradual improvement in oxygenation and clinical stabilization. Cardiac biomarkers were elevated on postoperative day 1: high sensitive troponin I (hs-TnI) 972 ng/L and B-type natriuretic peptide (BNP) 2375 ng/L. After cardiology consultation, treatment with aspirin, diuretics, and a polarizing solution was initiated. By day 7, hs-TnI and BNP decreased to 174 ng/L and 433 ng/L, respectively. Electrolyte abnormalities on day 1 (serum potassium 3.2 mmol/L, serum sodium 152 mmol/L) were corrected by intravenous potassium supplementation and sodium restriction (Fig. 3). The nutrition team adjusted enteral formulas to maintain fluid and electrolyte balance. On postoperative day 10, the patient developed hematochezia. Urgent colonoscopy performed by the gastroenterology team revealed active bleeding from an anastomotic clot, which was successfully managed with placement of three hemostatic clips (Fig. 4). After joint evaluation by the surgical, gastroenterology, and nursing teams, close monitoring was continued with no recurrent bleeding observed. The patient recovered well and was discharged on postoperative day 15 following MDT review and assessment.

Discussion

Percutaneous nephrolithotomy (PCNL) is the preferred method for treating kidney stones [15]. However, in rare cases, severe complications such as bowel perforation may occur postoperatively [16]. The primary cause of colovesical fistula following PCNL is the presence of an anatomical variation known as "renal colon," where the colon is located along the surgical puncture path, increasing the risk of colon perforation by surgical instruments [17]. After colon perforation, the release of bowel contents can lead to local infection and inflammation. If

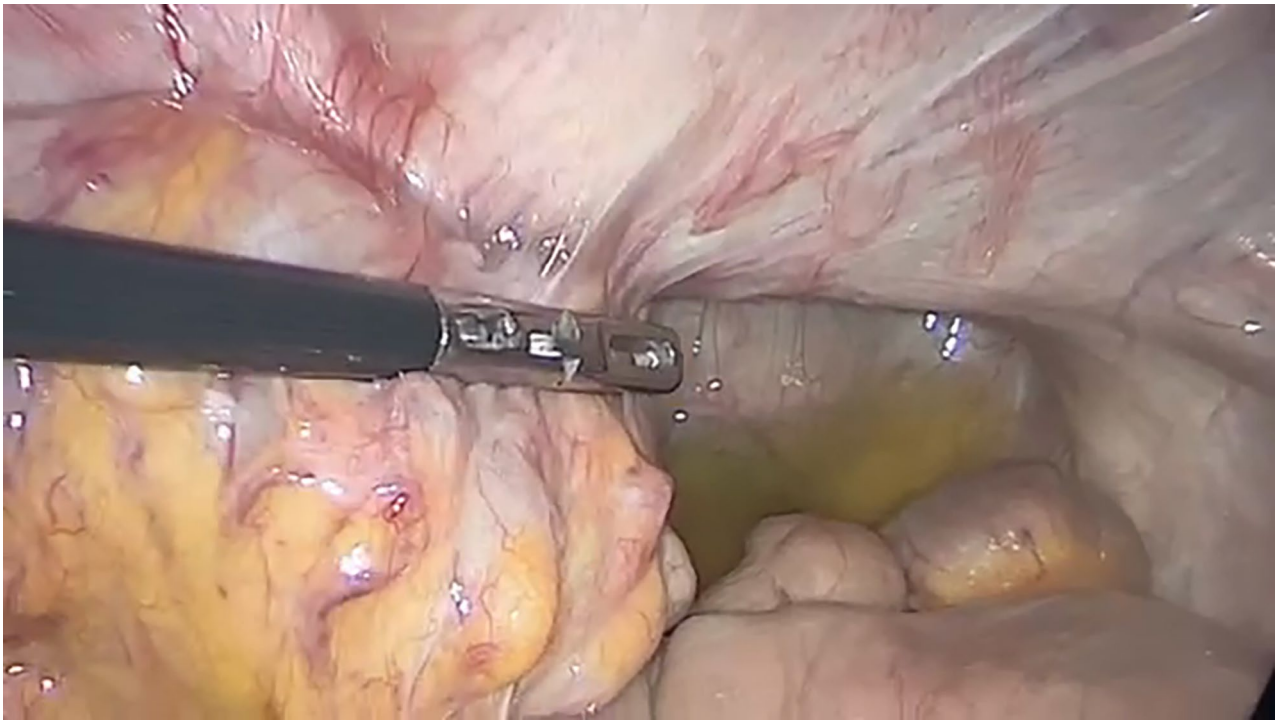

Fig. 2 Intraoperative findings of dense adhesion between the sigmoid colon and bladder. Laparoscopy revealed tight adhesion between the posterior wall of the sigmoid colon and the anterior wall of the bladder, with marked local edema and inflammatory exudation. Sharp dissection was performed layer by layer to avoid injury to the bladder wall and intestinal tract

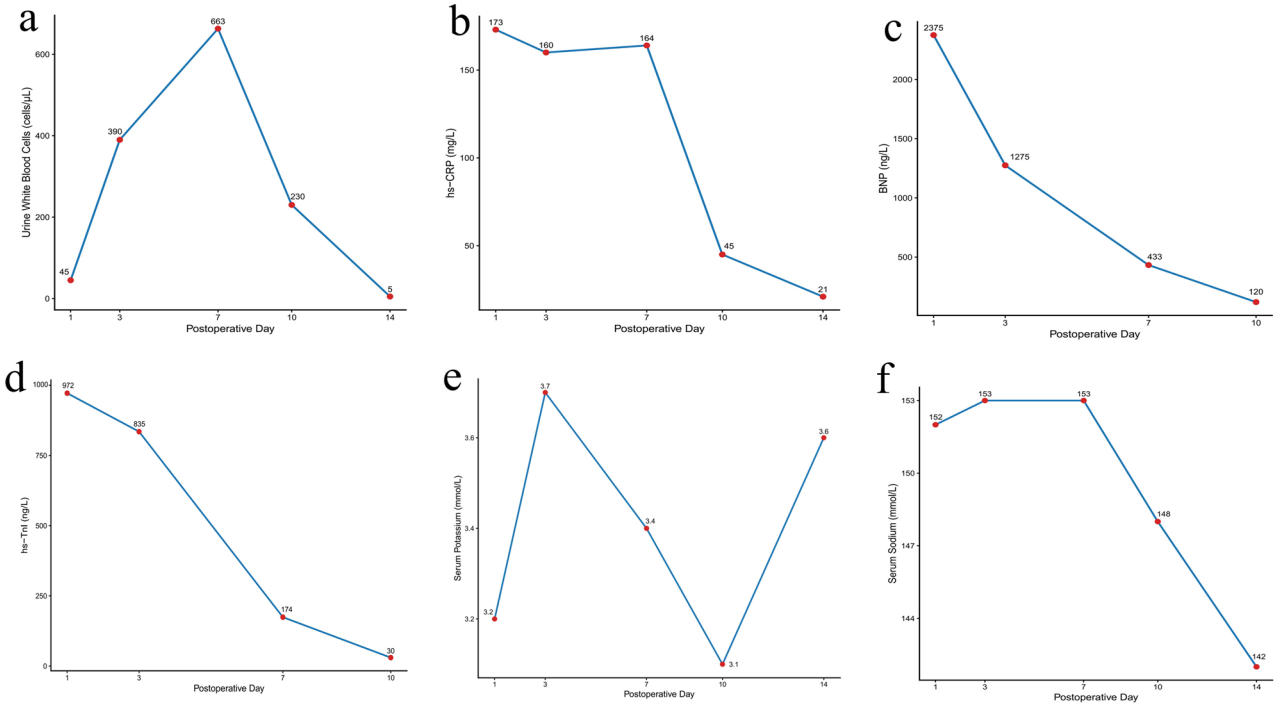

Fig. 3 Postoperative dynamic changes in major laboratory parameters. **a** Urine white blood cell count; (**b**) high-sensitivity C-reactive protein (hs-CRP); (**c**) B-type natriuretic peptide (BNP); (**d**) high-sensitivity troponin I (hs-TnI); (**e**) serum potassium; (**f**) serum sodium

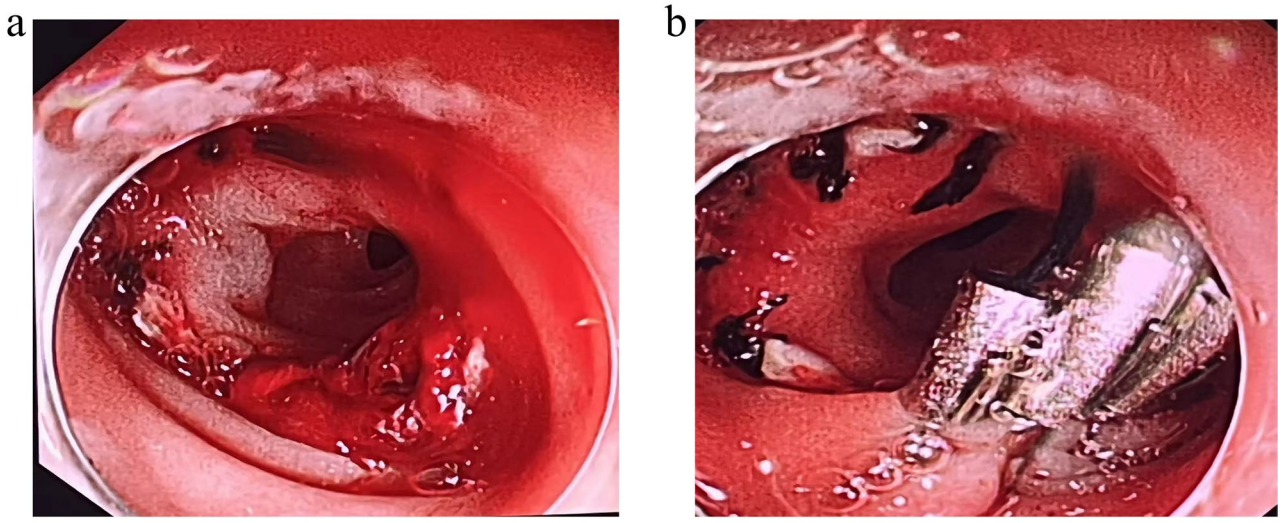

Fig. 4 Endoscopic management of postoperative bleeding at the colonic anastomosis. **a** Colonoscopy on postoperative day 10 revealed active bleeding with a localized blood clot at the anastomotic site. **b** Endoscopic hemostasis was successfully achieved using three metallic clips

the inflamed area remains in prolonged contact with the adjacent damaged bladder wall, it may result in adhesion and necrosis, ultimately forming an abnormal fistula [18].

Although stoma reversal is regarded as a restorative procedure, its risk and complexity increase markedly in elderly patients with multiple comorbidities. Numerous studies have shown that preoperative inflammatory status, nutritional condition, and organ functional reserve are closely associated with postoperative outcomes [19–21]. Therefore, perioperative management should go beyond the scope of surgery alone, emphasizing dynamic evaluation and optimization of the patient's systemic condition [14, 22]. In the present case, multidisciplinary collaboration facilitated infection control, cardiopulmonary assessment, and nutritional optimization before surgery, substantially reducing postoperative complications and exemplifying a "risk stratification–precision intervention" approach.

Infection control is a key determinant of outcomes in bladder fistula surgery, as urinary tract infection is a major risk factor [23]. Adjusting the antibiotic regimen according to urine or wound culture results and antimicrobial susceptibility testing can effectively limit exposure to resistant organisms [24, 25], reduce postoperative infection risk, and improve surgical readiness [23]. In this case, infection was successfully controlled using piperacillin–tazobactam guided by culture results, combined with enteral nutritional support to enhance host immunity, achieving improvement in both inflammatory and nutritional parameters prior to elective surgery.

Intraoperative management is equally critical. During bladder repair, a double-layer continuous suturing technique with an intraoperative water-leak test ensures watertight closure and prevents postoperative urinary leakage [26, 27]. The successful repair in this case highlights the value of the "precise dissection–double-layer repair–leak test verification" strategy, underscoring how meticulous surgical technique reduces the risks of urinary leakage and infection.

Cardiopulmonary dysfunction represents another major concern in elderly patients undergoing stoma reversal [28, 29]. Recent evidence suggests that patients with severe aortic stenosis can safely undergo noncardiac surgery under strict hemodynamic monitoring and fluid control, although cardiovascular complications remain a potential hazard [30]. In this patient, postoperative myocardial injury was promptly recognized and managed with antiplatelet therapy, diuretics, and metabolic support, leading to rapid recovery of cardiac biomarkers. Similarly, transient postoperative hypoxemia was effectively corrected through oxygen therapy and pulmonary rehabilitation, demonstrating the benefits of coordinated multisystem intervention.

Anastomotic bleeding after colorectal surgery is increasingly treated endoscopically as the first-line approach [31, 32]. In this case, postoperative hematochezia was managed successfully via endoscopic clipping of the bleeding site, thus avoiding reoperation. This strategy is safe, minimally invasive, and repeatable, and should be promoted for similar cases.

Most importantly, the MDT model played a continuous and pivotal role throughout the clinical course. Patients with complex abdominal pathology often present with concurrent infection, malnutrition, and organ dysfunction [33], which exceed the capacity of a single specialty to manage comprehensively. MDT collaboration allows feasibility assessment during the planning phase, rapid response to perioperative complications, and reduction

of intervention delays. In this case, timely MDT-based decision-making guided precise interventions during episodes of infection fluctuation, oxygen desaturation, and myocardial injury, significantly improving clinical recovery. Although in this case, we did not use validated risk assessment tools like the National Surgical Quality Improvement Program (NSQIP) calculator, the MDT team still performed a detailed risk evaluation through clinical assessment, the patient's medical history, and preoperative imaging. Tools like the NSQIP calculator can provide data-driven support to the MDT team, offering more quantitative insights when assessing mortality risk and complications [34]. Introducing such tools in similar cases in the future may help further optimize treatment plans.

In the absence of specialized MDT support, other conservative treatment alternatives can also serve as management strategies. For instance, in the absence of MDT support, urology can independently control urinary tract infections through antibiotic therapy, especially in the early stages of infection, using standard antibiotic treatment to alleviate symptoms and reduce the risk of preoperative infection [23]. For malnourished patients, enteral nutritional support provided by the nutrition department can help improve the nutritional status, thereby reducing postoperative complications [33]. For patients with cardiopulmonary insufficiency, internal medicine can alleviate the cardiopulmonary burden by optimizing pharmacological treatment and controlling fluid balance, thus lowering postoperative risks [35, 36]. Additionally, regular imaging monitoring (such as CT scans or MRI) can help detect changes in the condition and the occurrence of complications in the absence of MDT support.

In summary, this case illustrates a systematic management model for elderly patients undergoing stoma reversal after vesicosigmoid fistula repair, encompassing: preoperative culture-guided infection control and nutritional optimization, intraoperative meticulous dissection and watertight repair verification, postoperative multisystem monitoring and early intervention, and full-process MDT collaboration. This integrated pathway provides a reproducible and clinically valuable framework for managing high-risk patients with complex abdominal pathology.

Abbreviations

BNP	B-type natriuretic peptide
CT	Computed tomography
hs-CRP	High-sensitivity C-reactive protein
hs-TnI	High-sensitivity troponin I
MDT	Multidisciplinary team
MRI	Magnetic resonance imaging
NSQIP	National Surgical Quality Improvement Program
PCNL	Percutaneous nephrolithotomy

Acknowledgements
The authors sincerely thank the multidisciplinary team members from the Departments of Urology, Gastrointestinal Surgery, Cardiology, Respiratory Medicine, and Rehabilitation for their expertise, collaboration, and dedication in the management of this complex case.

Authors' contributions
Jian Yang and Li Zhang contributed equally to the conception, case management, data collection, and drafting of the manuscript. Ke Zeng participated in the surgical procedure, data interpretation, and critical revision of the article for important intellectual content. All authors read and approved the final version of the manuscript.

Funding
This work was supported by the Zigong Municipal Health Commission Research Project (Grant No. 24yb026).

Data availability
All relevant data supporting the conclusions of this article are included within the manuscript.

Declarations

Ethics approval and consent to participate
Ethical approval was not required for this single-patient case report. All patient data were anonymized, and confidentiality was strictly maintained.

Consent for publication
Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the journal's editorial office.

Competing interests
The authors declare no competing interests.

Received: 3 November 2025 / Accepted: 8 January 2026
Published online: 16 January 2026

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