

Case Report: Vesico-Cutaneous Fistula Following Laparoscopic Inguinal Hernia Repair: A Rare Complication

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Abstract

Background: Laparoscopic inguinal hernia repair is widely favored for its low recurrence rates and faster recovery. However, rare complications such as bladder injuries and vesico-cutaneous fistulas (VCF) may occur, often due to mesh-related erosion. **Aim:** This report illustrates a rare case of VCF following totally extraperitoneal (TEP) hernia repair, emphasizing diagnostic challenges, surgical decision-making, and outcomes. **Case Presentation:** A 70-year-old male underwent laparoscopic TEP right inguinal hernia repair. Three years later, he presented with haematuria and recurrent right groin abscesses at the site of the original repair. Despite multiple hospital visits and image-guided drainage, the underlying diagnosis was delayed. Retrospective correlation with his prior surgical history could have prompted earlier consideration of mesh-related complications. Imaging eventually revealed chronic mesh infection, and operative removal was performed. A persistent wound led to cystographic confirmation of a vesico-cutaneous fistula tracking from the right bladder base to the suprapubic wound. The patient was ultimately managed conservatively with catheterization and wound care, achieving spontaneous fistula closure without surgical repair. **Conclusion:** This case underscores the importance of recognizing vesico-cutaneous fistula as a delayed complication of mesh-based hernia repair. Early diagnosis and surgical removal of infected mesh are critical and may significantly reduce repeated hospital presentations, prolonged patient discomfort, and unnecessary admissions. Prompt urological referral and multidisciplinary team (MDT) involvement can streamline management and improve outcomes. In this case, simple catheterization alone led to complete fistula healing.

Keywords

Bladder Injury, Vesico-Cutaneous Fistula, Laparoscopic Hernia Repair, Mesh Infection, Ultrasound Drainage, Abscess, TEP, TAPP

1. Introduction

Laparoscopic inguinal hernia repair, including totally extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) techniques, is widely favored for its superior postoperative outcomes and reduced recurrence rates [1] [2]. Although considered safe, rare complications such as bladder injury and mesh erosion can occur, with vesico-cutaneous fistula (VCF) representing an exceptionally rare but serious delayed consequence [3] [4].

Risk factors include prior pelvic surgeries, deep dissection near the bladder, fixation tacks placed too close to the bladder wall, and chronic mesh infection or migration [5] [6]. While bladder injuries can be minimized with preventive measures—such as bladder decompression, anatomical awareness, and proper mesh fixation—complications may still arise [3].

Management of VCFs ranges from conservative approaches like catheter drainage to more invasive surgical repairs, depending on fistula size, patient stability, and underlying pathology [7]-[9]. This report contributes to the limited literature on mesh-related VCF and highlights the value of early recognition and a multidisciplinary approach in managing such complex postoperative sequelae.

2. Case Presentation

2.1. Patient History

A 70-year-old man underwent elective laparoscopic TEP repair for a symptomatic right inguinal hernia. Past medical history included:

- NSTEMI → managed with LAD stent
- Hypertension (on candesartan)
- Hyperlipidemia (atorvastatin)
- Hypothyroidism (levothyroxine)
- Aspirin use for secondary prevention

He was a non-smoker and consumed no alcohol.

2.2. Case Presentation

A 70-year-old male with a history of ischemic heart disease managed with a proximal LAD stent, and ongoing treatment with aspirin, atorvastatin, candesartan, and lansoprazole, underwent elective laparoscopic totally extraperitoneal (TEP) right inguinal hernia repair. The procedure was initially uncomplicated. Three years later, he presented with visible haematuria and right-sided abdominal pain.

Cystoscopy revealed a 5 mm lesion on the right anterior bladder wall with floating debris, and although imaging excluded urinary obstruction, bowel inflammation raised concerns for possible Crohn's disease (no previous evidence). The lesion was deemed benign, and he was referred to surgery for evaluation of groin discomfort. Shortly thereafter, he developed a right groin abscess, confirmed on CT and managed twice with ultrasound-guided drainage by interventional radiologist and antibiotics. However, symptoms recurred with ongoing purulent discharge from the suprapubic region. Further imaging revealed displaced mesh embedded within a heterogeneous collection. The patient remained systemically well but required readmission due to persistent wound drainage. A repeat CT (**Figure 1**) scan showed inflammatory collections in both the inguinal and pelvic regions, with compression of the urinary bladder and associated soft tissue changes. Urgent operative exploration revealed a chronic abscess cavity communicating with the mesh site; the mesh was partially floating and surrounded by infected granulation tissue. The sinus tract was excised, the cavity debrided, and the mesh removed (**Figure 2**). Postoperatively, the patient developed high-volume serous fluid output through the wound. An urgent cystogram was requested by the urology team after the referral confirmed a vesico-cutaneous fistula originating from the bladder base and tracking to the suprapubic wound (**Figure 3**). Conservative management with an indwelling urinary catheter was initiated with the urology team's advice. Despite intermittent haematuria and cloudy discharge, the patient remained clinically stable and was managed with antibiotics. On follow-up cystography, no further leakage was observed, and the fistula was deemed healed, though mild left-sided ureteric reflux persisted (**Figure 3**). The patient was scheduled for uroflowmetry, and a bladder scan to assess function, and a telephone follow-up was arranged to monitor long-term outcomes. He has also been discussed in both surgical and urological Mortality and Morbidity meetings.



Figure 1. CT abdomen and pelvis (axial and coronal section) demonstrate a well-defined multiloculated abscess collection in the right groin region and pelvis. The collection is associated with inflammatory fat stranding and a linear echogenic band, likely representing migrated or eroded mesh.

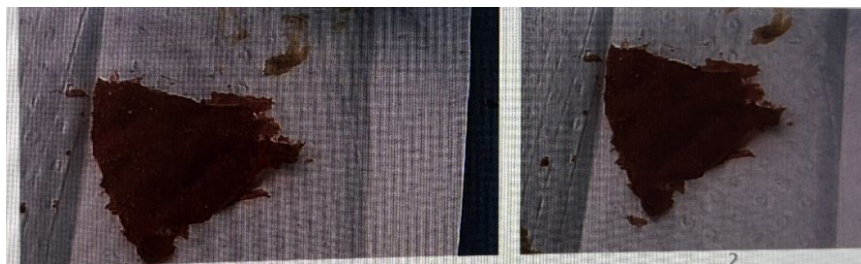


Figure 2. Intraoperative photograph showing mesh removal. The infected mesh is partially detached, embedded in fibrotic tissue, and was excised in entirety along with surrounding granulation tissue from the abscess cavity.

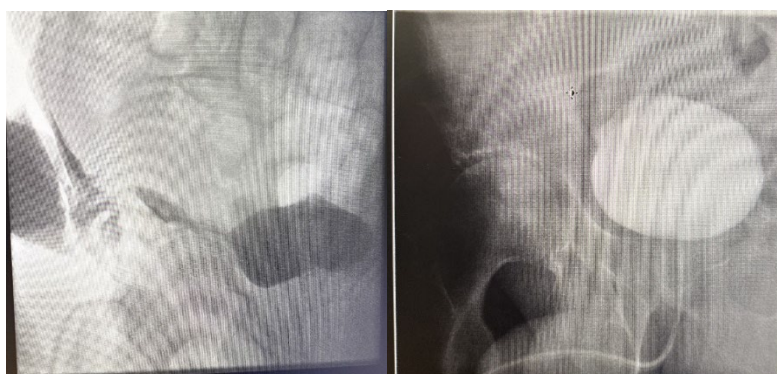


Figure 3. Cystogram images before and after catheter insertion. The initial image demonstrates contrast extravasation from the right bladder base to the anterior abdominal wall, confirming a vesico-cutaneous fistula. The follow-up image shows no contrast leakage after prolonged catheter drainage, indicating fistula resolution.

3. Imaging and Laboratory Findings

The diagnostic workup included ultrasound, computed tomography (CT), and cystography, which collectively revealed the progression from mesh-related infection to vesico-cutaneous fistula formation and eventual resolution.

- **Initial Ultrasound and CT Imaging**

Early imaging demonstrated a heterogeneous subcutaneous collection in the right groin region, measuring approximately 43×31 mm, containing echogenic linear bands consistent with displaced or degraded mesh. CT imaging confirmed a multiloculated abscess extending from the right iliac fossa to the suprapubic area, with surrounding fat stranding and inflammatory changes, suggestive of chronic infection and mesh-related complications.

- **Follow-up CT Imaging**

Repeat CT of the abdomen and pelvis identified:

- A right pelvic abscess with compressive effects on the bladder (44×19 mm)
- A right inguinal collection (38×22 mm)
- Signs of phlegmonous changes and a sinus tract extending toward the anterior abdominal wall. These findings raised suspicion of mesh-related erosion and deeper tissue involvement, prompting further urological investigation.

- **Cystographic Evaluation**

Contrast cystography revealed that Urografin contrast leaked from the right bladder base, tracking laterally and exiting through a cutaneous sinus—confirming the presence of a right-sided vesico-cutaneous fistula. There was no evidence of vesico-ureteric reflux at that time.

- **Serial Imaging and Recovery Monitoring**

As part of conservative management, subsequent imaging demonstrated significant reduction in abscess size, with a residual fluid pocket of ~15 mm and persistent, but improving, inflammatory changes. A repeat cystogram later showed no active urine leak, suggesting spontaneous closure of the fistula tract. However, mild right-sided ureteric reflux was incidentally noted on imaging, located on the same side as the prior fistula. This was not clinically significant and required no further intervention.

- **Laboratory Findings**

Abscess cultures remained sterile. Routine inflammatory markers such as CRP and WCC were within normal limits during follow-up. Urinalysis showed occasional leukocytes and trace blood, but no consistent urinary tract infection. NMP22 and cytology were negative for malignancy.

4. Multidisciplinary Management

Urological and Surgical Collaboration

The vesico-cutaneous fistula was managed conservatively with catheterization and wound drainage. Regular imaging and urine output monitoring were performed. The patient was discussed in a multidisciplinary team (MDT) meeting. Repeat cystogram in January 2024 showed no evidence of leakage, and the fistula resolved by March 2024.

Conservative Approach

Given the patient's stable condition and minimal symptoms, surgical reconstruction of the bladder wall was deferred. Mesh removal and infection control were key to resolution.

4.1. Discussion

Bladder injury is a rare but recognized complication of laparoscopic inguinal hernia repair, with a reported incidence of less than 0.1% [1]. These injuries are more likely to occur in cases involving direct or complex hernias or during revision procedures where normal anatomy is distorted [2]. Preoperative imaging, especially in atypical cases, may aid in identifying at-risk anatomy [3]. Bladder decompression with Foley catheter, meticulous dissection along anatomical landmarks, and avoidance of tack placement near the bladder are all emphasized in reducing intraoperative risk [3].

Unrecognized intraoperative bladder injuries can lead to delayed sequelae such as recurrent abscesses, persistent drainage, and in rare cases, vesico-cutaneous fistula formation [4].

In this case, the patient's comorbidities—including ischemic heart disease, use

of antiplatelet agents, and hypertension—likely contributed to impaired wound healing and susceptibility to chronic infection. Aspirin may have contributed to microvascular fragility, compounding delayed inflammatory responses. Over time, the mesh became eroded into the bladder, eventually forming a communication between the bladder and the suprapubic region.

VCF formation is typically due to either direct trauma during dissection or delayed mesh erosion resulting from persistent low-grade inflammation and foreign body reaction [5]. In our case, intraoperative findings supported delayed erosion rather than acute injury.

Management of VCFs may be conservative or surgical. Surgical options include fistulectomy, bladder wall repair, and use of omental flaps [6]. However, in this patient, conservative treatment with prolonged catheterization was favored, considering the absence of systemic infection, small tract size, and successful infection control following mesh removal.

Diagnosis requires a high index of suspicion. CT imaging is essential for abscess identification and fistulous mapping, while cystography remains the gold standard for confirming bladder leaks [7]. Cystoscopy may directly visualize intravesical mesh or erosion points [8]. Intraoperative methods such as methylene blue or sterile saline instillation via a Foley catheter can detect leaks immediately [9].

Preventive measures include adherence to anatomical dissection planes, avoiding deep dissection near the bladder, and judicious mesh placement—particularly in high-risk patients [3].

Furthermore, mesh explantation in the setting of chronic infection warrants heightened suspicion for bladder injury, especially when the mesh is in close proximity to the bladder or pelvic floor. Installation of dye or saline to detect intraoperative leaks should be routine in such cases [9]. Even if no frank injury is noted, postoperative catheterization should be considered in high-risk patients to reduce intravesical pressure, support mucosal healing, and prevent VCF formation. In this case, earlier catheterization post-mesh removal may have reduced the risk of delayed fistula and subsequent hospital readmissions.

4.2. Conclusions

This case highlights the critical need for awareness of rare but serious complications such as vesico-cutaneous fistula (VCF) following laparoscopic hernia repair, particularly in the context of mesh use. Prompt recognition through appropriate imaging, early multidisciplinary involvement, and individualized patient management are essential for optimizing outcomes. Surgeons should maintain a high index of suspicion when patients present with atypical wound drainage or recurrent urinary symptoms, even years after surgery. Key learning points include the importance of meticulous surgical technique, proper anatomical dissection, cautious mesh placement away from the bladder, and avoiding excessive fixation near sensitive structures. Preoperative risk assessment, careful intraoperative monitoring, and structured postoperative follow-up can significantly reduce the incidence of such com-

plications. By incorporating these preventive strategies and maintaining close collaboration between surgical and urological teams, clinicians can improve patient safety and minimize the long-term risks associated with laparoscopic hernia repairs.

In addition, this case underscores the importance of correlating recurrent groin infections and drainage with prior mesh-based repairs, particularly when symptoms persist despite repeated interventions. Earlier suspicions of mesh erosion and timely correct interpretation of imaging could have facilitated diagnosis before the development of fistula. Intraoperative measures—such as prophylactic catheterization and urology team involvement at the time of mesh explantation—may prevent fistula formation by decompressing the bladder and aiding early recognition of occult injuries. These straightforward interventions could have significantly reduced the patient's hospital visits, discomfort, and delayed recovery. Ultimately, this case serves as a reminder that early multidisciplinary planning and thinking beyond the expected can change the trajectory of patient outcomes.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report, including all relevant investigations and clinical images.

Author's Contributions:

Dr. Asmita Hossain is the first author and was primarily responsible for the conception, data collection, literature review, manuscript drafting, and critical revisions of the case report. Mr. P. Papikinos and Mr. T. Murray contributed through supervision, guidance and manuscript analysis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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