ACS Case Reviews in Surgery
Vol. 4, No. 7

Femoral Hernioplasty Using a Ventral Hernia Patch in a Critically Ill Patient

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Background	Femoral hernias, representing only 2-4% of all repaired groin hernias, are more common in women and carry a higher risk of incarceration and strangulation compared to inguinal hernias. Prompt repair following diagnosis is generally recommended due to these potential complications, particularly for patients who are not critically ill. However, managing femoral hernias in critically ill individuals presents unique challenges.
Summary	This case describes an open repair technique for an incarcerated femoral hernia in a critically ill patient. The minimally invasive approach utilized local anesthesia, an infra-inguinal incision, and placement of a disc mesh deep within the femoral ring. While tension-free mesh repair is generally preferred, studies suggest potential drawbacks associated with the commonly used mesh plug technique, including foreign body sensation, seroma formation, migration, and prolonged recovery. This case demonstrates a valuable alternative for managing incarcerated femoral hernias in high-risk patients by minimizing dissection and potentially reducing recovery time compared to traditional mesh plug repairs.
Conclusion	This study introduces a novel minimally invasive approach for femoral hernia repair in critically ill patients. The technique utilizes a self-expanding mesh, deployed with minimal dissection and secured using traction on fixation straps. This approach offers several advantages: reduced dissection, simplified deployment, and reduced anesthetic burden, especially for high-risk patients.
Key Words	femoral hernia; hernioplasty; mesh; incarceration; groin hernia

DISCLOSURE STATEMENT:
The authors have no conflicts of interest to disclose.

FUNDING/SUPPORT:
The authors have no relevant financial relationships or in-kind support to disclose.

RECEIVED: February 22, 2022
REVISION RECEIVED: April 19, 2022
ACCEPTED FOR PUBLICATION: May 3, 2022

To Cite: Kauke M, Piechura L, Kristo G, Itani K, Whang EE. Femoral Hernioplasty Using a Ventral Hernia Patch in a Critically Ill Patient. *ACS Case Reviews in Surgery*. 2024;4(7):77-80.

Case Description

Femoral hernias, protrusions of abdominal contents through the femoral canal, typically involve the peritoneal sac extending medially to the femoral vein, posterior to the inguinal ligament, lateral to the lacunar ligament, and anterior to the pectineal ligament. Although constituting only 2-4% of all repaired groin hernias, they are more common in females and carry a higher risk of incarceration and strangulation compared to inguinal hernias.[1,2] Consequently, prompt repair is recommended upon diagnosis, even for critically ill patients, to minimize complication risks.[3]

Femoral hernia repair options encompass laparoscopic and open approaches, with suprainguinal, transinguinal, and infrainguinal techniques documented.[4] While tension-free repair without mesh, like the McVay technique (approximating the transversus abdominis aponeurosis, transversalis fascia, and pectineal ligament), offers a theoretical advantage, it is technically challenging and associated with higher recurrence rates compared to mesh repairs.[5,6]

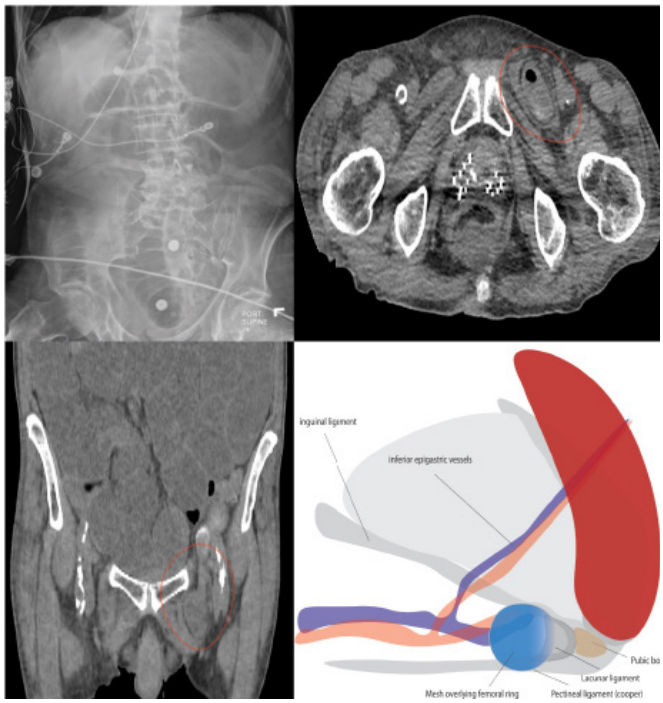
Long-term data on femoral hernia repair in critically ill patients remains scarce, making optimal treatment strategies debatable. This case report presents a valuable surgical approach for repairing incarcerated femoral hernias in this high-risk population.

A 69-year-old man with a history of transurethral resection of the prostate (TURP) was admitted for chronic obstructive pulmonary disease (COPD) exacerbation and pneumonia (IRB approval obtained).

Physical examination revealed abdominal distention, and abdominal X-ray showed mildly dilated small bowel loops (Figure 1A). Ileus was suspected due to pneumonia (no hernias identified on exam). Management included nonoperative nasogastric tube decompression and bowel rest. Initial labs showed leukocytosis (WBC 33,000/μL) and pre-renal acute kidney injury (creatinine 3.2 mg/dL, BUN 100 mg/dL).

The patient's condition worsened with atrial fibrillation, rapid ventricular response, and hypotension, prompting transfer to critical care. Five days after nasogastric tube removal (initial gas and stool passage reported), he developed renewed distention and witnessed aspiration. His respiratory status deteriorated, requiring high-flow nasal cannula (HFNC) and broader antibiotic coverage (vancomycin, cefepime, metronidazole). Non-contrast CT scan of the abdomen revealed mechanical small bowel obstruction due to a left-sided femoral hernia containing small bowel (Figure 1B, 1C). A concurrent chest CT scan confirmed aspiration pneumonia.

Figure 1. Imaging and Repair of Incarcerated Femoral Hernia. Published with Permission



A) Abdominal radiograph demonstrates dilated small bowel loops (suggestive of obstruction). B & C) Non-contrast CT scans reveal a femoral hernia containing a loop of incarcerated small bowel and ascites. The hernia sac is confined below the pubic tubercle, with compression of the femoral vein evident. D) Schematic illustration of minimally invasive mesh repair for incarcerated femoral hernia. The myopectineal orifice is closed with a mesh disc. The mesh patch (not shown) secures to the pectineal ligament, lacunar ligament, inguinal ligament, and the lateral aspect of the residual hernia sac. The disc overlies the femoral ring medially to the femoral vein, facilitating femoral canal closure.

Due to the patient's critical cardiorespiratory status, local anesthesia was chosen. Approximately 20 cc of a 1% lidocaine and 0.25% Marcaine solution was infiltrated into the skin and subcutaneous tissues, with the option for re-administration as needed. A 5 cm skin incision was made inferior to the inguinal ligament. Careful dissection, employing both sharp and blunt techniques with electrocautery, facilitated access to the hernia sac located medial to the femoral vein. This chronically inflamed, thickened, and indurated sac was meticulously dissected free from surrounding adhesions. Upon entering the sac with a size 15 blade (minimizing thermal injury risk to contents), a large volume of ascites was encountered.

An incarcerated but viable loop of bowel was visualized at the femoral ring during the procedure. To facilitate reduction, a vertical partial split was made in the inguinal ligament. The enlarged femoral canal (>3 cm) was reconstructed using a 4.3 × 4.3 cm PROCEED Ventral Patch (circle, polypropylene) commonly used for ventral hernia repair. The mesh was secured with 2-0 polypropylene sutures to the inguinal ligament anteriorly, the lacunar ligament medially, and the pectineal (Cooper's) ligament posteriorly. An additional anchoring stitch was placed laterally using the thickened hernia sac tissue. The iatrogenic split in the inguinal ligament was then closed in an interrupted fashion. The anterior portion of the hernia sac was resected, and the remaining lateral and medial edges were reapproximated with interrupted 3-0 Vicryl sutures over the femoral ring to achieve complete closure. Subcutaneous tissues were closed with interrupted 3-0 Vicryl sutures, and the skin was closed with a running 4-0 monocryl subcuticular stitch. The entire procedure was completed within 55 minutes without complications.

The patient's postoperative course was relatively uneventful. He reported no pain or foreign body sensation at the repair site. Effective pain management was achieved, allowing removal of the nasogastric tube on postoperative day 2. He was gradually advanced to a clear liquid diet, but experienced multiple liquid bowel movements and tested positive for *Clostridium difficile*. Consequently, he received a two-week course of oral vancomycin to treat the *C. diff* infection. Physical therapy assessments during hospitalization identified the need for further rehabilitation. He was discharged to a rehabilitation facility six weeks post-surgery for continued recovery.

Discussion

This case sheds light on the complexities in managing critically ill patients with complications arising from femoral hernias. We opted for an open yet minimally invasive approach to repair the incarcerated femoral hernia. This choice prioritized patient safety by avoiding the potential risks associated with general anesthesia or sedation, which are often necessary for laparoscopic repair in more stable patients. This minimally invasive open technique offers a valuable alternative for critically ill individuals who may not tolerate more extensive procedures.

The use of mesh in femoral hernia repair is widely accepted due to its demonstrated effectiveness in reducing recurrence rates compared to tissue repair techniques.[1,7] However, the mesh plug technique, a popular choice, has been associated with drawbacks such as foreign body sensation, seroma formation, mesh migration, and potentially longer recovery times.[8]

While techniques like the Kugel approach offer alternatives for femoral hernia repair, the preperitoneal dissection they require can be challenging and time-consuming, particularly for critically ill patients.[9] Additionally, large-scale, long-term studies specifically evaluating recurrence rates in emergency settings are limited. Furthermore, the preperitoneal approach necessitates incising the transversalis fascia and entering through Hesselbach's triangle, which is a more invasive procedure compared to others. This increased invasiveness may predispose patients to developing direct inguinal hernias later. This approach might not be the optimal choice for repairing femoral hernias in critically ill patients.

Conclusion

This study introduces a novel minimally invasive approach for repairing femoral hernias in critically ill patients. The technique utilizes a self-expanding mesh designed for minimal dissection and facilitates deployment through traction on fixation straps. This approach offers several potential advantages, including reduced surgical trauma and improved suitability for high-risk patients.

Lessons Learned

This case emphasizes the importance of tailoring the surgical approach to a patient's critical condition. Here, an open but minimally invasive technique was successfully employed to address an incarcerated femoral hernia containing bowel tissue. This approach balanced the need for effective hernia repair with minimizing risks associated with more extensive surgery, particularly relevant for a compromised patient.

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