Retroperitoneal Incisional Hernia Secondary to Lumbar Revision Surgery. Description of the Surgical Repair Technique with Mesh and Intertransverse Fixation: A Case Report

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ABSTRACT
Introduction: Lumbar spine revision surgery is a procedure performed when mechanical or biological complications arise after primary surgeries. The surgical approach can alter the anatomy of the posterior abdominal wall, weakening it and leading to hernias at this level. **Objective:** To describe the surgical technique for repairing an incisional hernia in the retroperitoneum after lumbar revision surgery, using mesh and intertransverse fixation. **Conclusions:** Lumbar incisional hernias secondary to lumbar spine revision surgery are rare. They can be repaired in the same surgical stage by placing a polypropylene mesh with intertransverse transosseous fixation, yielding good and reproducible results.
Keywords: Retroperitoneal incisional hernia; retroperitoneal herniorrhaphy; failed lumbar spine surgery.
Level of Evidence: IV

Hernia incisional retroperitoneal secundaria a una cirugía de revisión lumbar. Descripción de la técnica quirúrgica de reparación con malla y fijación intertransversa: a propósito de un caso

RESUMEN
Introducción: La cirugía de revisión de la columna lumbar es un procedimiento que se realiza cuando surgen complicaciones mecánicas o biológicas tras las cirugías primarias. El abordaje quirúrgico puede alterar la anatomía de la pared abdominal posterior, debilitándola, y generar hernias a este nivel. **Objetivo:** Describir la técnica quirúrgica de reparación con una malla y fijación intertransversa de una hernia incisional retroperitoneal secundaria a una cirugía de revisión lumbar,. **Conclusiones:** Las hernias incisionales lumbares secundarias a una cirugía de revisión de la columna vertebral lumbar son raras. Se las puede reparar en el mismo tiempo quirúrgico colocando una malla de polipropileno con fijación transósea intertransversa. Los resultados son buenos y reproducibles.
Palabras clave: Hernia incisional retroperitoneal; herniorrafia retroperitoneal; cirugía fallida de columna lumbar.
Nivel de Evidencia: IV

INTRODUCTION

Lumbar revision surgery is performed in patients with recurrent symptoms due to structural surgical failure or biological complications. This type of surgery is challenging because of preexisting anatomical alterations, the presence of scar tissue, and the increased risk of complications such as infection and dural injury.[1-5]

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A lumbar incisional hernia is an anatomical defect of the posterior abdominal wall through which abdominal contents protrude, most commonly from the retroperitoneum.[6] The defect is bounded superiorly by the twelfth rib, inferiorly by the iliac crest, laterally by the external oblique muscle, and medially by the erector spinae muscle.[7] These hernias are rare, accounting for 1.5% of abdominal wall hernias; they may present as a well-defined reducible mass or as a large, poorly defined fascial defect.[6]

The aim of this report is to describe a surgical technique for the repair of a retroperitoneal incisional hernia using mesh and intertransverse fixation, secondary to lumbar revision surgery.

CLINICAL CASE

A 60-year-old woman with no relevant medical history was diagnosed with degenerative spondylolisthesis at L4-L5 and lumbar stenosis at L3-L5. She had undergone decompression, instrumentation, and posterior lumbar interbody fusion in 2017. Following the procedure, she developed an acute complication consisting of a cerebrospinal fluid fistula and multilevel vertebral osteomyelitis. She underwent multiple surgical debridements, hardware removal, fistula repair, and antibiotic therapy.

After resolution of the infection, the patient continued to experience severe mechanical low back pain that worsened with exertion. She was unable to tolerate prolonged standing or sitting, and her symptoms did not improve with analgesics or physical therapy. She reported no abdominal symptoms.

On physical examination, there was lumbar facet pain predominantly on the right side, as well as pain with active lumbar flexion and extension. She had residual right L4 paresis (Medical Research Council grade 4/5).

Lumbar MRI showed resolution of the infection and instability due to grade II L4-L5 spondylolisthesis secondary to pseudoarthrosis. At L3-L4, in the right posterolateral region, a retroperitoneal incisional hernia was identified, with a 1-cm hernial defect and a hernia sac measuring 10 x 5 x 5 cm, at risk of strangulation, classified as L4, W1, R1 according to the European Hernia Society (Figure 1).[8]

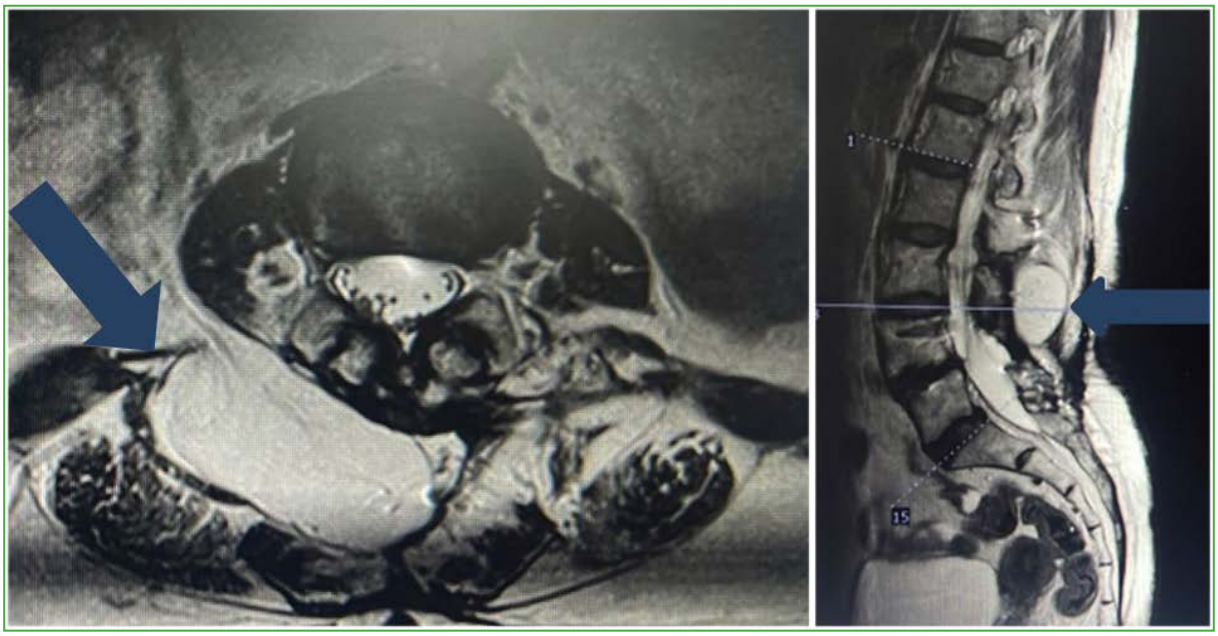

Figure 1. Magnetic resonance imaging of the lumbosacral region, axial and sagittal views. A hyperintense lesion measuring 10 x 5 x 5 cm is observed in the right posterolateral region, with a 1-cm hernial defect communicating with the retroperitoneal cavity.

Surgery was planned jointly by a spine surgeon and a general surgeon. A lumbar revision procedure was indicated to address pseudoarthrosis, along with repair of the retroperitoneal incisional hernia, given its interposition at the surgical approach site and the associated risk of iatrogenic bowel injury.

Layer-by-layer dissection was performed. The hernia sac (Figure 2A), its contents (omentum), and the hernial defect were identified, and a partial omentectomy was performed (Figure 2B).

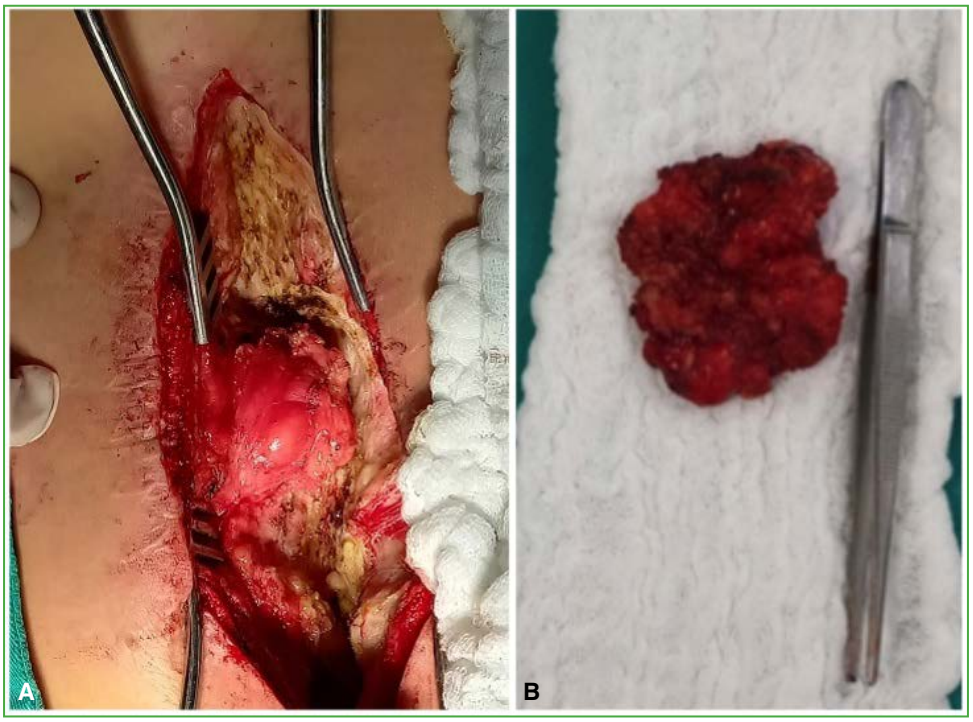

Figure 2. A. Right retroperitoneal incisional hernia. **B.** Partial omentectomy.

The hernia was reduced, and the fascial defect was repaired using a polypropylene mesh. Medially, the mesh was secured using a transosseous technique with Prolene™ 1 sutures to the right transverse processes of L3 and L4, which were drilled using a 1.5-mm drill bit; an additional suture was placed between the transverse processes (Figure 3).

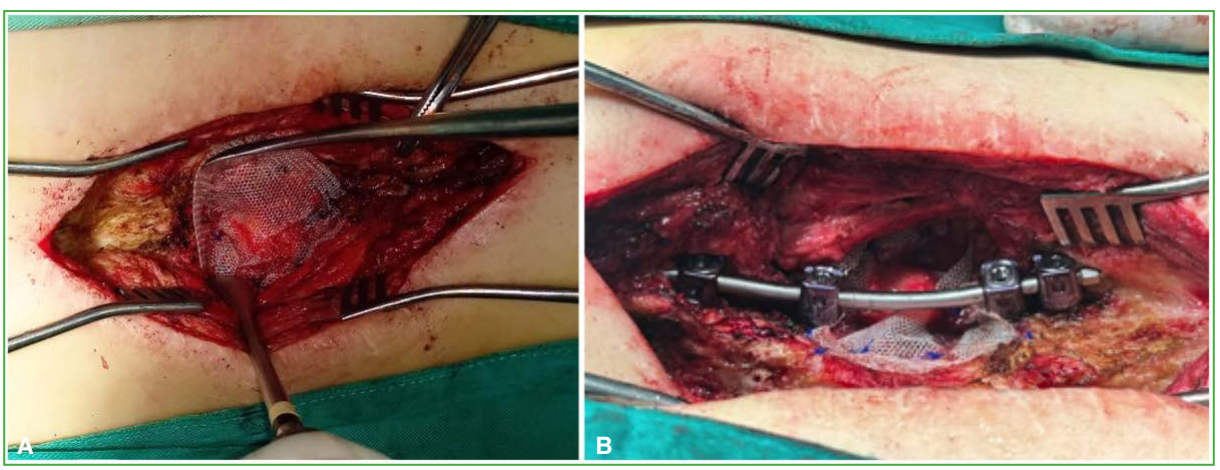

Figure 3. A. Hernia reduction and fixation of the polypropylene mesh. **B.** Lumbar instrumentation.

Laterally, the mesh was secured with three sutures to the remaining fascia and surrounding soft tissues (Figure 4). Subsequently, L2-S1 instrumentation was performed with intraoperative neuromonitoring, followed by posterolateral fusion using allograft. Postoperative radiographs confirmed appropriate lumbar instrumentation (Figure 5). The patient had a favorable outcome, with improved lumbar function and no pain or complications.

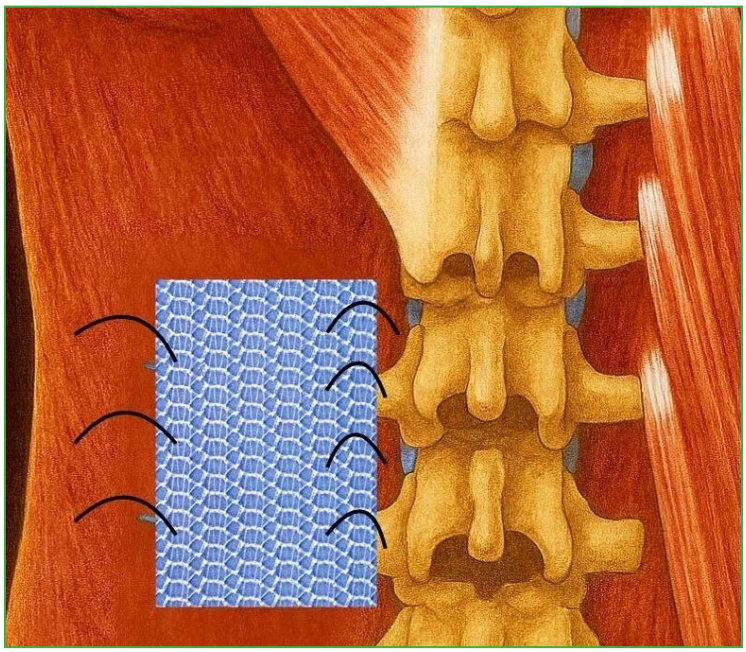

Figure 4. Representative image of the polypropylene mesh fixed to the fascia and surrounding soft tissues, as well as to the transverse processes of L3 and L4.

Figure 5. Anteroposterior and lateral radiographs of the lumbosacral region, postoperative follow-up. L2-S1 instrumentation.

At the 6-month postoperative follow-up, lumbar MRI demonstrated successful lumbar fusion and complete resolution of the retroperitoneal incisional hernia, with no evidence of recurrence (Figure 6).

Figure 6. Magnetic resonance imaging of the lumbosacral region, sagittal and axial views, showing resolution of the retroperitoneal incisional hernia.

DISCUSSION

Retroperitoneal hernias secondary to lumbar revision surgery are rare and occur following loss of integrity of the posterior abdominal fascia. They may result from resection of postoperative fibrotic tissue or from muscle atrophy.[9] The patient underwent multiple lumbar procedures, which weakened the posterior abdominal fascia and led to the development of a retroperitoneal incisional hernia.

The natural history of hernias involves a gradual increase in size.[10] Luu et al.[11] conducted a retrospective study of 735 patients who underwent lumbar spine surgery via a paramedian approach; 20 developed a lumbar incisional hernia, and 14 required surgical repair.

There is no consensus regarding optimal treatment. However, the primary objective is to restore the functional and mechanical integrity of the abdominal wall.[12] Predisposing factors include short stature, pregnancy, ascites, obesity, and muscle atrophy. The typical clinical presentation consists of a slowly enlarging lumbar mass, posterior abdominal pain or low back pain, and a positive Valsalva maneuver.[13]

Flank incisions may lead to retroperitoneal hernia due to disruption of the posterior abdominal wall fascia, or to pseudohernia secondary to nerve injury, resulting in decreased muscle tone and atrophy. Diagnosis is established by computed tomography (CT) or magnetic resonance imaging (MRI), which can demonstrate the hernial defect, size, location, and contents, or isolated atrophic changes of the abdominal wall.[12] In the present case, the diagnosis was confirmed by MRI.

Approximately 70% of these hernias require surgical treatment. Repair is technically challenging due to the proximity of bony structures, which limits adequate dissection and mesh overlap.[14] Surgical management may be open or laparoscopic, depending on defect size.[12] Current evidence favors laparoscopic repair over open techniques, as it is associated with reduced analgesic requirements, less postoperative pain, faster recovery, and improved visualization of visceral contents, thereby decreasing the risk of intra-abdominal injury.[13]

Du et al.[15] evaluated 11 patients with lumbar retroperitoneal hernias (not secondary to lumbar spine surgery) treated using a laparoscopic technique with self-adhering mesh and reported favorable outcomes.

This case illustrates an innovative technique for the repair of lumbar retroperitoneal hernias, involving transosseous intertransverse fixation of a mesh to both the transverse processes and the residual fascia. This approach may provide greater stability and reduce the risk of mechanical failure, with favorable outcomes. Further studies are required to validate this surgical technique.

CONCLUSIONS

Retroperitoneal incisional hernias secondary to lumbar spine revision surgery are rare. They can be repaired during the same surgical procedure using a polypropylene mesh with transosseous intertransverse fixation, with favorable outcomes.

This intertransverse mesh fixation technique provides enhanced stability and has not yet been described in the literature. Therefore, we recommend further evaluation through case series to validate its efficacy and safety. It may represent a useful option in complex cases requiring multiple prior surgical procedures.

Conflicts of interest: The authors declare no conflicts of interest.

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