

## Case Report

# An Extremely Rare Case Report of a Retroperitoneal Hernia Following Spinal Surgery

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Retroperitoneal hernias are extremely rare lumbar wall defects. Secondary hernias can occur after previous flank surgeries, infection or trauma. There is a paucity of literature regarding lumbar incisional hernias, most of them related to lateral approaches to the spine. We review a rare presentation of a symptomatic acquired retroperitoneal hernia following several posterior lumbar spine approaches. A successful hernia repair suturing the transversalis fascia to the middle layer of the thoracolumbar fascia using a biological mesh was performed, with resolution of the hernia symptoms. An extensive literature review regarding retroperitoneal hernia and its relation to spinal surgery was performed.

**Keywords:** Retroperitoneal hernia; Posterior approach; Hernia; Spine surgery; Postoperative complications.

## Introduction

Different surgical approaches have been developed to exposure lumbar spine, among which are the anterior approaches, the oblique and transposes retroperitoneal lateral approaches, or the posterior approach, this being the most commonly used at present.

One of the main advantages of the posterior approach is that allows an easy access to multiple levels for surgical procedures with a single incision. Furthermore, it is considered a versatile exposure through which many procedures can be performed. In the lumbar and thoracic spine, the posterior approach and its variants can even provide adequate exposure of the anterior part of the vertebral bodies, as has been described in surgery for spinal tumors [1], trauma and deformities [2].

The posterior surgical approach to the lumbar spine results in fewer complications than other approaches. Furthermore, few complications are directly attributable or unique to the posterior approach. Among the most frequent complications associated with this approach are excessive blood loss due to injury to vascular structures originating from subdermal vascular plexus, perforating segmental arteries, muscle, bone, and epidural venous plexus; surgical site infections, with has an estimated incidence of 1.0% to 12.0% [3]; epidural hematoma and its potentially devastating sequelae [4]; or wrong-level surgery, which prevalence has been estimated to be 1 in 3110 surgeries [5].

While hernias of the lumbar wall are a rare entity [6], and although spinal surgery has been described as a possible iatrogenic cause of them [7–9], however, there are no documented cases of retroperitoneal hernias secondary to a posterior approach of the lumbar spine.

Here we report a case of herniation of the retroperitoneal con-

tent into the paravertebral space following several posterior lumbar spine approaches. We present the following case in accordance with the CARE reporting checklist.

## Case Presentation

An obese Caucasian (BMI 32) 47-year-old female presented with severe non-specific low back pain, causing disability, that got worse with the Valsalva maneuver, and not responding to conservative treatment and opioid analgesics. The patient had no significant past medical history. She had a past surgical history of two spine surgeries including posterior spinal canal decompression with screw fixation from L2 to L5, and a second revision surgery removing previous instrumentation followed by instrumented posterolateral spinal fusion from L2 to L5.

Our patient did not present clinical signs or laboratory parameters suggestive of infection. As well as, no signs of stenosis, degenerative disease of the adjacent levels, or segmental vertebral instabilities were found. The instrumentation hardware was correctly positioned, and no signs of loosening or failure were observed. An MRI was obtained and demonstrated a lumbar hernia into the left paravertebral space containing retroperitoneal fat with no sign of incarceration or ischemia, with a fluid collection extend from level L3 to L5.

The patient underwent elective open drainage of fluid collection and the repair of transversalis fascia and the middle layer of the thoracolumbar fascia using a biological mesh derived from human extracellular matrix. The patient recovered well and was discharged on post-operative day five. At the time of publication there has been no hernia recurrence.

## Discussion

Retroperitoneal hernias are exceedingly rare, posterolateral,

parietal wall defect in the lumbar region containing retroperitoneal fat or viscera [10]. Retroperitoneal hernia are included in the group of lumbar hernias, with less than 400 cases reported in the literature and account for 2% of all abdominal wall hernias [11, 12].

They can be classified anatomically into superior or inferior lumbar hernias based on two well-defined areas of weakness. The superior lumbar triangle, describe by Grynfelt in 1886 [13], and the inferior lumbar triangle or Petit triangle, first described in 1783 [14, 15]. Herniation occurs more commonly in the superior triangle as it has a greater surface area compared to the inferior triangle, the reason why Grynfelt-Lesshaft hernias are much more common than Petit hernias [16].

In addition to the anatomic classification, lumbar hernias can further be categorized as congenital and acquired, which make up 20% and 80% of lumbar hernias, respectively [17]. On the one hand, congenital lumbar hernias are usually diagnosed during the pediatric age, and are most often associated with other congenital anomalies such as the lumbocostovertebral syndrome [18,19], although it has been reported with neural tube defects such as spina bifida [20]. On the other hand, acquired lumbar hernias can be primary or secondary [17]. Primary acquired lumbar hernias are more common, comprising 55% of all lumbar hernias [17]. Risk factors for developing a primary hernia are obesity, connective tissue disease, poor nutritional status, and conditions that increase intra-abdominal pressure, as the persistent cough [21]. Secondary lumbar hernias are either iatrogenic, traumatic, or following recurrent infection or inflammation process [22], and account for 25% of acquired lumbar hernias [13].

Lumbar hernias can lead to intestinal obstruction and intestinal strangulation after delayed diagnosis due to atypical clinical symptoms. Although strangulation of abdominal contents through a lumbar hernia is a very rare condition, with no more than 30 cases reported in the literature [23], the failure to resolve the obstructed circulation can be life-threatening because of intestinal necrosis.

Although post-traumatic lumbar wall herniations are relatively rare injuries, they should be suspected in patients with high-energy torso injuries [24]. In this sense, the only case of retroperitoneal hernia secondary to a lumbar vertebral fracture was described by Huang et al. in a patient who had suffered a traffic accident [25].

Most of the iatrogenic retroperitoneal hernias described in the literature have been related to injury to the retroperitoneal fascia in renal transplant surgery [26], retroperitoneal nephrectomies [27], radical cystectomy [28], or obtaining bone graft from the iliac crest [29], among others. However, hardly any cases of retroperitoneal hernias have been reported in the context of spinal surgery, and most of them are incisional hernias associated with lateral approaches to the thoracolumbar spine [9], whose usual clinical presentation is a bulging mass at the their lateral incision site. Although some authors suggest that its true incidence may be underestimated [30], only twenty three cases of incisional hernias have been described as a consequence of a lateral approach to the spine [30–35]. Most patients complained of a bulging mass at their lateral incision site. Furthermore, it should be noted the work published by Colosimo et al., in which to date is the only reported case of a patient with recurrent small bowel obstruction caused by a symptomatic retroperitoneal hernia secondary to anterior retroperitoneal lumbar spinal exposure [7].

In the surgical anatomy of the abdominal retroperitoneal spac-

es, the thoracolumbar fascia separate the paraspinous muscles from the muscles of the posterior abdominal wall and its middle layer is attached to the tips of the transverse processes of the lumbar vertebrae and extends laterally behind the quadratus lumborum [36], while the transversalis fascia forms the outer stratum of the retroperitoneal fascia, which lies deep to the transversus abdominis muscle and superficial to the preperitoneal fat and peritoneum [37]. Besides, some texts include the fascia of the psoas muscle with the transversalis fascia [38]. Therefore, and apart from the lateral approach surgery, which is fundamentally a retroperitoneal approach where there is a potential risk to damage intra- and retroperitoneal structures due to a close relationship between the surgical approach and the retroperitoneal fascia, in posterolateral fusion techniques in which a decortication of the transverse processes of the lumbar vertebrae is performed, there may be a risk of damaging the thoracolumbar and transversalis fasciae at the time of their dissection and surgical exposure, especially in those patients with paravertebral muscle atrophy and fatty degeneration. In fact, and similarly to our case, posterolateral fusion has been demonstrated as the most invasive procedure of the paraspinous muscles whose damage during lumbar back surgery may be one of the most important factors that causes atrophy of the muscles [39].

## Conclusion

Based on our findings and to our knowledge, this is the only case report of a retroperitoneal hernia as a complication of a direct posterior lumbar spinal exposure.

Although the complication in this patient was extremely rare, we must emphasize the importance of an adequate surgical exposure in order to preserve the retroperitoneal and thoracolumbar fasciae as biological barriers during surgical approaches to the spine.

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