

CASE SERIES OPEN ACCESS

Unexpected Pain: Thoracolumbar Disc Herniation and Its Neuralgic Shadows

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Received: 16 November 2024 | **Revised:** 29 January 2025 | **Accepted:** 19 February 2025

Funding: The authors received no specific funding for this work.

Keywords: case series | discectomy | inguinal pain | nerve block | neuroforaminal discopathy

ABSTRACT

Clinicians should consider thoracolumbar neuroforaminal discopathy in patients with atypical inguinal or abdominal pain, especially when common causes are excluded. MRI is crucial for accurate diagnosis. Temporary relief from nerve blocks may suggest spinal pathology. Surgical intervention, such as discectomy, can provide definitive treatment and effectively resolve referred pain.

1 | Introduction

Neuroforaminal discopathy, particularly neuroforaminal stenosis in the lumbosacral spine, involves the narrowing of the foraminal space, which compresses exiting nerve roots and leads to radicular pain, often manifesting as lumbar radiculopathy [1]. Symptoms primarily include radicular pain, sciatica, lower back pain, motor weakness, and sensory deficits, varying in severity based on the extent of stenosis and the affected nerve root [2]. Discopathy, or intervertebral disc degeneration, is known to cause atypical pain manifestations, such as inguinal, scrotal, or abdominal pain, due to the involvement of specific dermatomes—areas of skin innervated by a single spinal nerve root [3]. The spinal nerves leave the vertebral column through intervertebral foramina and supply distinct dermatomes in a segmental pattern [3]. The inguinal and scrotal regions are innervated by the iliohypogastric and ilioinguinal nerves, originating from the L1 and L2 spinal nerve roots, while the abdominal wall receives innervation from the lower thoracic and upper lumbar nerves (T10-L1) [4].

Inguinal and testicular pain can be attributed to various causes, including inguinal hernia and testicular issues [5]. Pain can also be referred from the spine, hip, or abdomen [6]. Inguinal hernias

are the most common cause of groin pain and can present with swelling and discomfort in the inguinal region [7, 8]. In contrast, pain at McBurney's point is a classic sign of acute appendicitis, often accompanied by anorexia, nausea, and vomiting [9]. A thorough diagnosis is essential to provide appropriate treatment. Healthcare providers may use a combination of physical examination, imaging tests, and laboratory tests to determine the underlying cause. The treatment plan will depend on the specific diagnosis and may include medication, physical therapy, or surgery [6, 10, 11].

Neuroforaminal discopathy can rarely present with inguinal, abdominal, or scrotal pain, which may mimic other conditions affecting the groin area. This can lead to diagnostic challenges and potentially unnecessary interventions if the underlying cause is not properly identified. The differential diagnosis of groin or abdominal pain requires a comprehensive approach, including neurological examination, blood biochemistry tests, and abdominal imaging. These investigations help rule out common conditions such as hernia, appendicitis, or renal pathology, ensuring that spinal causes, such as neuroforaminal discopathy, are not overlooked. The aim of this case series was to illustrate the diagnostic challenges and atypical presentations

Mohammad Reza Babaei and Mahsa Karbasi are contributed equally to this work and should be considered as co-first authors.

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of thoracolumbar disc herniation (TLDH) that can mimic other common conditions such as inguinal hernia, appendicitis, or renal issues.

2 | Case Presentation

2.1 | Case 1

A 45-year-old male presented with sharp, radiating pain from the inguinal region to the testicle. The pain was stabbing in nature and had been ongoing for several months. Several tests were performed during the initial evaluation, which showed normal CRP, ESR, and WBC levels, ruling out infection and systemic inflammation. Initial ultrasound and CT scans ruled out hernia, appendicitis, renal and testicular pathology. The patient was subsequently treated for neuralgia with an ilioinguinal and iliohypogastric nerve block. Pain relief was achieved for 1–2 weeks, but symptoms recurred, prompting further investigation.

2.2 | Case 2

A 50-year-old female reported persistent abdominal pain localized to McBurney's point. During the initial evaluation, blood tests showed normal levels of CRP, ESR, and WBC, ruling out infection or inflammation. Despite several imaging studies, no significant abnormalities were identified. The patient also underwent a nerve block with temporary improvement (Figure 2). However, as with the first case, pain recurred after 1–2 weeks.

2.3 | Case 3

A 52-year-old male experienced dull, aching pain in the inguinal area, which was initially suspected to be related to a possible hernia. Initial evaluations included blood tests, which showed normal levels of CRP, ESR, and WBC, ruling out infection or systemic inflammation. Despite multiple evaluations by a surgeon

who suspected a missed direct or indirect inguinal or spigelian hernia, imaging did not confirm this diagnosis. The patient underwent a nerve block similar to the others, with transient relief.

The patients in this series experienced pain in the inguinal dermatome and McBurney's point, with one patient describing stabbing pain radiating to the scrotum. Given these symptoms, the initial clinical workup included ultrasound and CT scans to rule out other possible conditions, such as hernia, appendicitis, and renal issues. After these conditions were excluded, the treating physician attempted to manage the pain by performing ilioinguinal and iliohypogastric nerve blocks. The initial nerve block consisted of an injection of 40 mg triamcinolone and bupivacaine (0.25%), performed under ultrasound guidance. This intervention resulted in temporary pain relief lasting 1–2 weeks; however, the symptoms subsequently reemerged. In response to the persistent pain, the physician proceeded with an alcohol block of the affected nerves. This intervention also led to temporary symptom relief, but the pain returned after 1–2 weeks. None of the patients had classic symptoms of disc herniation, such as back pain or radiculopathy, apart from mild discomfort in the thoracic and lumbar spine regions. Given the lack of improvement from nerve blocks and the inconclusive findings from earlier imaging studies, the treating physician ordered MRI scans of the thoracic and lumbar spine. The MRI revealed neuroforaminal discopathy at the upper lumbar and thoracolumbar regions.

3 | Diagnostic Challenges and Evolution

Despite initial interventions, the recurring nature of the pain and the lack of significant findings on imaging studies led the treating physician to explore alternative diagnoses. Given the absence of significant abdominal pathology and persistent pain, MRI of the thoracic and lumbar spine was performed for all three patients. The MRI findings revealed neuroforaminal discopathy in the upper lumbar and thoracolumbar regions, which had not been previously considered (Figures 1 and 2). It should be noted that the diagnosis for the first case took several months,

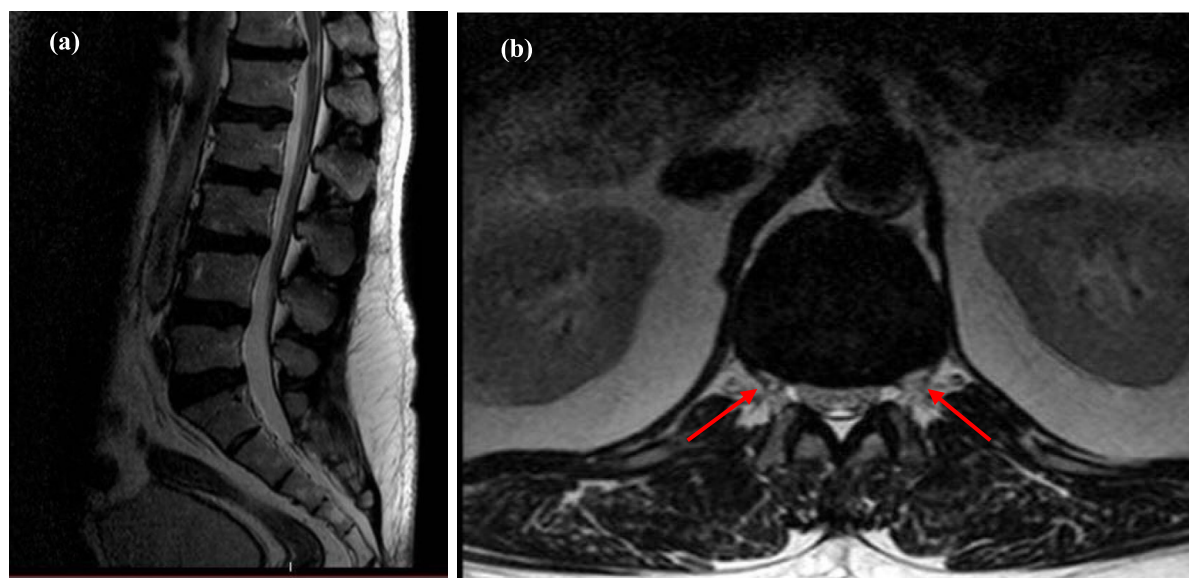


FIGURE 1 | First case: Sagittal (a) and axial (b) T2W images; bilateral neuroforaminal disc herniations are evident (arrows).

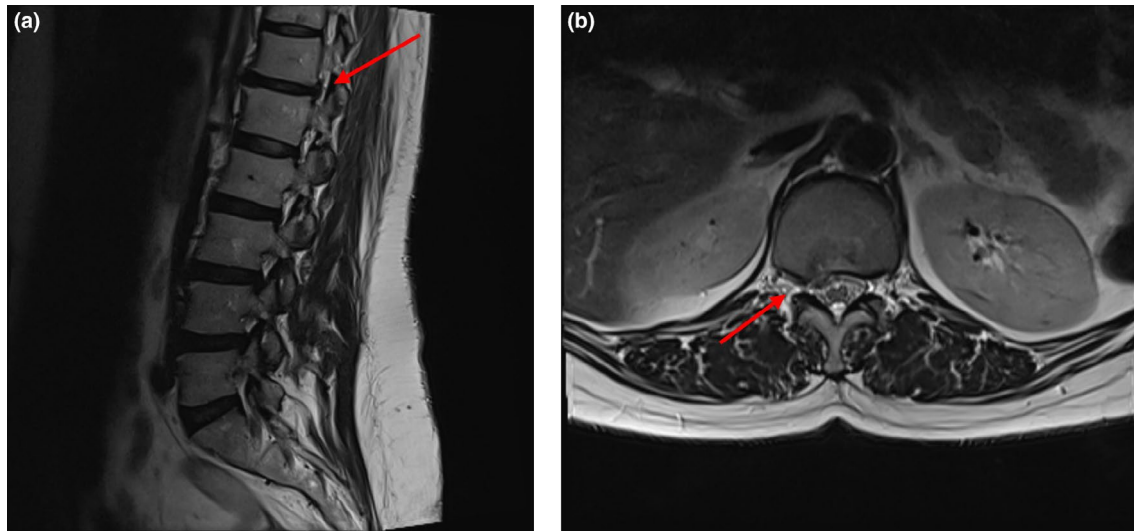


FIGURE 2 | Second case: Sagittal (a) and axial (b) T2W images demonstrate right neuroforaminal disc herniation (arrows).

but for the next two cases, based on our experience with the first case, we considered the atypical presentation of discopathy much earlier. Making a correct and timely diagnosis and paying attention to atypical manifestations is crucial, as the patient may suffer from pain for a long time otherwise.

4 | Treatment and Outcome

Following the diagnosis of neuroforaminal discopathy, the patients were referred for surgical evaluation. Each patient underwent discectomy, which resulted in significant improvement in symptoms. Postoperative follow-up indicated a resolution of inguinal, abdominal, and testicular pain, confirming the discopathy as the underlying cause.

5 | Discussion

TLDH is traditionally associated with more common symptoms such as back pain and radiculopathy. However, it can also present with atypical symptoms, including ilioinguinal/iliohypogastric neuralgia, scrotal pain, and abdominal pain, which pose significant challenges in clinical diagnosis and management. In the presented cases, initial evaluations included blood biochemistry tests and abdominal imaging, which ruled out common causes of groin and abdominal pain, such as hernia, appendicitis, or renal pathology. These non-neurological findings were crucial in narrowing the differential diagnosis and directing attention toward spinal pathology, ultimately leading to the identification of neuroforaminal discopathy.

The ilioinguinal and iliohypogastric nerves arise from the lumbar plexus, specifically from the L1 and L2 nerve roots. Herniation of discs at the thoracolumbar junction (e.g., T12–L1 or L1–L2) can compress or irritate these nerve roots, leading to pain referral in the distribution of these nerves [12, 13]. The ilioinguinal nerve supplies the lower abdominal and inguinal regions, while the iliohypogastric nerve supplies the lower abdominal and hip regions. Compression of the corresponding

nerve roots can result in pain in these areas, which may be misattributed to other conditions such as musculoskeletal issues or visceral problems [14]. A case report described a patient whose groin and scrotal pain, initially thought to be a urological issue, was ultimately traced back to TLDH. Such cases underscore the need for clinicians to consider spinal origins in patients with groin pain that does not fit typical patterns of urological conditions [15].

Scrotal pain as a symptom of TLDH is particularly rare and can easily be misinterpreted as a testicular or epididymal condition. Clinically, chronic testicular pain stemming from lumbar disc degeneration (LDD) is rare, likely due to underrecognition and lack of definitive diagnostics [16, 17]. However, cases linking LDD to testicular pain exist, suggesting a “pain involvement” mechanism [17, 18]. Bogduk et al. demonstrated multi-segmental innervation of lumbar discs, with pathways connecting L1/L2 nerve roots (involved in testicular sensation via genitofemoral and ilioinguinal nerves) to degenerated discs [18–20]. This neural overlap provides a basis for LDD-induced testicular pain. Discographic techniques, including methylene blue injection, targeting nociceptive nerve fibers in degenerated discs, have shown efficacy in alleviating both lumbar and testicular pain in such cases [21, 22]. This supports the hypothesis that testicular pain originates from LDD, transmitted non-segmentally via the sympathetic chain to L1/L2 nerve roots [22]. One reported case involved a patient whose persistent scrotal pain was eventually linked to a herniated disc compressing the genitofemoral nerve. This case highlights the importance of including spinal pathology in the differential diagnosis for scrotal pain when more common causes have been ruled out [15].

TLDH can also manifest as referred abdominal pain, further complicating the diagnostic process. Patients might undergo extensive investigations for gastrointestinal, urological, or gynecological issues before the spinal origin is identified. The abdominal pain from TLDH is often dull, aching, or cramping, and can be either localized or diffuse, mimicking various intra-abdominal conditions [15]. Compression or irritation of these nerve roots, particularly those at the T12–L1 or L1–L2 levels, can lead to abdominal

pain [14, 23]. A case report described a patient with severe right flank pain due to a thoracic disc herniation at the T9–10 level, which was successfully treated with surgical intervention [23].

These atypical presentations of TLDH often lead to misdiagnosis or delayed diagnosis. The overlapping symptomatology with other conditions, such as hip pathology or abdominal disorders, makes clinical evaluation complex. MRI is an essential tool in these cases, as it allows for direct visualization of the herniated disc and the compressed nerve roots, providing a definitive diagnosis when physical examination and other imaging modalities may fall short. Initial management of TLDH presenting with atypical symptoms often involves conservative measures. These include physical therapy aimed at reducing pain and improving mobility, pain management strategies such as nonsteroidal anti-inflammatory drugs (NSAIDs), and epidural steroid injections to reduce inflammation and alleviate nerve compression. When conservative treatments fail to provide relief, surgical options such as discectomy or spinal fusion may be necessary. Long-term monitoring is essential to ensure sustained relief and to address any complications early.

In conclusion, while neuroforaminal discopathy is a spinal condition, its potential to present with inguinal pain adds a layer of complexity to its diagnosis and management. The similarity of its symptoms to those of other inguinal conditions necessitates a careful and thorough diagnostic approach, with a strong emphasis on the use of imaging modalities such as MRI. Accurate diagnosis is critical to ensuring that patients receive the most appropriate and effective treatment, whether that involves conservative management or surgical intervention. By recognizing the possibility of neuroforaminal discopathy in patients with atypical inguinal pain, clinicians can avoid misdiagnosis and provide targeted care that addresses the true source of the patient's discomfort.

Author Contributions

Mohammad Reza Babaei: conceptualization, methodology, project administration, supervision, writing – review and editing. **Mahsa Karbasi:** conceptualization, methodology, project administration, supervision, writing – review and editing. **Alireza Motamedi:** writing – original draft. **Esmail Gharepapagh:** conceptualization, writing – review and editing. **Sahar Rezaei:** conceptualization, supervision, writing – review and editing.

Acknowledgments

The authors have nothing to report.

Ethics Statement

The local ethics committee at Tabriz University of Medical Sciences approved this study.

Consent

Written informed consent was obtained from the patients to publish this report in accordance with the journal's patient consent policy.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Requested data will be available based on a reasonable request.

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