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Case Report

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An Unusual Complication After Posterior Thoracolumbar Stabilization Surgery, Renal Hernia: A Case Report

Ender VERGILI[1], Irem KARABOGA[1], Ali Murat DURDU[1], Eren Fatma AKCIL[2], Mustafa Onur ULU[1]

[1]Istanbul University-Cerrahpasa, Cerrahpasa Faculty of Medicine, Department of Neurosurgery, Istanbul, Türkiye
[2]Istanbul University-Cerrahpasa, Cerrahpasa Faculty of Medicine, Department of Anesthesiology and Reanimation, Istanbul, Türkiye

Corresponding author: Ender VERGILI ✉ endervergili@gmail.com

ABSTRACT

Grynfeltt-Lesshaft hernia is a rare type of posterolateral abdominal wall hernia that may be either congenital or acquired. Only a few cases have been reported following surgical procedures. The risk of herniation increases after surgeries involving this region due to the weakening of the musculofascial structures, particularly in operations involving the thoracolumbar junction. Proper dissection and reconstruction of the paravertebral and deep back muscles are therefore crucial in minimizing the risk of herniation. In this paper, we discuss the mechanisms underlying the development of Grynfeltt-Lesshaft hernia following posterior thoracolumbar stabilization surgery—a procedure that is increasingly performed in neurosurgical practice. We also address the predisposing factors and emphasize the importance of meticulous reconstruction of the musculofascial structures within the superior lumbar triangle to prevent this rare complication.

KEYWORDS: Grynfeltt - Lesshaft hernia, renal hernia, posterolateral abdominal wall, thoracolumbar instrumentation

INTRODUCTION

Grynfeltt and Lesshaft described a hernia developing in the superior lumbar triangle in 1886 and 1870, respectively. The superior lumbar (Grynfeltt-Lesshaft) triangle is bordered medially by the quadratus lumborum and erector spinae muscles, laterally by the posterior margin of the internal abdominal oblique muscle, and superiorly by the 12th rib (3). The floor of this triangle is formed by the aponeurosis of the transversalis muscle, while its roof consists of the latissimus dorsi and external oblique muscles (Figures 1,2). Grynfeltt-Lesshaft hernias account for approximately 1% of all abdominal wall hernias (1).

In this paper, we discuss the mechanisms underlying the development of Grynfeltt-Lesshaft hernia following posterior thoracolumbar stabilization surgery—a procedure increasingly utilized in neurosurgical practice. We also highlight the predisposing factors and the importance of meticulous reconstruction of the musculofascial structures in the superior lumbar triangle to prevent this rare complication.

CASE REPORT

A 46-year-old female presented to the outpatient clinic with low back pain and anterior bilateral thigh pain persisting for four months. On neurological examination, there was tenderness over the thoracolumbar region on palpation, but no motor or sensory deficits were noted. Lumbar magnetic resonance imaging (MRI) and computed tomography (CT) scans revealed a cystic lesion in the L1 vertebral body (Figure 3A). With a preliminary diagnosis of aneurysmal bone cyst, the patient underwent tumor resection, T11-L3 posterior thoracolumbar instrumentation, and T12-L1 laminectomy.

Her symptoms resolved in the postoperative period, and she was fitted with a steel underwire lumbar corset for six weeks. Histopathological examination confirmed the diagnosis of

Ender VERGILI : 0009-0004-1142-1780
Irem KARABOGA : 0009-0009-3608-5505
Ali Murat DURDU : 0009-0005-2597-5618
Eren Fatma AKCIL : 0000-0002-5956-2265
Mustafa Onur ULU : 0000-0002-6256-0869

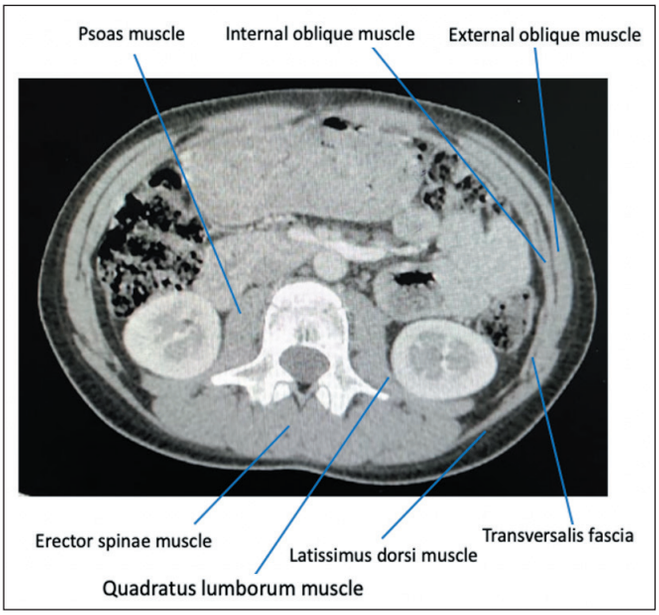

Figure 1: Axial abdominal CT image demonstrating anatomical structures adjacent to the superior lumbar (Grynfeltt-Lesshaft) triangle, including the quadratus lumborum, erector spinae, internal oblique, external oblique, latissimus dorsi muscles and transversalis fascia.

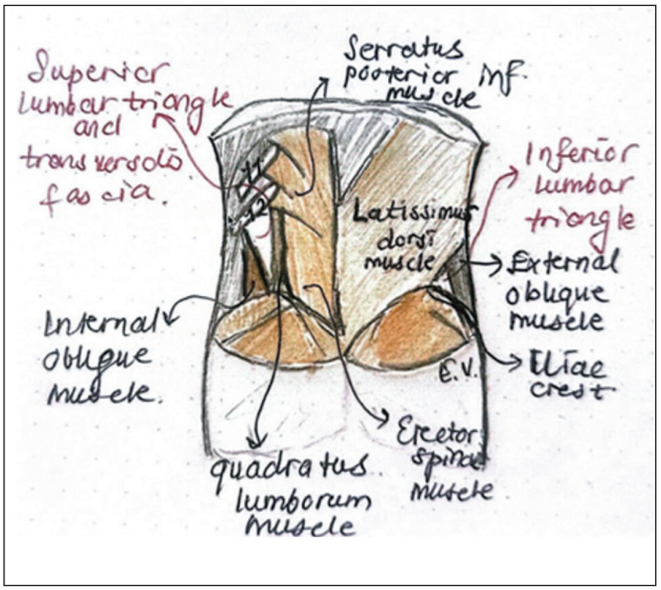

Figure 2: Schematic illustration of the superior lumbar (Grynfeltt-Lesshaft) triangle. The triangle is bordered medially by the quadratus lumborum and erector spinae muscles, laterally by the posterior border of the internal abdominal oblique muscle, and superiorly by the 12th rib. The floor is formed by the transversalis fascia, and the roof is formed by the latissimus dorsi and external oblique muscles.

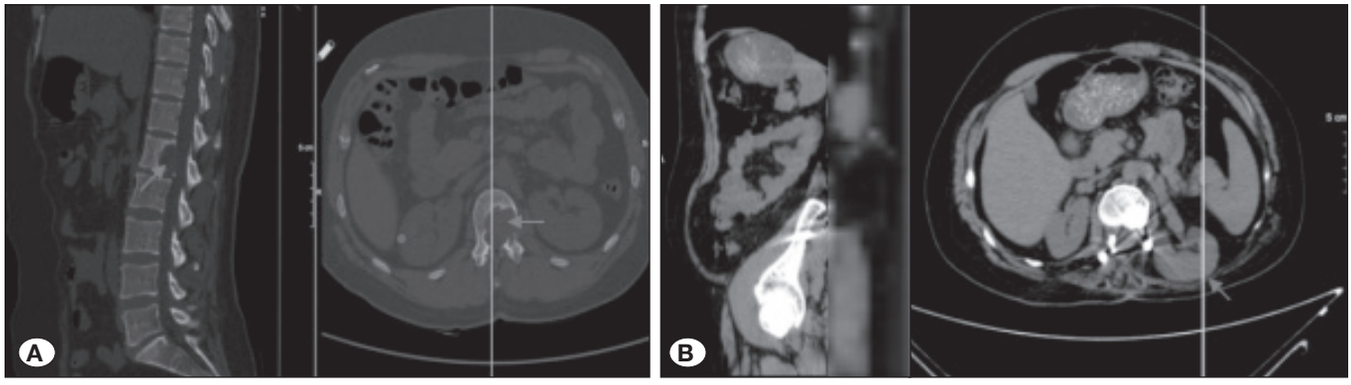

Figure 3: Preoperative CT **(A)** midsagittal and midaxial reconstruction shows a cystic lesion located in the L1 vertebra corpus (arrows), postoperative CT **(B)** sagittal and axial reconstruction shows left renal hernias (arrows).

aneurysmal bone cyst. Three years postoperatively, the patient presented again with recurrent low back pain lasting two months. Imaging revealed a rod fracture, and revision surgery (T10-S1 instrumentation) was performed. The patient's complaints resolved completely after the revision.

At the 10th postoperative month, a palpable, painless swelling was detected in the left flank region. Ultrasonography performed with the Valsalva maneuver revealed no apparent fascial defect, but the left kidney was seen adjacent to the lateral abdominal wall. Subsequent CT and MRI imaging demonstrated a left-sided renal herniation secondary to atrophy and weakening of the paravertebral muscles and fascia (Figures 3B, Figure 4). Laboratory tests, including renal function tests, were within normal limits. The patient was evaluated by a multidisciplinary team, and conservative management with periodic physical examinations and renal function monitoring was recommended. No significant changes were observed during follow-up.

DISCUSSION

Lumbar hernias account for approximately 2% of all abdominal wall hernias. They may be congenital or acquired; about 20% are congenital, typically occurring in infants as a result of weakness of the lateral abdominal wall. Acquired lumbar hernias constitute roughly 80% of cases and can be classified as spontaneous (primary) or secondary. The two types occur with similar frequency (5).

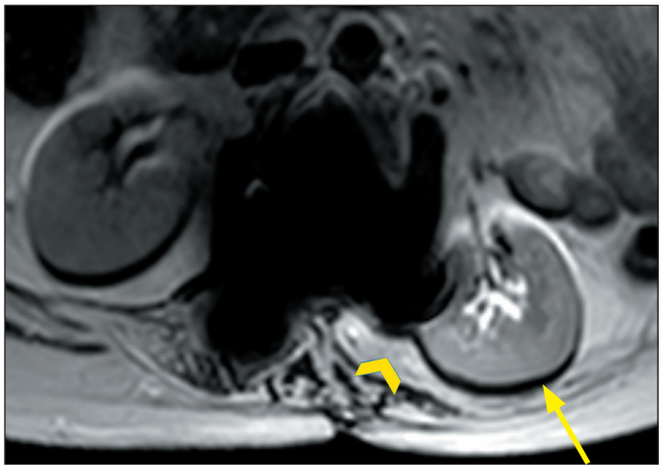

Figure 4: T2-weighted axial MRI image showing atrophy of the left paravertebral muscles (arrowhead) and weakening of the fascia compared to the right side, resulting in left-sided renal herniation (arrow).

The first reported case of Grynfeltt-Lesshaft hernia was published by Presti et al., describing a 42-year-old female who presented with low back pain and hematuria and was found to have Grynfeltt-Lesshaft hernia involving the kidney and ureteropelvic junction (5). Surgical repair was performed successfully. Another case was reported in a patient who had undergone laparoscopic adrenalectomy for Cushing's syndrome (4).

Primary lumbar hernias are associated with risk factors such as obesity, tall stature, chronic bronchitis, and muscular atrophy, whereas secondary lumbar hernias may result from trauma, benign or malignant lesions of the lumbar bones or muscles, retroperitoneal hematoma, or previous surgery (2,4). Review of the literature indicates that postoperative lumbar hernias have been described following laparoscopic adrenalectomy, pyeloplasty, and colectomy, with a higher prevalence among female patients around 60 years of age (6).

Clinical presentation may vary from asymptomatic swelling to severe pain, hematuria, or renal impairment. On physical examination, a flank bulge that increases with the Valsalva maneuver may be observed, sometimes accompanied by tenderness. Incarcerated hernias may lead to elevated urea and creatinine levels. Imaging modalities such as ultrasonography, CT, MRI, and intravenous pyelography are valuable diagnostic tools (1,6).

To the best of our knowledge, this is the first reported case of Grynfeltt-Lesshaft hernia developing after posterior thoracolumbar stabilization surgery. Factors contributing to herniation may include the use of cautery to detach paravertebral muscle groups from posterior vertebral elements, postoperative muscle atrophy, inadequate or excessively wide muscle dissection, and insufficient reconstruction of musculofascial structures at the end of the procedure, all of which reduce regional strength.

The risk of hernia formation increases in patients with comorbidities such as diabetes, hypertension, and hypothyroidism, in older female patients, in surgeries involving the thoracolumbar junction due to its proximity to the Grynfeltt-Lesshaft triangle, and in revision surgeries (5,6).

CONCLUSION

For surgical procedures at the thoracolumbar junction, careful dissection of paravertebral muscles, minimal use of cautery, anatomically accurate reconstruction of the musculofascial structures, and limiting the extent of dissection are critical for preserving the integrity of the posterior abdominal wall and minimizing the risk of Grynfeltt-Lesshaft hernia.

Declarations

Funding: No financial or personal relationships influenced the work reported in this manuscript.

Availability of data and materials: The data supporting the findings of this study are available from the corresponding author on reasonable request.

Disclosure: The authors declare that they have no conflicts of interest regarding the publication of this case report.

Ethics approval and consent to participate: This case report did not require formal Institutional Review Board approval; written informed consent was obtained from the patient.

AUTHORSHIP CONTRIBUTION

Study conception and design: EV, MOU
Data collection: EV, IK, AMD
Analysis and interpretation of results: EV, IK
Draft manuscript preparation: EV, IK
Critical revision of the article: EFA, MOU
Other (study supervision, fundings, materials, etc...): MOU
All authors (EV, IK, AMD, EFA, MOU) reviewed the results and approved the final version of the manuscript.

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