Poškodbena spondilolisteza L5-S1: prikaz primera

Traumatic L5-S1 spondylolisthesis: A case report

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Ključne besede:
poškodbena spondilolisteza, fiksacija s pedikularnimi vijaki, ligamentarna poškodba, medvretenčna košarica, spondilodeza

Key words:
traumatic spondylolisthesis, pedicle screw fixation, ligamentous rupture, interbody cage, lumbar interbody fusion

Članek prispel / Received
12. 6. 2023
Članek sprejet / Accepted
5. 10. 2023

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Izvleček

Namen: *Namen primera je prikaz diagnostične obravnave in zdravljenja travmatske spondilolisteze ledveno-križničnega prehoda. Gre za redko poškodbo, pri kateri gre za eno ali obojestranski izpah fasetnega sklepa na nivoju L5-S1 s posledičnim premikom vretenca L5 glede na križnico.*

Prikaz primera: *Predstavljen je primer poškodbene spondilolisteze na nivoju L5-S1. Predoperativni CT in MR sta pokazala subluksacijo fasetnega sklepa L5-S1 desno z zlomljeno spodnjo faseto L5 na desni strani, prekinjenim sprednjim longitudinalnim ligamentom, poškodbo zadnjega ligamentarnega kompleksa in protruzijo diska L5-S1. Po opravljeni vstavitvi pedikularnih vijakov L4, L5 in S1 ter obojestranski razbremenitvi živčnih korenin, je bila izvedena dokončna fiksacija in*

Abstract

Purpose: *Here, we report the diagnosis and management of a patient with a traumatic lumbosacral spondylolisthesis, a rare clinical entity that is characterized by unilateral or bilateral facet dislocations causing displacement at the level of the fifth lumbar vertebra in relation to the sacrum.*

Case presentation: *We report a case of a traumatic L5-S1 unilateral lumbosacral dislocation. Based on the preoperative CT and MRI findings, the patient sustained a right-side unilateral L5–S1 subluxation with an L5 right inferior articular process fracture, a torn anterior longitudinal ligament and posterior ligamentous complex, and L5-S1 disc protrusion. Decompression, reduction with L4, L5, S1 pedicular screw fixation, L5-S1 disc excision, and inter-*

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zatrditev segmenta L5-S1 z medvretenčnima vsadkoma, vstavljenima z zadnje strani. Operativni poseg in pooperativna rehabilitacija sta potekala brez zapletov in po šestih mesecih je gospod brez težav opravljal predpoškodbene aktivnosti.

body cage insertion were performed. The patient had an uneventful recovery and returned to his previous activities 6 months after surgery.

INTRODUCTION

Traumatic spondylolisthesis in the lumbosacral region is a rare clinical entity that is characterized by unilateral or bilateral facet dislocations causing displacement at the level of the fifth lumbar vertebra in relation to the sacrum (1). A traumatic spondylolisthesis is caused by a high-energy injury that affects all three columns and is frequently associated with severe concomitant injuries. Radiographs performed in the emergency room do not always demonstrate subtle findings, and a proper diagnosis can easily be missed, especially in multitrauma patients (2).
Here, we report the diagnosis and surgical treatment of this rare traumatic condition.

CASE REPORT

A 35-year-old man was injured while working in the forest when a tree fell on his back. On presentation to the emergency department the patient was hemodynamically stable, he was breathing at a rate of 30/min, and he denied dyspnea. He complained of pain on the left side of the chest and mild lumbosacral pain. Palpation of the spine revealed low lumbar tenderness with ecchymoses in the lumbosacral region. There was no neurologic impairment of the lower extremities.
The initial radiographs showed serial rib fractures on the right side and fractures of transverse processes from L1–L5 (Fig. 1). A computed tomography (CT) scan of the lumbosacral junction also revealed additional L5-S1 right-side facet subluxation with an L5 right inferior articular process fracture (Fig. 2).

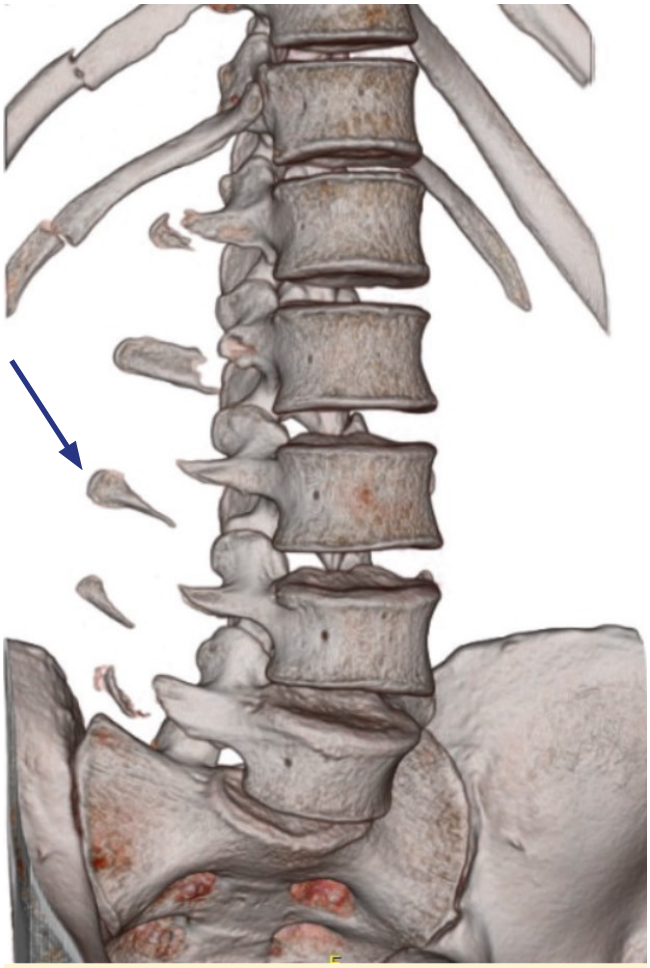

Figure 1: *Three-dimensional CT showing inferior rib and L1–L5 transverse process fractures on the right side (black arrow).*

A magnetic resonance image (MRI) of the lumbosacral spine confirmed the bone injuries and showed mild anterior subluxation of L5 on S1. Furthermore, the MRI demonstrated disruption of the posterior ligamentous complex, rupture of the anterior longitudinal ligament, and L5-S1 disc herniation (Fig. 3).

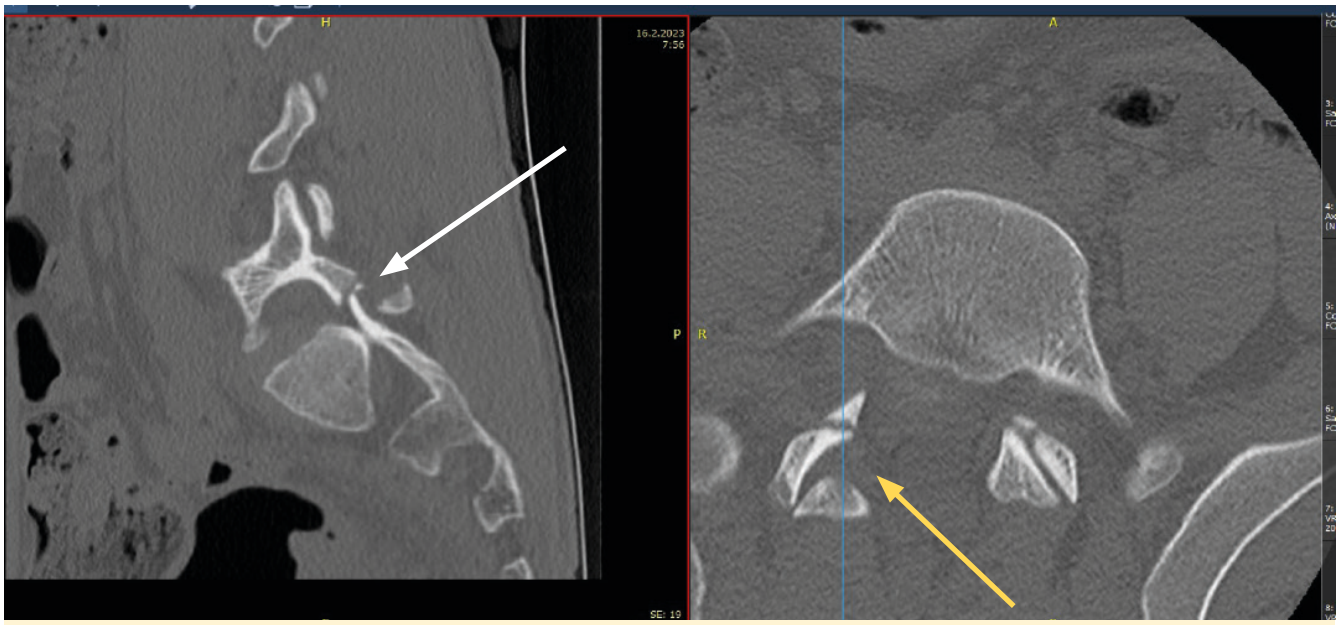

Figure 2: *Computed tomography (CT) of the lumbar spine. There is evidence of an L5 right inferior articular process fracture, a perched facet–vertebral joint in which the inferior articular process appears to sit "perched" on the ipsilateral superior articular process of the vertebra below (white arrow) and L5-S1 right-side facet subluxation (yellow arrow).*

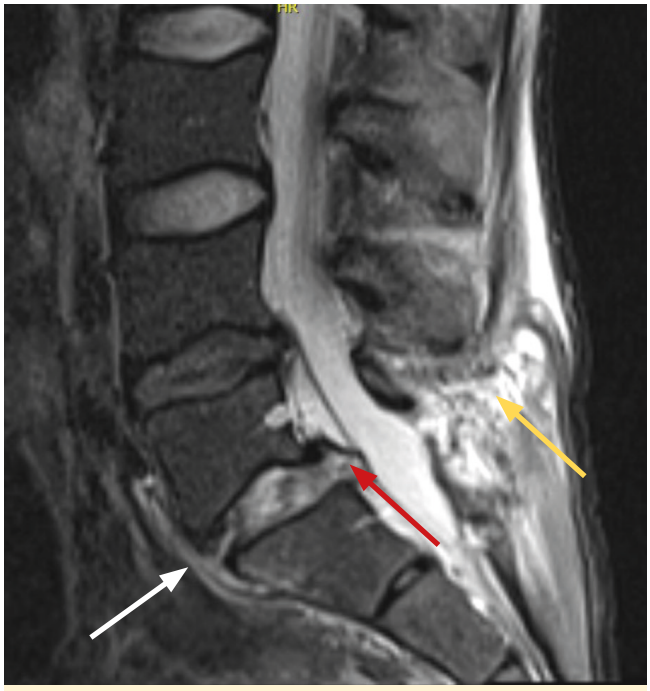

Figure 3: *T2-weighted MRI demonstrates disruption of the posterior ligamentous complex (yellow arrow), rupture of the anterior longitudinal ligament (white arrow), and L5-S1 disc herniation (red arrow).*

Decompression, reduction with L4-S1 pedicular screw fixation, L5-S1 disc excision, and two interbody cage insertions were performed. The patient tolerated the procedure without complications. Postoperatively, the patient had a favorable outcome and was ambulating without assistance upon discharge.

The patient had regular clinical and radiologic follow-up evaluations. Six months postoperatively the patient was pain-free and fully mobile. There were no signs of infection. The patient returned to normal activities, including work. X-ray films showed normal anatomic alignment of the lumbar spine and solid fusion of the L5-S1 segment (Fig. 4).

DISCUSSION

Facet dislocation is an injury that is classically localized to the mobile cervical spine. The rarity of facet dislocation in the lumbosacral spine has been attributed to a more stable junction because of an increased inclination in the sagittal plane, the increased vertical orientation of the facets, and the presence of the powerful musculature and ligamentous

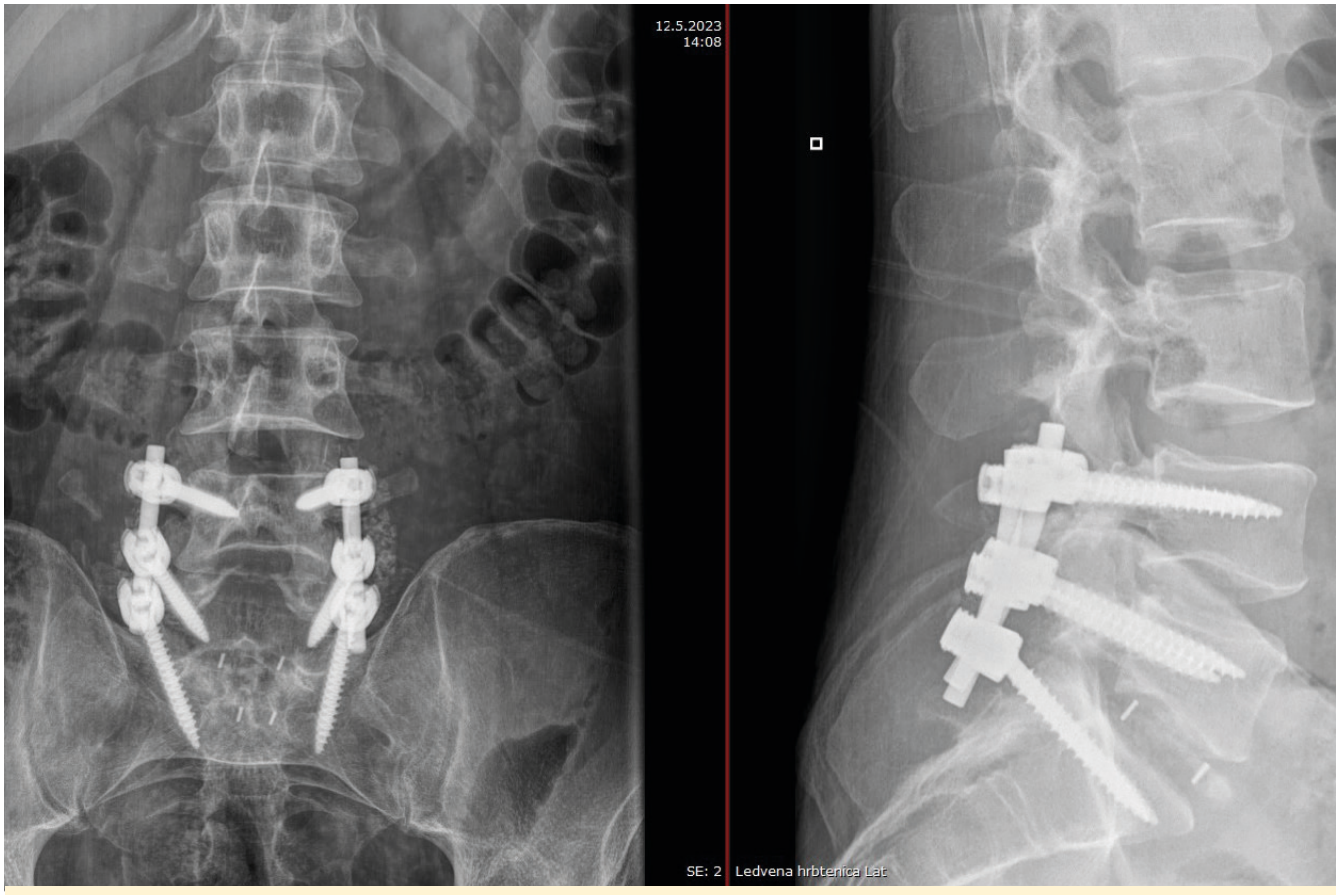

Figure 4: *Postoperative (6-month follow-up evaluation) standing AP and lateral plain X-ray showing anatomic reduction and solid fusion with good sagittal balance.*

complex (3). Most facet dislocations tend to be bilateral with only few cases of unilateral facet dislocations reported in the literature (4).

Good-quality initial radiographs are important to establish a diagnosis because radiographs obtained in the emergency room are frequently inadequate. As in our case, transverse process fractures of lumbar vertebrae are frequent radiologic findings associated with traumatic spondylolisthesis in the lumbosacral region. Therefore, transverse process fractures visible on plain radiographs should be an alarming finding that warrants a further search for traumatic spondylolisthesis (2).

Other features suggestive of traumatic spondylolisthesis on lateral radiographs are the interspinous distance, a sharp kyphosis at L5-S1, narrow anterior disc space height, and increased spine radiodensity due to superimposed vertebral bodies on anterior–posterior (AP) radiographs, subtle focal angulation of AP spinal alignment, and absence of psoas shadow due to retroperitoneal hemorrhage. Bowel shadows may obscure these findings and the correct diagnosis can be overlooked (5).

It is recommended that CT and MRI be performed in all high-energy trauma patients with suspected spondylolisthesis (6). Advanced imaging modalities are now routinely used in virtually all high-energy trauma patients in our institution. A CT study allows for visualization of injuries to the posterior elements and locked or fractured facet dislocations with displacement of L5 on S1. An MRI examination allows identification of the herniated disc and degree of ligamentous disruption (7).

Forced hyperextension was the mechanism of injury initially proposed to account for traumatic spondylolisthesis (8). In contrast, the probable mechanism of injury in the current case was severe flexion-distraction injury in the lumbar spine. There

was initially a ligamentous fracture of the facet with right-side subluxation and subsequent disc rupture. All of these findings were verified intraoperatively.

The therapeutic management of lumbosacral dislocation has changed with time. Although success with conservative treatment has been reported, this choice of treatment is not currently used except in very young children (5). According to the Denis classification, traumatic spondylolisthesis is an unstable three-column injury that requires surgical stabilization. Open reduction, internal fixation, and bone grafting are favored by many authors, and a posterior approach is currently recommended. Surgical intervention provides normal anatomic relationships and prevents late deterioration (9).

After posterior reduction with L4, L5, and S1 pedicle screw instrumentation, anterior lumbar interbody fusion using two interbody cages was performed in the current case. Reduction of the listhesis was easy, which we believe reflects the high degree of instability of that motion segment, and accordingly required adequate anterior and posterior stabilization.

CONCLUSION

We reported on a rare injury of the lumbosacral junction resulting from a high-energy mechanism. Because traumatic spondylolisthesis is a rare injury, traumatic spondylolisthesis can be easily missed without appropriate radiographic examination and a high index of suspicion. Advanced imaging modalities should be used routinely in virtually all high-energy trauma patients to facilitate demonstration of the injury. Acute complete dislocations are highly unstable, three-column injury patterns requiring surgical intervention.

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