



Case Report

Early postoperative sacral fracture after short-segment posterior lumbar interbody fusion for L5/S1 isthmic spondylolisthesis: A case report

Toshinari Kawasaki¹, Motohiro Takayama¹, Yoshinori Maki², Tamaki Kobayashi¹, Yoshihiko Ioroi¹

¹Department of Neurosurgery, Otsu City Hospital, ²Department of Rehabilitation, Hikari Hospital, Shiga, Japan.

E-mail: *Toshinari Kawasaki - toshi821@kuhp.kyoto-u.ac.jp; Motohiro Takayama - gara1016@hotmail.com; Yoshinori Maki - passatempo19840816@gmail.com; Tamaki Kobayashi - ktamaki@kuhp.kyoto-u.ac.jp; Yoshihiko Ioroi - yioroi@kuhp.kyoto-u.ac.jp



*Corresponding author:
Toshinari Kawasaki,
Department of Neurosurgery,
Otsu City Hospital, Shiga,
Japan.
toshi821@kuhp.kyoto-u.ac.jp

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ABSTRACT

Background: Early postoperative sacral fractures are extremely rare complications of single-level posterior lumbar interbody fusions (PLIFs).

Case Description: A 71-year-old female presented with lower back pain and right S1 radiculopathy attributed to MR-documented L5/S1 isthmic spondylolisthesis. Following a L5 laminectomy and bilateral L5/S1 PLIF, she experienced sacral pain while sitting. When the MR showed a sacral insufficiency fracture with anterolisthesis at L5/S1, a secondary posterior fusion was extended to the pelvis, utilizing bilateral iliac screws. Following this reoperation, the patient did well and went on to achieve arthrodesis.

Conclusion: Early postoperative sacral fractures that occur following single-segment L5/S1 PLIF for isthmic spondylolisthesis warrant fusion to the pelvis with bilateral iliac screws.

Keywords: Iliac screws, Isthmic spondylolisthesis, Sacral fracture, Short-segment posterior lumbar interbody fusion

INTRODUCTION

Early postoperative sacral fractures following L5/S1 posterior lumbar interbody fusion (PLIF) are rare. Here, a 71-year-old female sustained a postoperative sacral fracture after a L5/S1 PLIF performed for isthmic spondylolisthesis. Following a secondary fusion to the pelvis utilizing bilateral iliac screws, the patient's complaints resolved.

CASE DESCRIPTION

Clinical presentation and first surgery

A 71-year-old female with low back pain and right lower extremity sciatica had initial MR and CT studies that revealed L5/S1 isthmic spondylolisthesis (near Grade 3) and a Cobb's angle of 19.3° [Figure 1a-d]. The L5/S1 PLIF was performed using pedicle screws (7.5 mm × 50 mm and 7.5 × 45 mm) and an interbody cage. One day postoperative lumbar X-rays/CT studies, and the MRI obtained at 1 postoperative week, documented resolution of the L5/S1 isthmic spondylolisthesis [Figure 2a and b].

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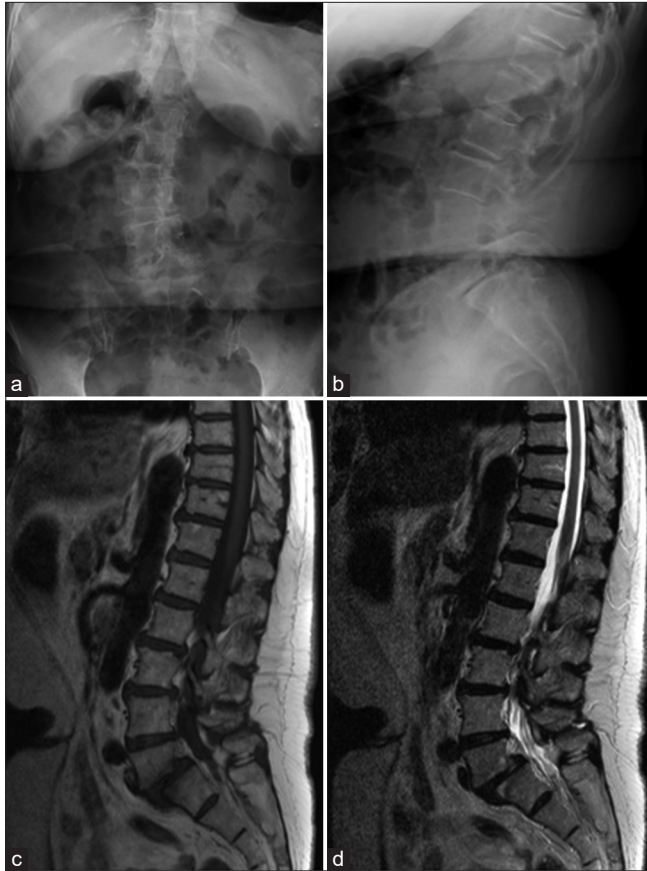


Figure 1: Anteroposterior (a) and lateral (b) radiographs of the lumbar spine before lumbosacral fusion demonstrated isthmic spondylolisthesis at L5/S1 with mild scoliosis. T1- (c) and T2-weighted images (d) showed isthmic spondylolisthesis of L5 on S1.

Second surgery

Two weeks later, the right leg numbness recurred. By the 3rd postoperative week, X-rays and MRI studies showed a sacral insufficiency fracture, with instability above the sacral fracture, and anterolisthesis of S1 [Figure 2c and d, Figure 3]. The posterior fusion was then extended to the pelvis using bilateral iliac screws (8.5 mm × 70 mm and 7.5 mm × 50 mm). One month postoperatively, X-rays, CT, and MRI examinations confirmed fusion, and the patient was now asymptomatic [Figure 4, Tables 1, 2].

DISCUSSION

Sacral insufficiency fractures are typically complications of previous long-segment instrumented lumbosacral fusions, but rarely involve single-level PLIF [Table 3].^[1,3,5-8] According to Klineberg *et al.* and Odate *et al.*, the incidence of sacral insufficiency fractures is 3.1–4.3% for long-segment versus just 1.3% for short-segment instrumented lumbosacral fusions.^[2,4] Before performing short-segmental lumbosacral



Figure 2: Anteroposterior (a) and lateral (b) radiographs of the lumbar spine after lumbosacral fusion showed improvement of the L5/S1 spondylolisthesis. T1- (c) and T2-weighted images (d) indicated the sacral fracture (white arrows) 3 weeks after the lumbosacral fusion.

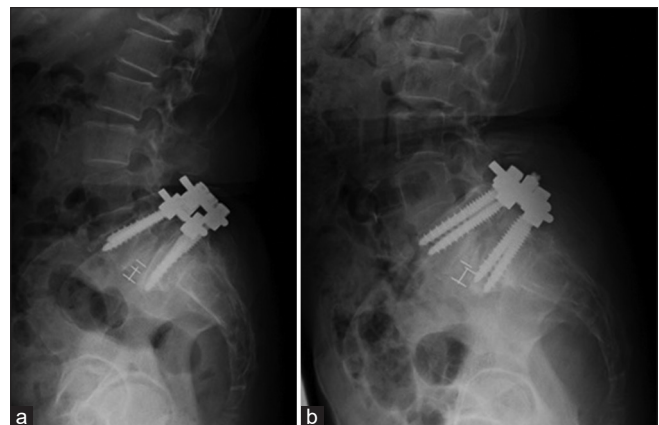


Figure 3: Lateral radiographs of the lumbar spine in the sitting (a) and supine positions (b) after lumbosacral fusion showing instability at the S1/S2 level.

fusions, bone density studies should be performed to rule out osteoporosis, especially in elderly females with high-grade L5/S1 spondylolisthesis. Certainly, patients showing

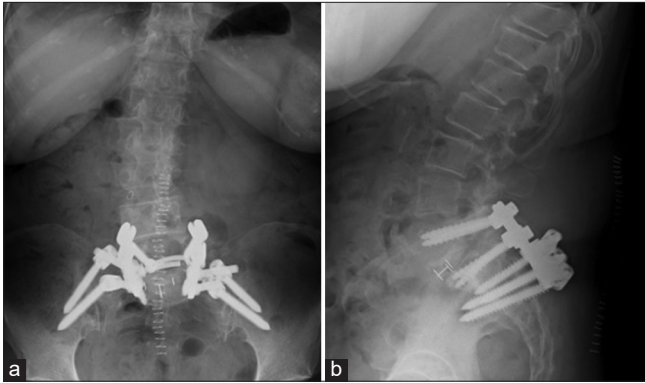


Figure 4: Postoperative anteroposterior (a) and lateral (b) radiographs of the lumbar spine following the lumbopelvic fusion.

Table 1: Summary of the pelvic parameters.

	Preoperative value	Postoperative value
SS (°)	30.0	40.8
PT (°)	12.2	16.6
PT (°)	46.0	54.3
LL (°)	59.0	48.4
SVA (mm)	-28.6	-41.0

Table 2: Summary of the VAS score and the ODI score.

	Preoperative	Two weeks after the procedure	One month after the additional procedure
VAS score			
Low back pain (mm)	50	50	70
Buttock and leg pain (mm)	50	90	30
Numbness of the buttock and leg (mm)	50	50	20
ODI score (%)	55.5	38	36

VAS: Visual analog scale, ODI: Oswestry Disability Index

Table 3: The risk factors of sacral fractures after lumbosacral fusion.

Risk factors
Previous spinal surgery (long-segmental fusion, method of bone graft procurement)
Advanced age
Female sex
Alcohol abuse
Rheumatoid disease
Oral steroid administration
Obesity
Osteoporosis
Smoking
Congestive heart failure
Hypertension
Thoracic vertebral compression fractures

radiographic confirmation of instability/fractures at the postoperative surgical site on X-ray/MR/CT studies and should be considered for placement of bilateral lumbosacral iliac screws.

CONCLUSION

A 71-year-old female developed an early postoperative sacral fracture after a L5/S1 PLIF for isthmic spondylolisthesis. Following extension of the fusion to the pelvis using bilateral iliac screws, the patient became asymptomatic and achieved successful arthrodesis.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Grimm JO, Jackson RP, Hamilton AC. Stress fracture of the pelvis: A complication following instrumented lumbar fusion. *Orthop Trans* 1993;17:108.
- Klineberg E, McHenry T, Bellabarba C, Wagner T, Chapman J. Sacral insufficiency fractures caudal to instrumented posterior lumbosacral arthrodesis. *Spine (Phila Pa 1976)* 2008;33:1806-11.
- Mathews V, McCance SE, O’Leary PF. Early fracture of the sacrum or pelvis: An unusual complication after multilevel instrumented lumbosacral fusion. *Spine (Phila Pa 1976)* 2001;26:E571-5.
- Odate S, Shikata J, Kimura H, Soeda T. Sacral fracture after instrumented lumbosacral fusion: Analysis of risk factors from spinopelvic parameters. *Spine (Phila Pa 1976)* 2013;38:E223-9.
- Papadopoulos EC, Cammisa FP Jr., Girardi FP. Sacral fractures complicating thoracolumbar fusion to the sacrum. *Spine (Phila Pa 1976)* 2008;33:E699-707.
- Vavken P, Krepler P. Sacral fractures after multi-segmental lumbosacral fusion: A series of four cases and systematic review of literature. *Eur Spine J* 2008; 17 Suppl 2:S285-90.
- Wilde GE, Miller TT, Schneider R, Girardi FP. Sacral fractures after lumbosacral fusion: A characteristic fracture pattern. *AJR Am J Roentgenol* 2011;197:184-8.
- Wood KB, Geissele AE, Ogilvie JW. Pelvic fractures after long lumbosacral spine fusions. *Spine (Phila Pa 1976)* 1996;21:1357-62.

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