



Case Report

Technical nuances of a posterior-only L5 vertebrectomy with anterior column reconstruction

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ABSTRACT

Background: Burst fractures involving the L5 vertebra are quite rare. They can be managed with anterior, posterior, or combined 360 approaches. Here, we report a 25-year-old female who presented with a traumatic cauda equina syndrome attributed to an L5 burst fracture following a motor vehicle accident, and who did well after a posterior-only decompression/fusion.

Case Description: A 25-year-old female presented with a traumatic cauda equina syndrome attributed to an L5 burst fracture following a motor vehicle accident. She was treated with a posterior-only vertebrectomy and followed for 5 postoperative months. During this time, she experienced complete resolution of her preoperative neurological deficit and demonstrated radiographically confirmed spinal stability.

Conclusion: One of the major pros for the all-posterior L5 corpectomy as in this case, was that the patient underwent a successful single-stage, single-position operation. However, the posterior-only L5 corpectomy approach is technically demanding, and only allows for the placement of a lower profile interbody cage.

Keywords: Anterior L5 corpectomy, L5 burst fracture, L5 pedicle subtraction osteotomy, L5 spondylectomy, Posterior-only L5 corpectomy, Sacral slope

INTRODUCTION

Burst fractures of L5 represent approximately 1.2% of overall spine fractures, and 2.2% of thoracolumbar fractures.^[2,3,5] There is limited literature comparing the safety and efficacy of L5 posterior corpectomies performed for L5 burst fractures utilizing anterior only, posterior-only, or combined anterior-posterior approaches.^[1-3,6,7] Notably, advanced pedicle screw instrumentation techniques have provided the ability to place them quickly and safely whether as a standalone procedure, and/or to supplement an anterior construct.^[4-6] The latter 360 approaches have the advantages of short-segment posterior fixation, which may limit disruption of lower lumbar motion segments, improve kyphotic deformity correction, and more readily facilitate direct fracture fragment removal for canal decompression. However, 360 procedures also have several cons: higher morbidity rates, longer operative time, and longer length of stay. Alternatively, posterior-only L5 corpectomy avoids the potential morbidities associated with the combined 360 anterior/posterior approaches, requires much less operative time, and is correlated with

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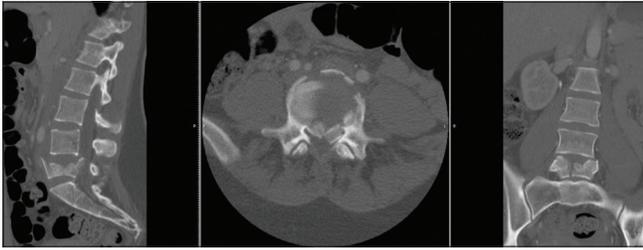


Figure 1: Pre-operative computed tomography scan showing L5 burst fracture with retropulsion into the canal.



Figure 2: Magnetic resonance imaging showing significant cauda equina compression.

more rapid rehabilitation.^[1,6] Here, we present a 25-year-old female who, following a motor vehicle accident, developed a traumatic cauda equina syndrome that was effectively treated with a posterior-only L5 vertebrectomy [Figures 1 and 2].

CASE DESCRIPTION

A 25-year-old female underwent a posterior-only L5 vertebrectomy accompanied by a pedicle screw instrumented fusion from L3-S1 [Figure 3]. Once the L5 vertebral body was resected under fluoroscopic guidance, a reasonably sized expandable cage was placed into the anterior intervertebral space; this extended from the inferior endplate of L5, to the superior endplate of S1. Contoured cobalt-chromium rods were then applied from L3 to the ilium [Figures 4 and 5] [Table 1].

DISCUSSION

Posterior L5 vertebrectomies are technically demanding operations. To safely deploy an expandable cage into the ventral compartment, it is critical to extensively skeletonize the L4, L5, and S1 nerve roots, thus effectively exposing the thecal sac. This decompresses the neural elements, while providing a safer setting for cage deployment. The most technically demanding portion of this operation is removing the inferior-most part of the L5 vertebral body and working within the axilla of the L5



Figure 3: Perioperative exposure of the L4, L5, and S1 nerve roots.

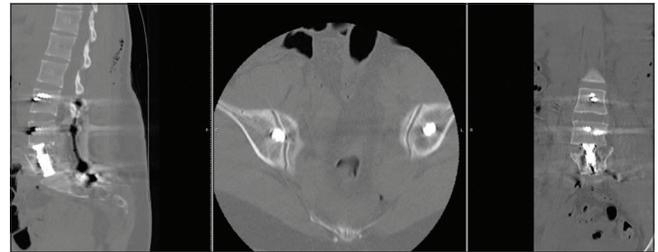


Figure 4: The postoperative computed tomography scan showing the anterior cage with L3-pelvis instrumentation.



Figure 5: Follow up X-ray after 6 weeks.

nerve root. Once the endplates of L5 and S1 are prepared for cage insertion, one must achieve an “anatomic” fit between the end caps of the cage, and the end plates of the L5 and S1 vertebral bodies. Once optimal sagittal and coronal alignment have been achieved following cage expansion, the posterior portion of pedicle/screw the fusion may be completed.

Table 1: Surgery: Posterior-only approach.

Patient positioning	Prone, open Jackson table
Spinal segment exposure	L3 pedicle to S1/S2 junction
Screws placement	Free hand technique: Pedicle L3–S1, S2-alar-iliac
Exposed roots	L4, L5, S1
Rods placement	Cobalt chrome from L3-iliac with dual headed screws at L4 and S1
Cage size	Expandable, with end-caps 16 mm wide

**Figure 6:** Follow up X-ray after 5 months.

CONCLUSION

The posterior-only L5 corpectomy approach to burst fractures is technically demanding. Its advantages include: a single-position, single-stage operation with limited morbidity (e.g., extra-spinal complications). However, when performing these procedures utilizing anterior cage reconstruction, the lateral vertebral body wall should be left *in situ* place to provide more intervertebral osseous surface area for fusion [Figures 5 and 6].

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.

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