

Minimally-invasive Direct Pars Repair with Cannulated Screws and Recombinant Human Bone Morphogenetic Protein: Case Series and Literature Review George M. Ghobrial MD; Allan D. Levi MD PhD FACS

Introduction

Lumbar spondylolysis is highly prevalent in collegiate athletes involved in collision and endurance sports through frequent lumbar hyperextension. The authors present a clinical case series using percutaneous direct pars screw repair for lumbar spondylolysis with the use of a minimally-invasive tubular approach for curettage and bone grafting of the fracture defect.

Methods

A retrospective review for all patients treated surgically for lumbar spondylolysis via a minimally-invasive approach. Summary demographic information, clinical features of presentation, perioperative and intraoperative radiographic imaging, postoperative narcotic consumption, and VAS back pain assessment were collected.

Results Nine patients were identified

(mean age 17.7 ± 3.42 years, range 14-20) 3 of which were female. All patients presented with bilateral pars fractures between the L4 (n = 4 of 9) and L5 (n = 5 of 9) levels. The mean duration of preoperative symptoms was 17.22 ± 13.2 months (range 9-48). The mean operative duration was 189 ± 29 minutes. The Mean intraoperative blood loss was 17.5 ± 10 mL (range 10-30). Radiographic follow-up was available in 9 patients (100%) at a mean of 30.6 ± 23.6 months (range 1-59 m). The mean hospital length of stay was 1.13 \pm 0.35 days (range 1-2 days). The mean VAS back score improved from 7.33 \pm 2.35 to 0.11 ± 0.33 . Both CT and radiographic evidence of fusion was noted in all patients.

Conclusions

Lumbar spondylolysis treatment with a minimally invasive direct pars repair is a safe and technically feasible option whereby minimizing muscle and soft tissue dissection particularly benefits the adolescent population with a desire to return to a high level of physical activity.



Figure 1. Chronic L5 pars fracture. Computed tomographic imaging, sagittal reconstruction of the lumbar spine demonstrating chronic L5 pars fracture.





Figure 2. Intraoperative Docking of the UCSS Guide and threaded guidewire advancement. Intraoperative photograph demonstrating surgical setup and use of biplanar fluoroscopy.

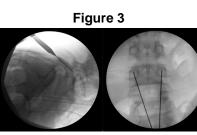


Figure 3. Placement of bilateral L5 intralaminar threaded guidewires. Intraoperative fluoroscopic view demonstrating bilateral placement of threaded guidewires.

Figure 4



Figure 4. Pars Screw placement and Fracture Debridement. Intraoperative fluoroscopic view demonstrating bilateral placement of cannulated pars screws over threaded guidewires in the anteroposterior (left) projection. Following successful placement, the pars fracture is exposed bilaterally using tubular-based retractors for decortication (right).

Figure 5



Figure 5. Postoperative Standing Upright Lumbar Spine Radiographs. Postoperative anteroposterior(left) and Lateral (right) upright standing radiographs demonstrating placement of bilateral 4.0mm diameter, 46 mm length, cannulated, fully-threaded titanium cortical screws.

Learning Objectives

To describe the use of a minimally -invasive surgical treatment of lumbar spondylolysis in athletes by a fluoroscopically-guided direct pars screw with recombinanthuman bone morphogenetic protein-2, with clinical and radiographic follow-up.