

Radiculopathy due to Bone Chip Extrusion following Transforaminal Lumbar Interbody Fusion

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ABSTRACT

Transforaminal lumbar interbody fusion (TLIF) is a commonly used technique for the treatment of degenerative lumbar spine disease. Success of surgery depends on the fusion that occurs between the vertebral body end plates. Local morselized bone graft is routinely used for achieving fusion with or without a cage or interbody spacer. Complications related to cage migration have frequently been reported. However, migration of bone chips into the neural foramen causing radiculopathy is rare and can be missed if not diagnosed early. Though such complications have been known to occur, they have not been reported frequently. Here, we present one such case of TLIF, who developed radiculopathy in the postoperative period due to migration of bone chips, which was detected early and managed.

Keywords: Interbody fusion graft migration, Radiculopathy, Transforaminal lumbar interbody fusion.

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INTRODUCTION

Since its original description by Harms and Rolinger,¹ TLIF has been routinely used for achieving circumferential fusion in the treatment of degenerative lumbar spine disease. Success of the fusion relies mainly on the type of instrumentation and the bone graft material used. Autogenous iliac crest bone graft or local morselized bone graft are often used with or without a cage or interbody spacer. Complications related to migration of the graft are rare, being around 2 to 3%.² We report one such rare complication of morselized local bone graft extrusion causing radiculopathy in the immediate postoperative period.

CASE REPORT

A 52-year-old female presented with complaints of low back ache with left lower limb radicular pain, numbness

of both lower limbs, and difficulty in walking. On examination, patient had left lower limb extensor hallucis longus (EHL) weakness and straight leg raising test positive. Radiological evaluation with magnetic resonance imaging showed L4 to L5 level diffuse disk bulge with ligamentum flavum thickening and bilateral facet arthropathy (Fig. 1). Spinal canal stenosis was present and both nerve roots appeared compressed. X-ray of lumbosacral spine showed mild degenerative listhesis at L4 to L5 level. Bone mineral density had a T score of 1.4.

The patient underwent L4 spinal laminectomy and left TLIF with autologous morselized bone graft prepared from the L4 laminectomy and inferior facetectomy bone fragments. Prior to interbody fusion, bilateral L4 and L5 pedicle screws were placed. The medial margin of left L5 superior facet was nibbled using Kerrison rongeurs and hence, the lateral canal was deroofed and left L5 nerve root was clearly visualized. After L4 to L5 discectomy and denuding the end plates, the morselized bone graft chips were packed in the intervertebral space and firmly impacted. Later, the rods were fixed with the screws. The screws were compressed prior to final tightening. Immediate postoperative recovery was uneventful.

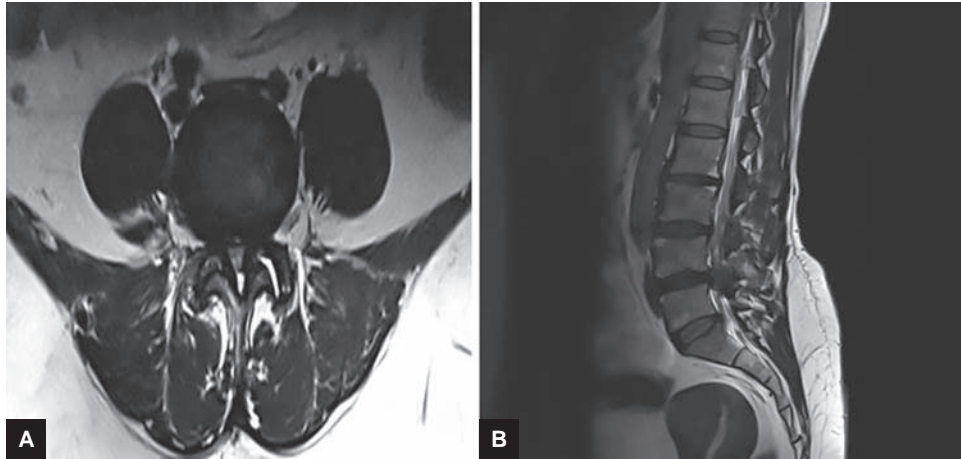
However, from the first postoperative day after surgery, the patient developed a shock-like sensation in the left lower limb with pain radiating down the left lower limb along L5 dermatomal distribution. Patient also developed left ankle dorsiflexion and EHL weakness. Pain increased gradually and the patient was unable to walk. Evaluation with X-ray showed proper position of screws. Further evaluation with computed tomography (CT) scan showed displacement of few bone chips into the lateral canal and nerve root foramen (Fig. 2).

Patient then underwent reexploration and removal of the extruded bone chips. Bone chips were seen compressing the shoulder of L5 nerve root. After further nibbling of the L4 pars interarticularis and excision of ligamentum flavum, few bone chips were seen embedded anterior to L4 nerve root within the foramen as well as within the axilla of L4 nerve root (Figs 3 to 5). Microsurgical exploration was done and bone chips were completely removed. At the end of the procedure, the left L4 and L5 nerve roots appeared free (Fig. 6).

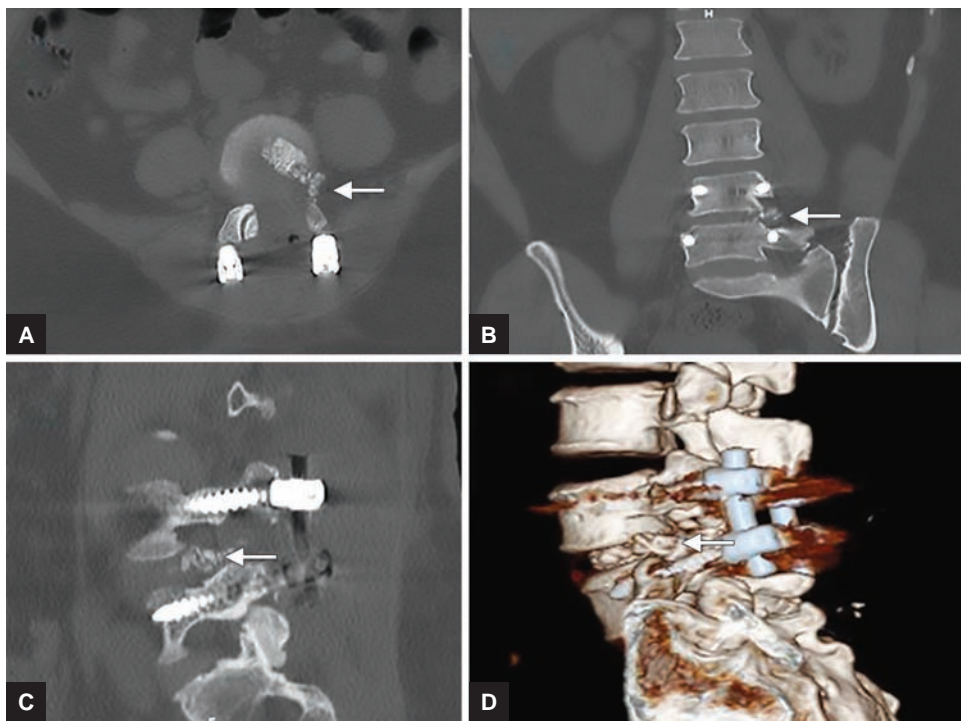
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Figs 1A and B: L4–L5 diffuse disk bulge with canal stenosis. (A) axial view; (B) sagittal view



Figs 2A to D: Postoperative CT scan showing extruded bone chips within the lateral canal and neural foramen. (A) Axial view; (B) coronal view; (C) sagittal view; (D) three-dimensional reconstruction

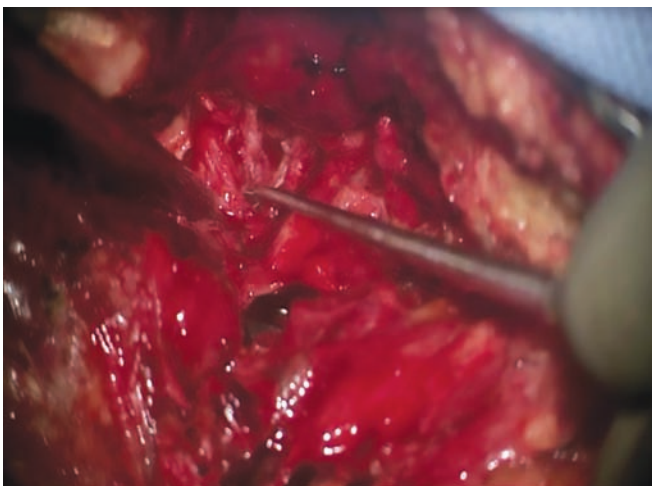


Fig. 3: Intraoperative image. L4 nerve root being retracted



Fig. 4: Intraoperative image: bone chips anterior to L4 nerve root being removed



Fig. 5: Intraoperative image: bone chips within the axilla of L4 nerve root being removed



Fig. 6: Intraoperative image: L4 and L5 nerve roots appearing free

Postoperative scan showed that the extruded bone chips were completely removed (Fig. 7). Patient recovered and was completely free of pain. Patient was able to walk normally with a lumbar corset.

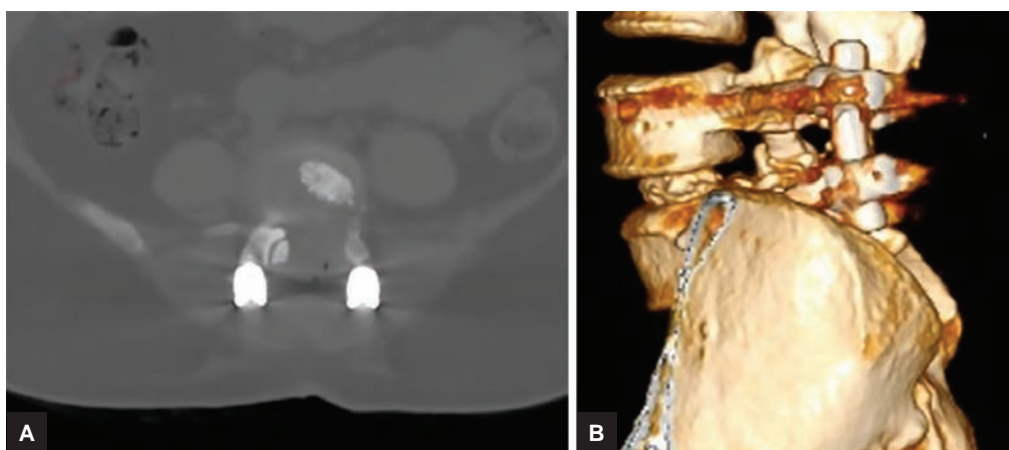
DISCUSSION

The popularity of TLIF has increased over the past decade. It permits posterior decompression and simultaneous three column arthrodesis for bony fusion. Compared with posterior lumbar interbody fusion, the TLIF approach obviates the need to retract the thecal sac and nerve roots. Complications following TLIF, such as durotomy, infection, screw misplacement, retroperitoneal injury, and interbody cage migration have been reported. Aoki et al³ followed up 125 patients who underwent TLIF and reported that the incidence of cage migration was 3.2%. However, complications due to migration of autologous morselized bone graft have not been reported though they are known to occur.

In our case report, we have visualized the L5 nerve root during surgery. However, the patient developed symptoms postoperatively due to compression of both L4 and L5 nerve roots on the left side. As already mentioned, bone chips were seen compressing both L4 and L5 nerve roots on the left side and removal of which relieved the patient’s symptoms. Bone chips might have extruded during compression maneuver applied just prior to final tightening of screws to maintain the normal lordotic curvature. A relook at the operative site through the microscope after final tightening of the screws would have prevented this complication.

CONCLUSION

Morselized bone graft migration even after adequate impaction can occur in TLIF surgery during the compression maneuver. A thorough visualization of the operative site after final tightening of screws can prevent this complication, and considering this as a potential cause of radiculopathy would help in early identification to address the problem.



Figs 7A and B: Computed tomography scan after removal of bone chips. (A) Axial view; (B) three-dimensional reconstruction

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