

## Case Report

# Surgical nuances of circumferential lumbar spondylectomy: A case report and short literature review

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## Abstract

**Background:** Chordomas are uncommon malignant bone tumors that are often minimally symptomatic for several years. By the time they are diagnosed, these lesions are typically large, involve major neural, bony, and vascular structures, and are no longer readily resectable. This leads to a high recurrence rate.**Case Description:** In this case report, we present a 67-year-old male with nonmechanical axial back pain, neurogenic claudication, and a large mass centered at the L3 level on magnetic resonance imaging consistent with a locally invasive chordoma. The patient underwent surgical resection that required a complete lumbar spondylectomy utilizing a three-stage approach, leading to incomplete tumor excision. The patient's residual postoperative symptoms included paresthesias/numbness in the right anterior thigh and a partial (4/5) right-sided foot drop. At the time of discharge, there were plans for future proton beam therapy.**Conclusions:** Because of their relative resistance to chemotherapeutic agents, the optimal surgical management of chordomas is gross total *en-bloc* excision. Unfortunately, this is rarely feasible.**Key Words:** Adult chordoma, lumbar spondylectomy, treatment of chordoma

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## INTRODUCTION

Chordomas are rare, locally aggressive malignant bone tumor. Such tumors only account for only 1–4% of all primary bone tumors. Their treatment is complicated by frequent close proximity and frequent involvement of critical neurovascular structures.<sup>[2]</sup> Although they are slow growing, often they are highly malignant lesions that are locally invasive, destructive, and difficult to treat. Despite aggressive surgical resection and utilization of adjuvant therapy, incomplete excision leads to high recurrence rate and the median survival rate is just 7.7 years.<sup>[2-5]</sup> We present a case of a 67-year-old male who

underwent a complex three-stage lumbar spondylectomy for attempted aggressive excision of an extensive chordoma.

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## CASE DESCRIPTION

A 67-year-old male presented with nonmechanical axial back pain, neurogenic claudication, and an otherwise normal neurological exam. Established T1 (hypointense), T2 (hyperintense), and T1 enhanced magnetic resonance (MR) studies documented a large tumor centered at the L3 level with marked epidural compression and bilateral retroperitoneal extension [Figure 1].

### L3 spondylectomy technique

Following confirmation of a chordoma by needle biopsy, our patient underwent a three-stage operation for complete resection.

### Stage I – posterior approach

Following a midline exposure from T12 to L5, the pedicles of L1, L2, L4, and L5 were instrumented bilaterally. Transforaminal interbody grafts were placed at L1/2 and L4/5. A massive *en-bloc* resection of the tumor required bilateral troughs in the L3 pars extending to the superior lamina, and included L2/3 bilateral facetectomies and transverse process resections. Pedicle screws were then connected with two rods and a crosslink [Figure 2].

### Stage II/III – anterolateral approach

The vascular surgery team performed a retroperitoneal approach to the anterolateral lumbar spine on both the right and left sides respectively. The ribs of T11 and T12 were taken, the psoas muscle was mobilized,

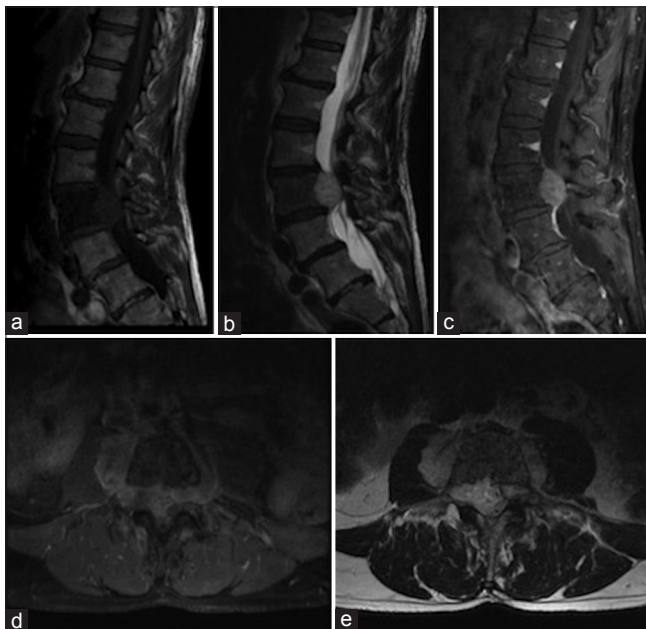
and the anterolateral disc spaces of L2/3 and L3/4 were exposed allowing retroperitoneal tumor resection utilizing annulotomies and discectomies [Figure 3]. The defect was reconstructed with an expandable cage and lateral plate, whereas the harvested rib was used to create a strut graft next to the cage for early bone fusion [Figure 4].

### Postoperative course

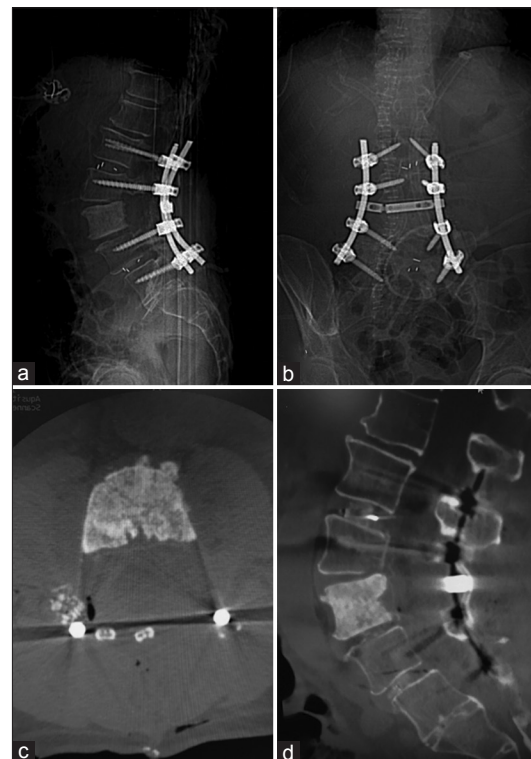
Postoperatively, the patient only had mild paresthesias and numbness of the right anterior thigh accompanied by a partial 4/5 dorsiflexion deficit; symptoms/signs resolved prior to transfer to a rehabilitation center. The histological examination of the *en-bloc* specimen confirmed tumor excision along with 1 of 3 lymph nodes that was positive for chordoma. Subsequent plans were made for future proton beam therapy.

## DISCUSSION

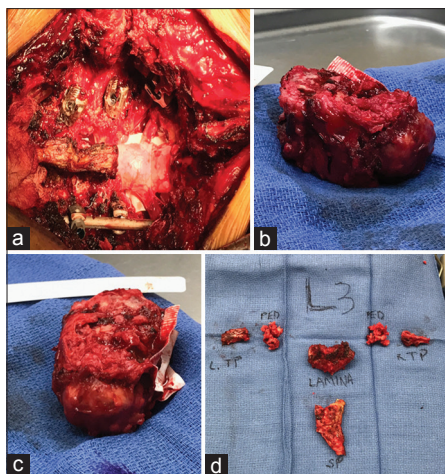
Chordomas are slow growing but aggressive tumors that demonstrate a high incidence of local recurrence. The surgical goal for chordomas is centered on total *en-bloc* resection with canal decompression and spinal reconstruction as needed.<sup>[4]</sup> They primarily affect patients older than 40 years of age but have been observed in all age groups.<sup>[6]</sup> The 5-year survival rate for lumbar chordomas reaches 50%, with better prognoses correlating with early detection and gross total tumor resection.<sup>[3,4]</sup>



**Figure 1:** Sagittal MRT1-weighted, T2-weighted (a) T1-fat saturated post contrast (b), axial T1-post gadolinium (c), and axial T2-weighted (d) images demonstrating a T1 hypointense, T2 hyperintense enhancing mass centered in the L3 vertebral body with significant epidural and retroperitoneal extension and decreased marrow signal in L3 vertebral body (e)



**Figure 2:** Post Stage I images on lateral plain film (a), AP plain film (b), axial CT (c), and midsagittal CT (d)

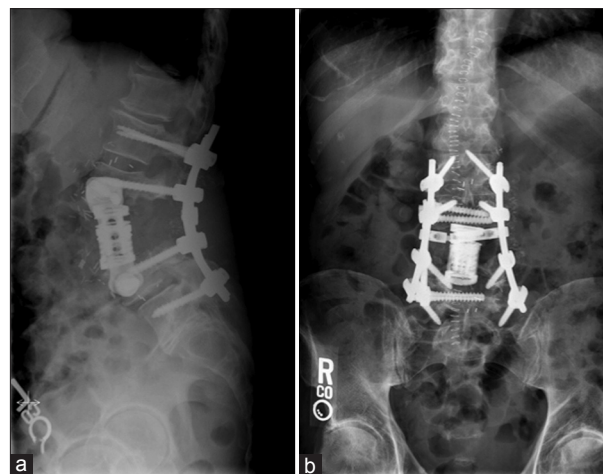


**Figure 3:** Surgical view after posterior element removal. Bilateral L2 and L3 nerve roots are visualized (a). Ventral epidural Gortex patch. Anterior view of the removed L3 vertebral body with attached left sided tumor (b). Lateral view of the removed L3 vertebral body with attached left sided tumor and ventral epidural gortex patch (c). Removed posterior elements (d)

However, *en-bloc* spondylectomy is often not technically feasible due to surrounding critical neural and vascular structures.<sup>[1]</sup> Nevertheless, aggressive combined anterior and posterior approaches are warranted to remove as much tumor burden as possible to facilitate maximal recovery and long-term survival.

## CONCLUSION

Lumbar chordomas are locally invasive, indolent tumors, requiring aggressive surgical resection. Mortality rates are high and long-term survival correlates with early diagnosis and the extent of surgical resection.



**Figure 4:** Final construct shown on AP (a) and lateral (b) plain films

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## Conflicts of interest

There are no conflicts of interest.

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