



Case Report

Image-guided resection of lumbar monostotic fibrous dysplasia: A case report and technical note

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ABSTRACT

Background: Monostotic fibrous dysplasia rarely involves the lumbar spine. Although its optimal surgical management is unknown, some recommend complete resection to decrease the likelihood of future recurrence.

Case Description: A 41-year-old female presented with fibrous dysplasia involving the right L4 lamina and spinous process. Following image-guided *en bloc* resection, the patient remained asymptomatic without evidence of recurrence 8 months later.

Conclusion: Image-guided excision of monostotic fibrous dysplasia involving the right L4 lamina and spinous process was successfully performed without clinical or radiographic evidence of recurrence within 8 postoperative months.

Keywords: Fibrous dysplasia, Intraoperative computed tomography, Navigation, Spine

INTRODUCTION

Monostotic or polyostotic fibrous dysplasia (i.e., involving single or multiple bones) is an abnormality of bone development resulting in dysplastic fibrous tissue localized to the bony trabeculae in the absence of appropriate mineralization. It compromises approximately 5% of all benign bony tumors and is commonly discovered incidentally in the ribs, femur, tibia, and maxilla^[2,4]. Spinal involvement occurs in <2% of cases and only rarely causes pain, bony deformity, or fracture.^[2] Malignant transformation to sarcoma, although rare, has been described.^[9]

Although the optimal surgical management of these lesions is unclear, some recommend *en bloc* resection to reduce the risk of recurrence.^[2,7,10] Intraoperative CT (iCT) navigational guidance, especially when fused with preoperative magnetic resonance imaging (MRI), is a useful adjunct when performing *en bloc* surgical resection of these lesions. Here, we present the case of a 41-year-old female with monostotic fibrous dysplasia in the L4 spinous process and right lamina who successfully underwent image-guided *en bloc* lesion resection (i.e., L4 laminectomy and removal of the L4 spinous process).

CASE REPORT

A 41-year-old female presented with a one year history of low back and intermittent right leg pain that was worse at night. MRI revealed a T1-hypointense and T2-hyperintense cystic lesion

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involving the right L4 spinous process and lamina (measuring 11 mm by 21 mm) [Figure 1]. The differential diagnosis included osteoblastoma, giant cell tumor, and/or aneurysmal bone cyst. The patient underwent a fused iCT/MRI-guided resection of the right sided L4 lamina and removal of the L4 spinous process with a navigable ultrasound bone scalpel. The lesion was resected *en bloc* and the postresection CT scan confirmed gross total resection [Figures 2 and 3]. Pathologic analysis revealed a benign-appearing spindle-cell lesion consistent with fibrous dysplasia. Surgical margins were negative for tumor. Eight months postoperatively, the patient's pain had improved and she was referred to an endocrinologist for further work-up, evaluation, and treatment.

DISCUSSION

Fibrous dysplasia is a common benign skeletal lesion. In the monostotic form, lesions tend to enlarge with bony growth and senesce with skeletal maturity.^[2] Surgery may be indicated in cases of severe pain, functional impairment, fracture, or significant diagnostic uncertainty. Furthermore, as malignant transformation to osteosarcoma, fibrosarcoma, or chondrosarcoma are possible, gross total resection of these lesions is warranted.^[2] Furthermore, intraoperative stereotactic navigation may be used to successfully maximize resection and minimize postoperative instability and neurologic morbidity when resecting primary spinal tumors.^[1,3,5,6,8,11]

Here, we described a 41-year-old female who presented with a right-sided cystic lesion involving the L4 spinous process and lamina who underwent open *en bloc* resection utilizing iCT/MRI guidance. She has remained asymptomatic without evidence of recurrence 8 months postoperatively.

Literature review of lumbar monostotic fibrous dysplasia

There are 17 previously reported cases of monostotic fibrous dysplasia involving the lumbar spine [Table 1]. The mean age of presentation for these patients was 34 years old (range: 12–58). Eight patients (47%) were male and 9 (53%) were female. Lesions involved all five lumbar vertebral bodies, with L3 (seven patients, 41%) and L4 (six patients, 35%) being the most common. Of interest, five patients (29%) had lesions limited to the vertebral body, 6 (35%) involved the posterior elements alone (pedicle, facet, pars interarticularis, lamina, and/or spinous process), and 6 (35%) had a lesion that traversed both the vertebral body and posterior elements. Although recurrence of fibrous dysplasia has been reported in at other bony sites in the literature, there has not been a reported occurrence of recurrent monostotic fibrous dysplasia in the lumbar spine. No instances of malignant transformation were reported.

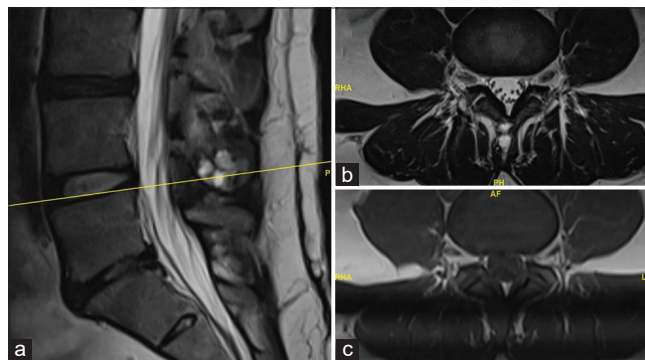


Figure 1: (a) Sagittal T2-weighted, (b) axial T2-weighted, and (c) axial T1-weighted magnetic resonance imaging images demonstrating a T1-hypointense and T2-hyperintense cystic lesion located in the spinous process and right lamina of the L4 vertebra.

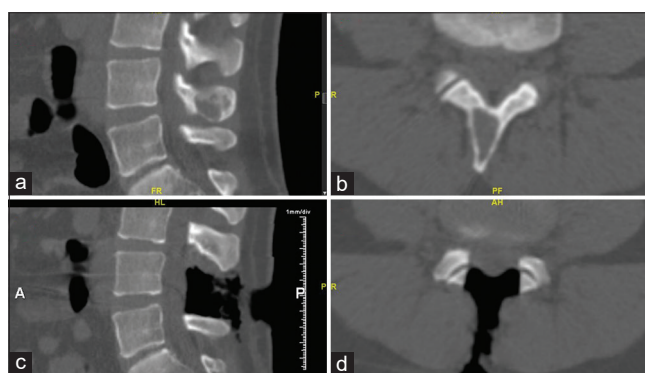


Figure 2: Pre- (a and b) and postresection (c and d) intraoperative computed tomography scan demonstrating complete resection of a hypointense lesion located within the L4 spinous process and right lamina.

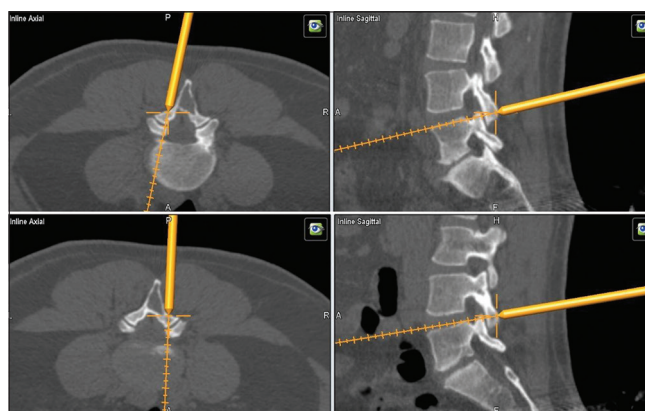


Figure 3: Intraoperative navigated computed tomography demonstrating stereotactic navigation being used to plan lateral extent of laminectomy bilaterally. The navigated stereotactic pointer used during the case is indicated in yellow.

CONCLUSION

A 41-year-old female with lumbar monostotic fibrous dysplasia involving the right L4 lamina and spinous process

Table 1: Summary of 17 previously reported cases of monostotic fibrous dysplasia in the lumbar spine.

Characteristic	Value (total n=17)
Age	34 (range: 12–58)
Gender	
Male	47%
Female	53%
Vertebral level	
L1	12%
L2	6%
L3	41%
L4	35%
L5	6%
Site involvement	
Vertebral body	29%
Posterior elements	35%
Both	35%
Management	
Biopsy	18%
Excision or curettage	76%
Unknown	6%

successfully underwent *en bloc* resection with L4 right-sided laminectomy and spinous process resection facilitated by intraoperative CT navigation fused with preoperative MRI.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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