

CASE REPORT

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Fifth lumbar vertebrae solitary osteochondroma arising from the neural arch, a case report

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Abstract

Background: Osteochondromas are a benign outgrowth of bone and cartilage and one of the most common bone tumors that usually occur in long bones, with only 1–4% being located in the spine, more frequently in the cervical and upper dorsal region, and rarely the lumbar spine. Here, we report a case of lumbar spine (L5) osteochondroma arising from the neural arch.

Case presentation: A 30-year-old man presenting with a solid painless mass at the lower lumbar region. No neurological symptoms. Radiological examinations revealed an exophytic lesion in the fifth lumbar articular process, and the spinous process appears to be a solitary osteochondroma. Lumbar spine magnetic resonance imaging showed a bony lesion covered by a 2-mm-thick cartilaginous cap. Surgical en bloc resection of the mass was performed, and the histopathological examination confirmed the diagnosis of osteochondroma. No evidence of recurrence at the end of 4-year follow-up.

Conclusion: Osteochondromas are benign tumors rarely present in the spine; diagnosis can be made by the typical appearance of the cartilaginous cap over the mass in the magnetic resonance imaging. Surgical excision is the best management option.

Keywords: Osteochondroma, Exostosis lumbar spine, Posterior element, Surgical resection

Background

Osteochondroma is the most common benign bone tumor and represents about 10% of all bone tumors and around 36% of benign bone tumors [1]. Osteochondroma can arise as a solitary lesion or as part of an inherited condition known as multiple hereditary exostoses (MHE) [2]. The long bones are most affected; only 1–4% of osteochondromas affects the spinal column [1, 3]. For a spinal lesion, the clinical manifestations vary from pain and deformity to neurological manifestations as radiculopathy, myelopathy, and cauda equine syndrome, which occur due to neural tissue compression [4].

Several studies have reported that a solitary spine osteochondroma is more common than an osteochondroma associated with MHE [5, 6]. A few case reports of lumbar osteochondromas expanding in the spinal canal and presenting with neurological signs have been reported in the literature [7–9]. However, it was suggested by some authors that spine osteochondroma is not rare as it was previously reported [3, 10]. This case report describes an unusual presentation of a solitary osteochondroma arising from the neural arch of the posterior element of the fifth lumbar vertebrae in a male patient.

Case presentation

History: A 30-year-old man presented with chronic low back pain, classified as 2/10 based on a visual analog scale (VAS). The patient reported an insidious onset of a palpable mass on the lower back for two years but with

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neither symptoms nor size progression. He had no constitutional or neurologic symptoms. He had no relevant past medical history or family history of similar lesions. *Clinical examination:* General examination was unremarkable, with no other lesions or swellings in other areas of the body. The local examination started with an inspection that showed a uniform swelling localized to the lumbar spine area, just below the iliac crest level; the skin over the mass was normal. A 4 * 4 cm subcutaneous mass at the midline and more to the left paraspinal area of the lower lumbar region was detected on palpation. The mass was immobile, solid in consistency, and not pulsating and slightly tender on palpation only. The lumbar range of motion (flexion, extension, and side bending) was slightly painful; the neurological examination was unremarkable. *Imaging:* Lumbar plain anteroposterior (AP) and lateral radiographs showing ossified mass protruding posteriorly, apparently from the L5 vertebra (Fig. 1). A lumbosacral computed tomography (CT) scan demonstrated an osseous lesion with a medullary cavity contiguous with the medullary cavity of the left lamina and spinous process of L5 vertebrae (Fig. 2). Magnetic resonance imaging (MRI) showed no enhancement of the mass and no apparent evidence of local tissue invasion; a bony lesion measured about 42 * 36 * 40 mm in size with a 2-mm-thick cartilaginous cap (Fig. 3). No signs of cord or root compression were seen. *Surgical management:* en bloc excision of the mass was performed under general anesthesia while the patient in a prone position through a direct posterior approach (Fig. 4). Histopathological examination revealed a benign osteochondroma with no evidence of atypia. The follow-up period went uneventful; no further complaint or local recurrence has been noticed at the end of 4 years of follow-up postoperatively.

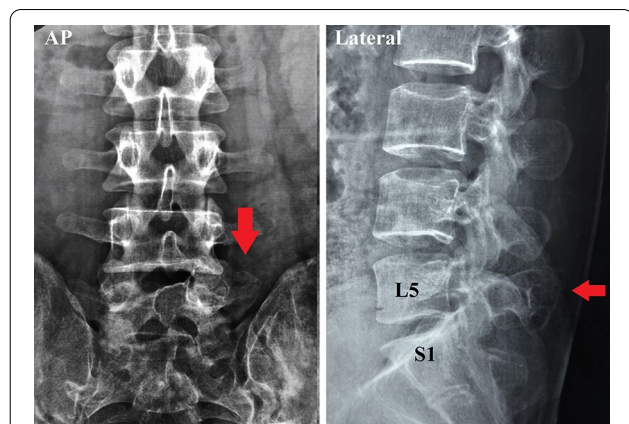


Fig. 1 Lumbar spine plain radiographs (anteroposterior and lateral views) showing a bony lesion originating from the posterior element of L5 vertebrae (red arrowheads)

Discussion

Of all spinal tumors, 70% of primary bone tumors are benign [11]. Osteochondromas (exostoses), which represent up to 7% of the benign spinal tumors [3], are a benign outgrowth of bone covered by a cartilaginous cap [8, 12], which could present as either a solitary lesion or as multiple lesions that occur either spontaneously or in an autosomal dominant pattern known as hereditary multiple exostoses (HME) [5].

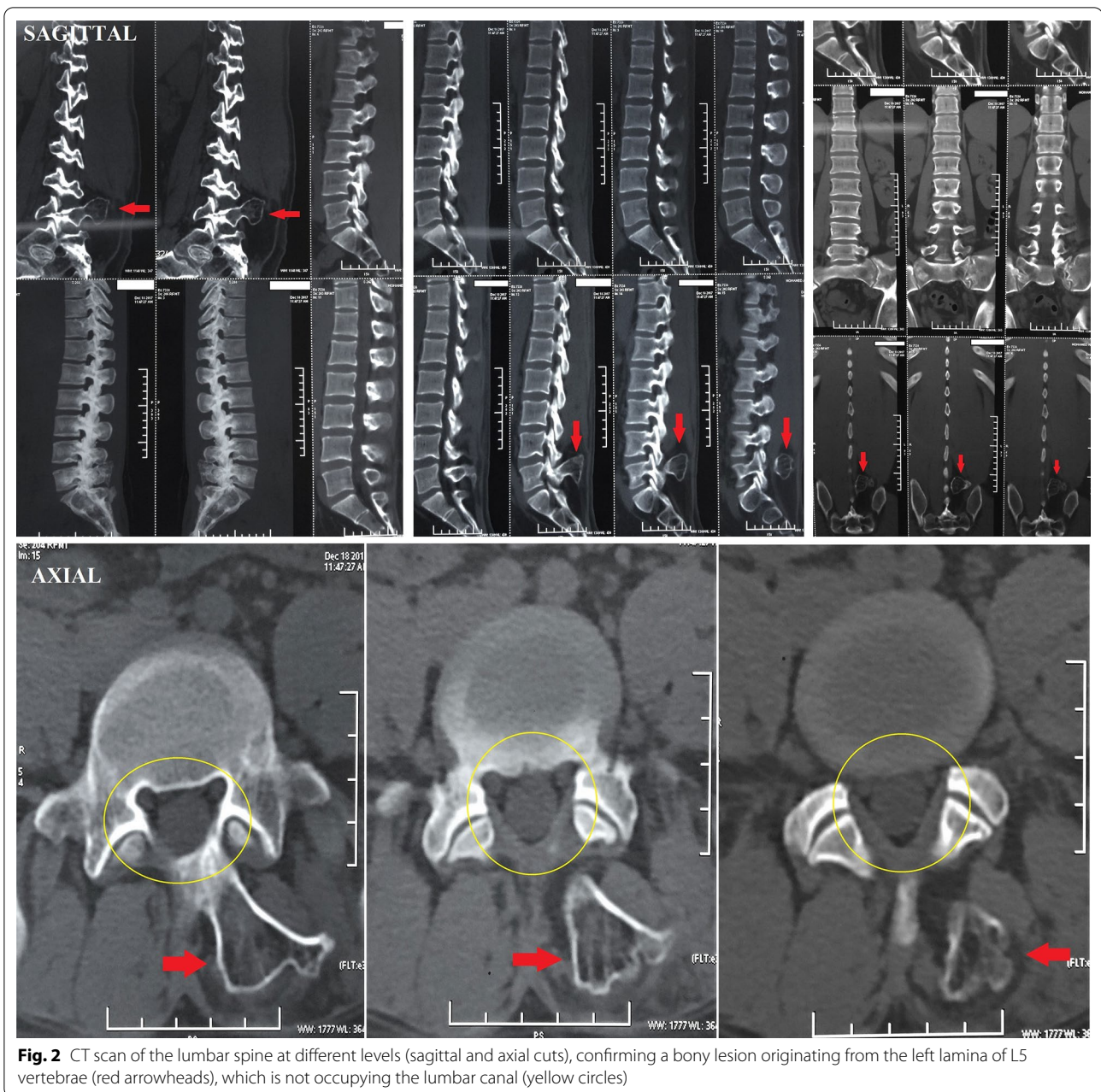
Spinal osteochondromas occur more frequently in the cervical spine and upper dorsal segments, with lumbar osteochondroma, which is least affected [10]; they commonly arise in the pedicles, the lamina, or in the vertebral body [9]. The relative rareness of lower lumbar osteochondromas is believed to be due to less flexibility of the lumbar region compared to the cervical, which gives the lumbar area greater resistance to epiphyseal growth cartilage displacement (which is believed to be the reason for osteochondroma development) [13].

In a review of literature by Yakkanti et al. [3] where they evaluated 84 articles reporting on 149 cases (123 (88.6%) were solitary, and 17 (11.4%) were associated with MHE), for the solitary lesions as the one reported in the current case, the most common region of affection was the cervical spine 63 (52.2%) of the cases, followed by the lumbar region 35 (26.5%), the posterior element was the commonest origin of the lesion with 85 cases (64.3%). For the lumbar spine affection, four cases were reported to affect L5 vertebrae, one affecting the lamina [14], two affecting the body [15, 16], and in one case, the location was not reported [17].

Lumbar osteochondromas can cause various symptoms depending on their location, commonly related to the mechanical effects of the lesion leading to neurological symptoms (if it is growing inside the canal or compressing a nerve root) in the form of radiculopathy, myelopathy, cauda equina syndrome, foot drop, or neurogenic claudication [4, 8, 10].

Albrecht et al. suggested that plain radiographs are not conclusive for definite diagnosis [5]; further imaging modalities should be utilized, commonly a CT and MRI [3, 4, 15]. The CT scan will define the origin of the mass and help define the anatomical landmarks needed for planning the surgical excision [11]. In contrast, the MRI will be beneficial for measuring the cartilage cap's thickness, assessing the surrounding neural tissues, and if a suspected malignant transformation needed to be ruled out [9].

Surgical resection of a lumbar osteochondroma is the management option of choice, especially if the patient is presented with symptoms; this surgical excision could be in situ marginal or wide excision, via a posterior, anterior, or combined approach, according to the location and the



size of the mass [3, 6]. In case of development of neurological symptoms, surgical excision with decompression of a nerve root or the neural canal should be performed, with instrumented stabilization with or without fusion according to the spine stability after lesion resection [3, 14, 15].

Although it is fortunately rare, malignant transformation is considered the most concerning complication, with an estimated risk of transformation of about 1% for solitary osteochondroma and up to 5% for multiple osteochondromas [10]. Malignant transformation should

be suspected if the cartilaginous cap is more than 3 cm, when patients report new onset of symptoms, and when the mass rapidly increases in size [9].

Conclusion

We presented a rare case of lumbar spine osteochondroma originating from the posterior element of L5; besides clinical and neurological assessment, a spine CT and MRI are paramount for diagnosis. Surgical excision is the management of choice, especially if the patient developed neurological symptoms.

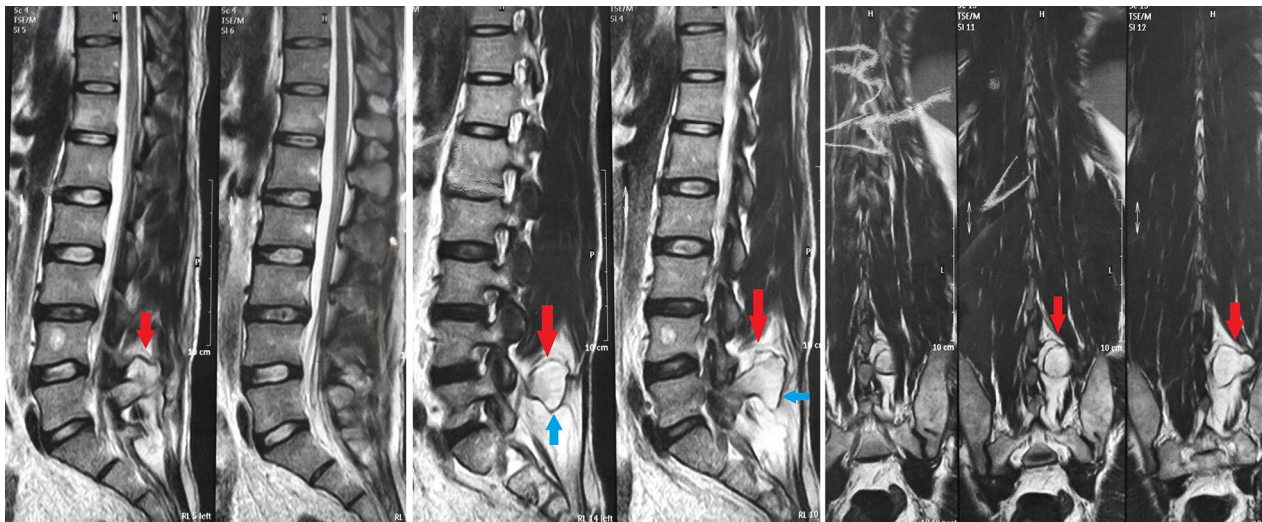


Fig. 3 Sagittal MRI views of the lumbar spine revealed a bony mass from the caudal border of the L5 lamina spinous process (red arrowhead), a thin black coverage representing the cartilaginous cap (blue arrowhead)

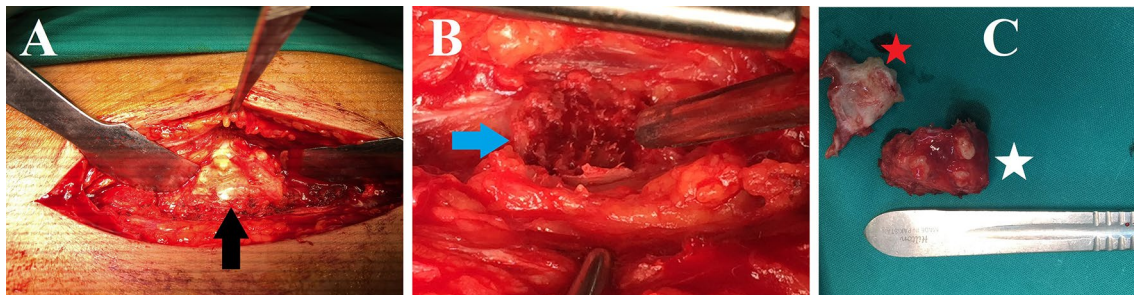


Fig. 4 surgical excision of the lesion, **a**: intraoperative picture showing a lumbar spine posterior midline approach exposing the tumor in situ contiguous to the spinous process of L5 causing adjacent left paraspinal muscular compression (black arrowhead), **b** the lesion cancellous bony bed after excision (blue arrowhead), **c** the resected mass showing the cartilaginous cap (white asterisk) and the bony stalk (red asterisk)

Abbreviations

CT: Computed tomography; MRI: Magnetic resonance imaging; L5: Fifth lumbar vertebrae; MHE: Multiple hereditary exostoses; VAS: Visual analog scale; AP: Anteroposterior.

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None.

Authors' contributions

O.R. carried out the idea, as well as performed the surgeries, A.A.K. and M.A. carried out data acquisition and assessment. A.A.K., M.A.Z., and A.M.F. did the literature search, drafted the manuscript, and designed the figures, O.R. and M.A. did the critical revision. All authors discussed the results and commented on the manuscript. All authors read and approved the final manuscript.

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Availability of data and material

All the data regarding the presented case are included within the article.

Declarations

Ethics approval and consent to participate

The ethical committee of our institution waived ethical approval for this case report as this was considered a part of the usual patients' care (Faculty of Medicine, Assiut University, Egypt, Telephone, Fax: + 20882332278, ethics-committee12@yahoo.com, <http://afm.edu.eg>).

Consent for publication

A verbal, as well as an informed written, consent was obtained from the patient to use his clinical data and images for publication of this case report, no identification of the patients' identity is present neither in the manuscript nor in the images.

Competing interest

None for all authors.

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References

- Sugiyama H, Omonishi K, Yonehara S, Ozasa K, Kajihara H, Tsuya T, et al. Characteristics of benign and malignant bone tumors registered in the Hiroshima tumor tissue registry, 1973–2012. *JB JS Open Access*. 2018;3(2):e0064.
- Dahlin DC, Unni KK. Bone tumors: General aspects and data on 8547 cases. 1986.
- Yakkanti R, Onyekwelu I, Carreon LY, Dimar JR 2nd. Solitary Osteochondroma of the spine—a case series: review of solitary osteochondroma with myelopathic symptoms. *Glob Spine J*. 2018;8(4):323–39.
- Choi BK, Han IH, Cho WH, Cha SH. Lumbar osteochondroma arising from spondylyolytic I3 lamina. *J Korean Neurosurg Soc*. 2010;47(4):313–5.
- Albrecht S, Crutchfield JS, SeGall GK. On spinal osteochondromas. *J Neurosurg*. 1992;77(2):247–52.
- Khosla A, Martin DS, Awwad EE. The solitary intraspinal vertebral osteochondroma. An unusual cause of compressive myelopathy: features and literature review. *Spine (Phila Pa 1976)*. 1999;24(1):77–81.
- Spaziante R, Irace C, Gambardella A, Cappabianca P, De Divitiis E. Solitary osteochondroma of the pedicle of L4 causing root compression. Case report. *J Neurosurg Sci*. 1988;32(4):141–5.
- Kahveci R, Ergungor MF, Gunaydin A, Temiz A. Lumbar solitary osteochondroma presenting with cauda equina syndrome: a case report. *Acta Orthop Traumatol Turc*. 2012;46(6):468–72.
- Fiumara E, Scarabino T, Guglielmi G, Bisceglia M, D'Angelo V. Osteochondroma of the L-5 vertebra: a rare cause of sciatic pain Case report. *J Neurosurg*. 1999;91(2 Suppl):219–22.
- Gille O, Pointillart V, Vital JM. Course of spinal solitary osteochondromas. *Spine (Phila Pa 1976)*. 2005;30(1):E13–9.
- Erlemann R. Imaging and differential diagnosis of primary bone tumors and tumor-like lesions of the spine. *Eur J Radiol*. 2006;58(1):48–67.
- Qasem SA, DeYoung BR, editors. Cartilage-forming tumors. In: *Seminars in diagnostic pathology*; 2014. Elsevier.
- Bonic EE, Kettner NW. A rare presentation of cervical osteochondroma arising in a spinous process. *Spine (Phila Pa 1976)*. 2012;37(1):E69–72.
- Xu J, rui Xu C, Wu H, le Pan H, Tian J. Osteochondroma in the lumbar intraspinal canal causing nerve root compression. *Orthopedics*. 2009;32(2).
- Rymarczuk GN, Dirks MS, Whittaker DR, Neal CJ. Symptomatic lumbar osteochondroma treated via a multidisciplinary military surgical team: case report and review of the literature. *Mil Med*. 2015;180(1):e129–33.
- Lotfinia I, Vahedi P, Tubbs RS, Ghavame M, Meshkini A. Neurological manifestations, imaging characteristics, and surgical outcome of intraspinal osteochondroma. *J Neurosurg Spine*. 2010;12(5):474–89.
- Sciubba DM, Macki M, Bydon M, Germscheid NM, Wolinsky J-P, Boriani S, et al. Long-term outcomes in primary spinal osteochondroma: a multi-center study of 27 patients. *J Neurosurg Spine*. 2015;22(6):582–8.

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