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Rare Case of a Solitary Spinal Osteochondroma with Myelopathy Treated by a Minimally Invasive Technique

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Abstract

Among primary bone tumors, osteochondroma or osteocartilaginous exostosis is a common occurrence. However, solitary spinal osteochondromas are quite rare, seen in only in 1–4% of all reported cases. Only few symptomatic cases have been reported so far in the literature. Recurrence and malignant transformation are also known, thereby necessitating wide surgical excision as the treatment of choice. We would like to report one such a case of a solitary cervical osteochondroma presenting with myelopathy that was excised surgically using a minimally invasive tubular approach.

Keywords: Spinal, Osteochondroma, Solitary, Myelopathy, Minimally invasive, Tubular.

Introduction

Osteochondromas are relatively common primary benign bone tumors. They may be either occurring as solitary lesions or multiple exostosis. This may either be sporadic or hereditary osteochondromatosis [1]. Typically, they develop from endochondral bone structures during childhood and adolescence, and may remain asymptomatic for prolonged periods. These lesions represent 30–40% of primary bone tumors, however, those arising in the spine only account for 1.3–4.1% of all solitary osteochondromas [2, 3].

Spinal osteochondromas mostly remain benign, however, severe complications may arise on progression into the spinal canal or foramen [4]. This may lead to spinal cord or nerve root compression and neurological deficit resulting in a delayed presentation in most cases. Hence, only sparse information is available in the literature in the form of isolated case reports. While recurrence and malignant changes into chondrosarcoma have been reported in osteosarcomas, they remain extremely rare, with multiple exostosis having a greater predilection for both (10–15%) than the solitary forms (1–2%), being rarer still in the spine [1]. Timely diagnosis is a key challenge, thus, making the treatment of choice for symptomatic osteochondromas as purely complete surgical excision for obtaining neurological decompression.

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The authors report one such a case of a solitary cervical osteochondroma presenting with myelopathy that was treated surgically with complete excision using a minimally invasive, tubular approach.

Case Report

A 63-year-old gentleman presented with neck pain since many years with a 2-week history of progressive worsening pain. This was associated with bilateral upper limb radiating pain and mild unsteadiness while walking. On examination, he was partially myelopathic (Nurick Grade 2) with upgoing plantar reflexes and hyperreflexia in upper and lower limbs but normal power. He also had reduced sensation on the left C4, C5 dermatomes.

Magnetic resonance imaging of the cervical spine revealed an extradural, bony lesion along the left C4 lamina extending into the canal measuring 6.3 mm × 8.8 mm with compression of the spinal cord and nerve roots (Fig. 1 a and b). He underwent a minimally invasive C4 hemilaminectomy and complete excision of the lesion.

Position and set up

After induction under general anesthesia, the patient was positioned prone over bolsters, with the head fixed on pins. Neurophysiological monitoring was utilized during the entire surgery.

Procedure

Incision and paramedian access – tube docking

A paramedian vertical incision of 2.5 cm was marked at the C4-5 level, confirmed by fluoroscopy. The surgical area was then prepared sterile and draped. The paramedian access was

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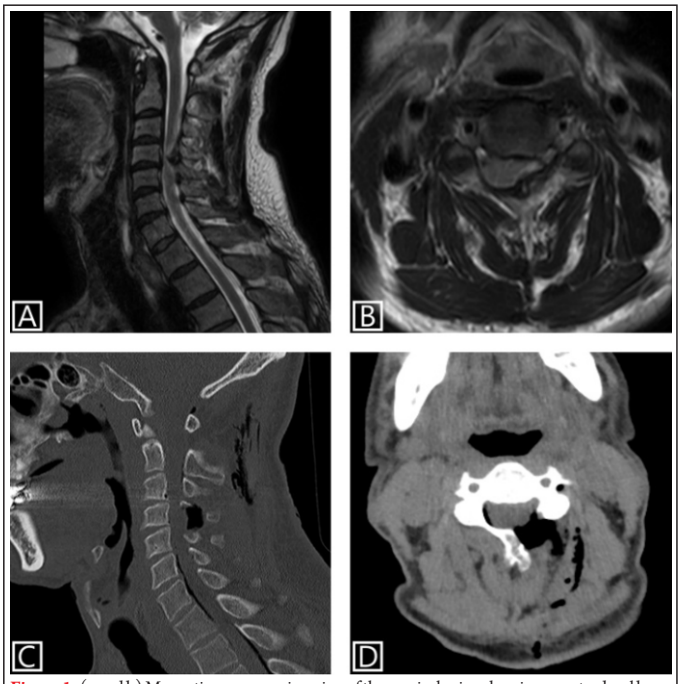

Figure 1: (a and b) Magnetic resonance imaging of the cervical spine showing an extradural bony lesion arising from left C4 lamina (measuring 6.3 mm × 8.8 mm) with compression of the spinal cord and nerve roots (a – Sagittal T2WI, b – Axial T2WI). (c and d) Post-operative computed tomography of the cervical spine showing complete excision of the extradural bony lesion with decompression of the spinal canal (c – Sagittal, d – Axial).

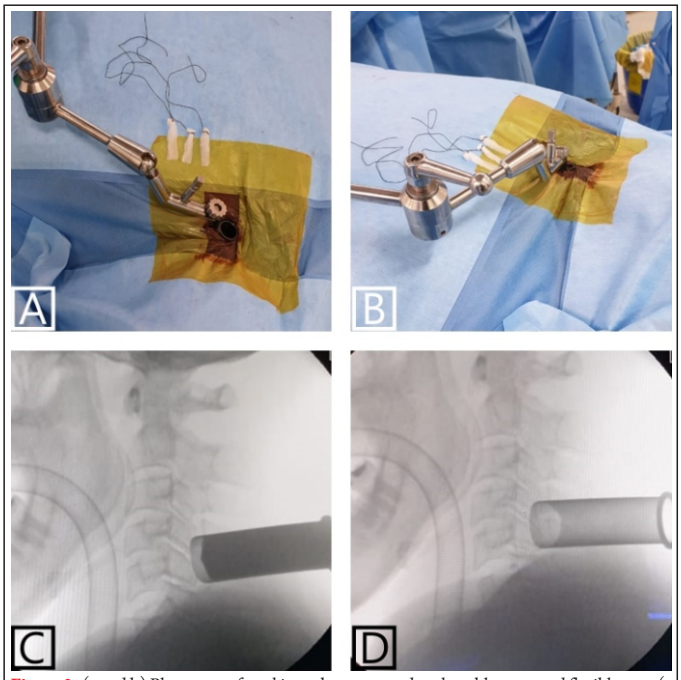

Figure 2: (a and b) Placement of working tube connected to the table-mounted flexible arm. (c and d) Intraoperative fluoroscopy showing working tube in place.

obtained using the METRx tube dilator system (Medtronic Sofamor Danek, Memphis, TN) and a 22 mm diameter METRx tube working port was docked onto the required lamina. Final position confirmed with intraoperative 2D fluoroscopy (Fig 2). Further steps were carried out using an operating microscope.

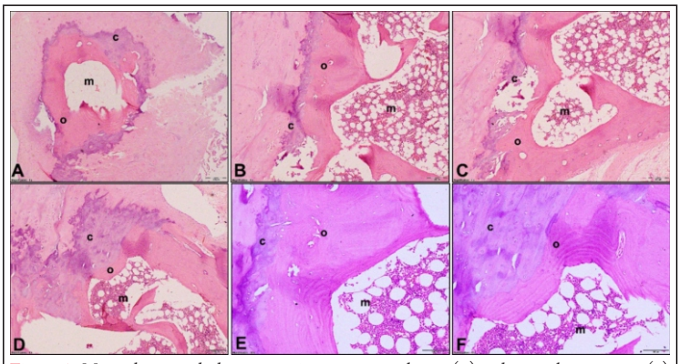

Figure 3: Microphotograph showing projecting osseous lesion (o) with a cartilaginous cap (c) over the osseous area (o) which encases the marrow spaces (m). (a) transverse section H & E × 100, (b-f) vertical/longitudinal sections, H & E (b-d – × 100; e,f – × 200).

Surgical steps

Using standard microsurgical techniques, a laminotomy was performed. Care was taken not to disrupt the facets. The tumor was seen involving the lamina and purely extradural. Complete tumor was removed in toto along with lamina. Hemostasis was achieved and after removal of the working port, the muscle layers were noted to fall back and occlude the dead space. The wound was then closed in layers.

Histopathology revealed osteochondroma (Fig. 3). He improved neurologically post-surgery with good progress on follow-up (Nurick Grade 0). A follow-up computed tomography showed complete excision of the lesion with no facetal involvement (Fig. 1 c and d).

Discussion

Osteochondromas involving the spine are extremely rare and make up for 1–4% of all osteochondromas, inclusive of both solitary and multiple types [2, 5]. Among locations within the spine, the cervical spine accounts for 56–80%, those arising from thoracic spine comprise 20–36%, while in the lumbar spine, they are less common [6, 7].

Approximately 27–30% of the cases with solitary spinal osteochondromas tend to have myelopathic features [4]. As they are predominantly benign lesions, they become apparent only when there is neural compression, being asymptomatic for prolonged periods [8]. This may be attributed to continued bone growth with delayed presentation of either pain or neurological deficit.

While malignant transformation into a chondrosarcoma is not unknown, it is a rare complication of osteochondromas. This usually develops in the cartilage cap. It is a common occurrence in the appendicular skeleton, however, secondary spinal chondrosarcomas arising from a pre-existing osteochondroma is seen in only 1–5% of patients with solitary forms and in 10–25% of those with multiple hereditary exostosis [1, 7].

Malignancy may be suspected if there is a new onset of pain or local tenderness, sudden increase in size of lesion, recurrence of lesion after total resection, and growth after skeletal maturity or

if the cartilaginous cap thickness is greater than 3 cm [9, 10, 11]. Usually, they may already be associated with neurological deficits at the time of presentation [12]. Thus, early identification becomes vital in making the correct diagnosis and initiating timely treatment.

Complete surgical excision is thus the treatment of choice in all cases, especially in symptomatic osteochondromas for achieving neurological decompression. Although rare, local recurrence is known to occur in <4% in solitary spinal osteochondromas [1]. This may be avoided by achieving complete excision of the cartilaginous cap [7, 13].

Conventionally, this has always been in the setting of large "open" approaches, the pitfalls of which have been well described, including significant muscle dissection, bony resection, wide laminectomies, and even destabilizing facetectomies to remove extensive tumors [14, 15, 16, 17, 18, 19]. Nowadays, with the advent of minimally invasive spinal (MIS) techniques, such approach related morbidities may be reduced significantly, without compromising surgical goals of complete wide excision. Inherent complications associated with traditional approaches such as CSF leak and neurological deficit may also be negated using the principles of MIS techniques.

In our case, the patient had progressive symptoms with a recent onset of myelopathy. Early and prompt diagnosis was able to pick up the subtle lesion and help initiate timely treatment. Total excision was possible in view of no involvement of neural elements and pure extradural nature of the lesion. Muscle dissection was minimal since the muscle fibers are only split and "fall back" on removal of the tubular retractors, thereby occluding any dead space. Since facet joints are not violated, potential for instability also does not arise.

Conclusion

This report depicts an interesting case of a primary solitary cervical spinal osteochondroma with myelopathy. Total surgical excision was achieved using MIS approach leading to a favorable outcome.

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Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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