

A solitary osteochondroma of the cervical spine: a case report and review of literature

Uday Singh Raswan¹ · Abdul Rashid Bhat¹ · Humam Tanki¹ · Nuzhat Samoon² ·
Altaf Rehman Kirmani¹

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Abstract

Introduction Osteochondromas are usually found in the extremities and are rarely seen in the spine. They are most commonly found in the posterior elements of the spine, and intraspinal extension is uncommon. Compressive myelopathy as a presentation of vertebral osteochondroma in a child is a rare entity.

Methods We report a case of vertebral osteochondroma arising from the lamina of C3 vertebra, presenting with features of compressive myelopathy in a 15 year old boy. Total excision of the tumor was carried out along with lamina of C3 vertebra. Patient recovered significantly.

Conclusion Spinal osteochondromas must be considered as rare etiology of spinal cord or root compression in the pediatric age group and utmost care should be taken while excising these benign lesions.

Keywords Tumors of the cervical spine · Osteochondroma · Pediatric spinal tumor

Introduction

Osteochondromas constitute 0–15% of all bone tumors and 20–50% of all benign bone tumors [1]. Between 1.3 and 4.1% of solitary osteochondromas arise in the spine [2]. In spine,

they have special predilection for the posterior elements of cervical or thoracic spine. They are usually asymptomatic, and compressive myelopathy is a rare presentation [3].

Case report

We report a case of a 16-year-old boy who presented with a history of weakness on the left side of his body with duration of 30 days which progressed to the right side for 10 days. He was able to stand and all kith support. There was also history of difficulty in holding things with both hands (left > right).

On examination, higher mental function and cranial nerve examination were normal. Fundi were normal. Tone was increased in all four limbs. Power on the left upper and lower limbs was 2/5 and on the right upper and lower limbs was 3/5. Deep tendon reflexes were brisk all over, and plantars showed bilateral extensor response. There was gross impairment of spinothalamic tract and posterior column sensations in all the limbs. Magnetic resonance imaging of the spine revealed an extradural mass lesion (Figs. 1 and 2) arising from the posterior arch of C3 vertebra leading to cord compression. Plain computed tomography of the cervical spine revealed a C3 posterior arch bony lesion projecting into spinal canal. (Figs. 3 and 4).

A vertical midline incision was made from C2 to C4 spinous process. Total excision of the tumor was carried out along with lamina of C3 vertebra. The histopathological examination was diagnostic of osteochondroma (Fig. 5). By the 2nd postoperative day, the patient had significant improvement and at the end of the 10th day of surgery, the patient had normal power in all the four limbs. There has been no recurrence at follow-up after 18 months.

✉ Uday Singh Raswan
usrx95@yahoo.co.in

¹ Department of Neurosurgery, Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, India

² Department of Pathology, Sher-I-Kashmir Institute of Medical Sciences, Srinagar, India

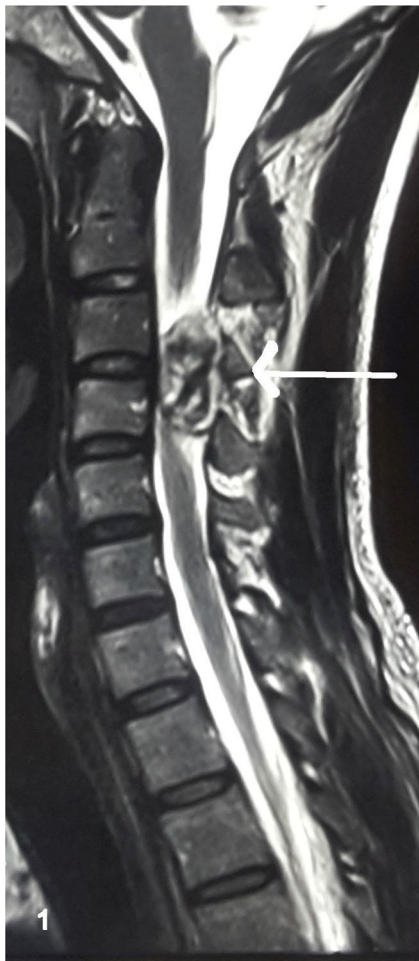


Fig. 1 MRI spine (T2-weighted sagittal view): extradural mass lesion arising from the posterior arch of C3 vertebra leading to cord compression

Discussion

Osteochondromas are thought to arise through a process of progressive enchondral ossification of aberrant cartilage of the growth plate as a consequence of a congenital defect or

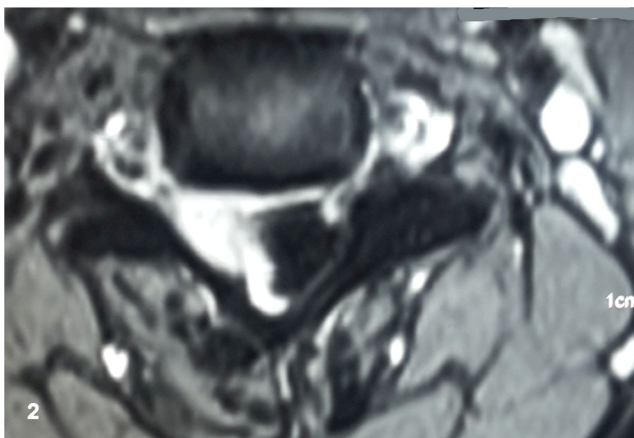


Fig. 2 MRI spine (T2-weighted axial view): extradural mass lesion arising from the posterior arch of C3 vertebra leading to cord compression



Fig. 3 CT spine (sagittal): C3 posterior arch bony lesion projecting into spinal canal

trauma. The secondary ossification centers, which lie in the spinous process, transverse process, articular process, and end plate of the vertebral body fuse in adolescence, which completes the growth of vertebral column. The secondary ossification centers appear between the ages of 11 and 18 years in the cervicothoracic and lumbar spine, respectively, and in the sacrum during the 3rd decade of life. The more rapid the ossification processes of these centers, the greater the probability that aberrant cartilage will form. This explains the fact that osteochondromas are more frequently located in the higher segments of the vertebral column [2, 3].

Osteochondromas present as sessile or pedunculated bony lesions with periosteum and cortex that are continuous with those of the host bone. They manifest in two different patterns, solitary lesions with no genetic abnormality or as multiple lesions known



Fig. 4 CT spine (axial): C3 posterior arch bony lesion projecting into spinal canal

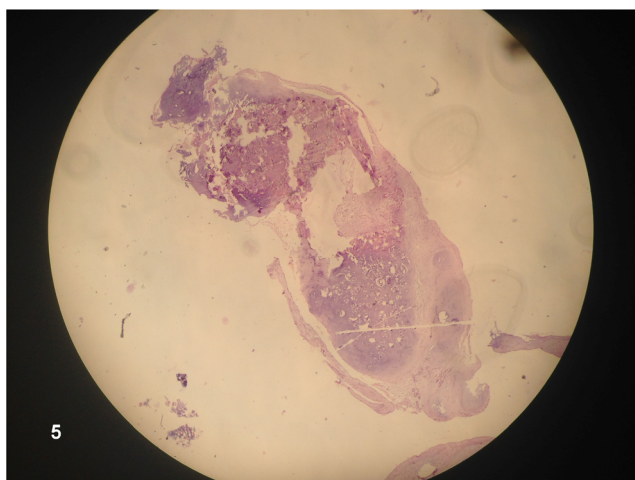


Fig. 5 Photomicrograph shows cartilaginous capsule with underlying mature bone trabeculae with interphase of enchondral ossification. $\times 40$ (hematoxylin and eosin)

as hereditary multiple exostoses. The long bones of the lower extremity are most frequently affected (50% of cases) and are more commonly involved than those of the upper extremity by a ratio of 2 to 1. Spinal involvement is unusual (2%) [1].

According to the study reported by Albrecht et al. [3], 49% of the osteochondromas which develop in the vertebrae occur in the cervical vertebra, 26% in the thoracic vertebra, and 23% in the lumbar vertebra. Osteochondromas are more common in males than females, with a male to female ratio of about 1.5:1.4. The mean age of most patients is 20 years or younger [3–5]. Our reported patient is 16 years old. Osteochondromas commonly arise from the tip of the spinous process and project outwards [6]; however, in our case, it arose from the inner surface of lamina and projected inside causing cord compression.

The clinical manifestations vary widely. The tumor may present as painful sites or as palpable masses that may or may not be painful. Neurological signs are exhibited when the lesion involves the spinal canal and these tumors may cause radiculopathy or myelopathy. It is the result of progressive encroachment of the slowly expanding osteochondroma on neural

Table 1 Literature review of cases of pediatric cervical osteochondroma presenting with spinal cord compression

Authors	Year	Age (years)	Sex	Origin of lesion
Hickey, [10]	1969	12	F	C6–C7
MacGee, [11]	1979	16	F	C2
Palmer and Blum, [12]	1980	14	M	C7 facet
Khosla et al., [13]	1999	17	M	C7 lamina
Sharma et al., [14]	2002	18	M	Posterior arch C1
Moon et al., [15]	2006	16	M	C5–C7 lamina
Wang and Chou, [16]	2009	16	F	Anterior arch C1
Rahman et al., [17]	2012	16	M	Posterior arch C1
Sultan et al., [18]	2016	8	M	Posterior arch C1

structures. Our case presented with feature of compressive myelopathy. Nevertheless, association with neurological symptoms is very rare because most lesions do not invade the spinal canal [7].

The detection of spinal osteochondroma may be difficult on plain radiography because of the many superimposed structures found on various projections [8]. Characteristic findings on CT scan are paraspinous, dumbbell, or eccentrically located, round, and sharply outlined mass in the spinal canal with bone-like density with scattered calcifications and osteosclerotic changes in the neighboring bone and lacking contrast enhancement [9]. CT scan of the cervical spine in our case exhibited a lobulated osseous mass with sclerotic margin that projected from the inner aspect of the left-sided lamina of C3 into the spinal canal. MRI is useful in demonstrating the level and extent of neural compression along with the marrow content and the cartilaginous cap, which gives the appearance of a prominent peripheral rim of low intensity corresponding to ossification and a small central core of intermediate signal similar to that of bone marrow. MRI of our patient showed a pedunculated bony lesion, arising from the left lamina of C3 vertebra showing direct medullary continuity, with a smooth overlying T2 hyperintense covering suggestive of cartilaginous cap. The lesion is seen to grow into the spinal canal and displace the cord to right side with cord compression.

On reviewing the literature, we found nine cases of cervical osteochondroma in the pediatric age group presenting with cord compression (<18 years; Table 1).

Asymptomatic presentation of solitary osteochondromas can be managed conservatively due to the low rate of malignant transformation [19]. Tumor causing pain or neurological complication due to compression or the ones with indefinite diagnosis should be excised at base. Complete excision is the goal because incomplete removal of cartilaginous cap may lead to tumor recurrence [20]. Our patient presented with symptoms of cervical myelopathy which was progressive in nature. Complete excision of the lesion with partial C3 laminectomy was done to relieve the compression and prevent recurrence.

Spinal osteochondromas must be remembered as rare etiology of the spinal cord or root compression in the pediatric age group, and utmost care should be taken while excising these benign lesions.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Murphey MD, Choi JJ, Kransdorf MJ, Flemming DJ, Gannon FH (2000) Imaging of osteochondroma: variants and complications with radiologic-pathologic correlation. *Radiographics* 20:1407–1434

2. Fiumara E, Scarabino T, Guglielmi G, Bisceglia M, D'Angelo V (1999) Osteochondroma of the l-5 vertebrae: a rare case of sciatic pain. Case report. *J Neurosurg* 91:219–222
3. Albercht S, Crutchfield JS, SeGall GK (1992) On spinal osteochondromas. *J Neurosurg* 77:247–252
4. Roblot P, Alcalay M, Casenave-Roblot F, Levy P, Bontoux D (1990) Osteochondroma of thoracic spine. *Spine* 15:240–243
5. Silber JS, Mathur S, Ecker M (2000) A solitary osteochondroma of the pediatric thoracic spine: a case report and review of the literature. *Am J Orthop (Belle Mead NJ)* 29:711–714
6. Malat J, Virapongse C, Levine A (1986) Solitary osteochondroma of the spine. *Spine (Phila Pa 1976)* 11:625–628
7. Patel A, Tharadara GD (2014) Rare case of osteochondroma of spine. *Indian journal of Applied research* 4:456–458
8. Faik A, Mahfoud Filali S, Lazark N, El Hassani S, Hajjaj-Hassouni N (2005) Spinal cord compression due to vertebral osteochondroma: report of two cases. *Joint Bone Spine* 72:177–179
9. Labram EK, Mohan J (1996) Diaphyseal aclasis with spinal cord compression. Report of two cases and review of the literature. *J Neurosurg* 84:518–521
10. Hickey CH (1969) Osteochondroma of the vertebra. *Henry Ford Hosp Med J* 17:53–58
11. MacGee EE (1979) Osteochondroma of the cervical spine: a cause of transient quadriplegia. *Neurosurgery* 4:259–260
12. Palmer FJ, Blum PW (1980) Osteochondroma with spinal cord compression: report of three cases. *J Neurosurgery* 52:842–845
13. Khosla A, Martin DS, Awwad EE (1999) The solitary intra-spinal osteochondroma. An unusual case of compressive myelopathy: features and literature review. *Spine (Phila Pa 1976)* 24:77–81
14. Sharma MC, Arora R, Deol PS, Mahapatra AK, Mehta VS, Sarkar C (2002) Osteochondroma of the spine: an enigmatic tumor of the spinal cord. A series of 10 cases. *J Neurosurg Sci* 46:66–70
15. Moon KS, Lee JK, Kim YS, Kwak HJ, Joo SP, Kim IY et al (2006) Osteochondroma of the cervical spine extending multiple segments with cord compression. *Pediatr Neurosurg* 42:304–307
16. Wang V, Chou D (2009) Anterior C1-2 osteochondroma presenting with dysphagia and sleep apnea. *J Clin Neurosci* 16:581–582
17. Rahman A, Bahadur PB, Hoque SU, Ansari A, Hossain ATM (2012) Solitary osteochondroma of the atlas causing spinal cord compression: a case report and literature review. *BMJ Case Rep*; 2012: pii:bcr1220115435
18. Sultan M, Khurshheed N, Makhdoomi R, Ramzan (2016) A compressive myelopathy due to osteochondroma of the atlas and review of the literature. *Pediatr Neurosurg* 51:99–102
19. Chatzidakis E, Lypiridis S, Kazdaglis G, Chatzikonstadinou K, Papatheodorou G (2007) A rare case of solitary osteochondroma of the dens of the C2 vertebra. *Acta Neurochir* 149:637–638
20. Arasil E, Erdem A, Yuceer N (1996) Osteochondroma of the upper cervical spine. A case report. *Spine* 21:516–518