Pediatric solitary osteochondroma of T1 vertebra causing spinal cord compression: A case report

Dear Editor,

Osteochondroma is one of the common benign tumors usually found in the appendicular skeleton. Between 1.3% and 4.1% of solitary osteochondroma arise in the spine.[1] When present in the spine, they have a special predilection for the cervical or thoracic spine.[2] Osteochondroma of the spine usually arises from the neural arch of the cervical and thoracic vertebra and can cause compression of the spinal cord.

A 9-year-old boy presented with a history of frequent falls while walking and standing without support, which progressively worsened over 4-5 days. There was also history of difficulty in standing up from the squatting position. There was visible wasting of bilateral lower limbs. Tone was increased in both lower limbs, and spasticity was positive. There was an inability to perform straight leg raising test. Local examination did not reveal any visible swelling or deformity except for tenderness at D1-D2 spinous processes. The neurological examination was normal. Plain computed tomography of thorax revealed anterior wedge compression of D1 vertebral body with sclerotic lesion involving body and posterior arch elements of D1 vertebra with ossified tissue extending into the spinal canal cavity causing its narrowing [Figure 1]. Magnetic resonance imaging of the whole spine revealed an enhancing extradural mass protruding into the spinal canal at T1 vertebral level causing compression, and posterior displacement of spinal cord [Figure 2].

Under general anaesthesia, patient was put in the prone position. A vertical para median incision was made on the tumor. Trapezius was dissected and paraspinal muscles were incised along the fibers to expose the tumor. Elliptical capsulated mass was seen with all the borders well-defined. Near total excision of the tumor was carried out. On microscopic examination, there was a thin cartilage cap with an orderly arrangement of chondrocytes undergoing endochondral ossification to create trabecular bone separated by marrow fat [Figure 3]. The histopathological examination was diagnostic of osteochondroma. Postoperative course was uneventful. By 6th postoperative week, patient was able to stand and walk without support. There was reduced spasticity and the tone was nearly normal in both lower limbs.

Osteochondromas are thought to arise through a process of progressive enchondral ossification of aberrant cartilage of a growth plate as a consequence of congenital defect or trauma. Knowledge of development of the spine can help us to speculate on another explanation. In adolescence, secondary ossification centers, which lie in the spinous

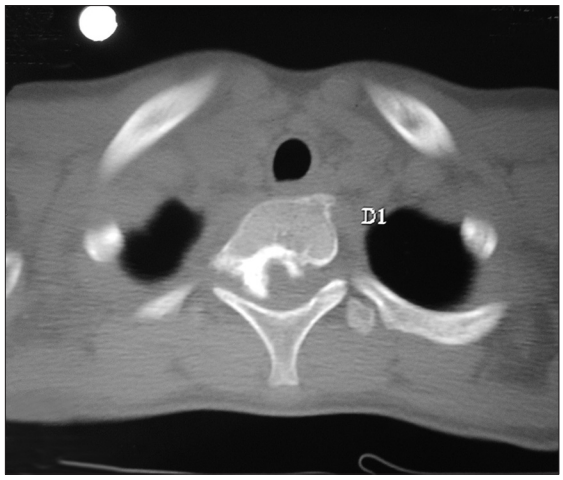

Figure 1: Computed tomography image showing spinal canal involvement by a bony tumor with a catrtilagenous component arising from T1 vertebra

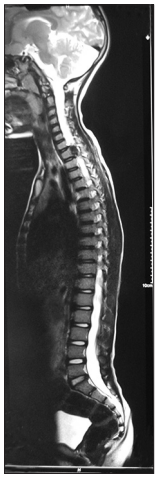

Figure 2: Magnetic resonance imaging of the whole spine revealed an enhancing extradural mass protruding into the spinal canal at T1 vertebral level

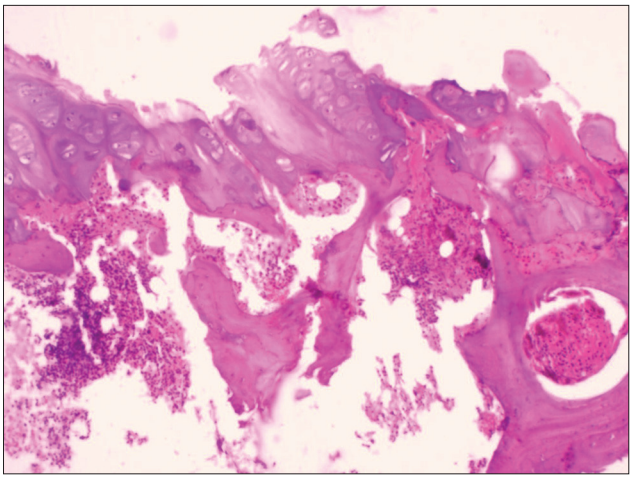

Figure 3: Mature trabecular bone along with hematopoietic marrow covered by a cartilaginous cap (H and E, ×40)

process, transverse process, articular process, and end plate of vertebral body, complete the growth of the vertebral column. These secondary ossification centers appear in children between the ages of 11 and 18 years and develop in to complete ossification in the cervical spine during adolescence, in the thoracic and lumbar spine during the end of the second decade of life and in the sacrum during the third decade of life. It is possible to speculate that the cartilage of secondary ossification centers can be the origin of aberrant islands of cartilaginous tissue that cause the osteochondroma to form. The more rapid the ossification processes of these centers, the greater the probability that aberrant cartilage will form. Therefore, the fact that osteochondromas are more frequently located in the higher segments of the vertebral column could be explained by the different durations of the ossification processes in these centers, which increase gradually below the cervical segments.[1,2]

The mean age of 60% patients who develop osteochondroma in the vertebra is less than 20 years, and it occurs more frequently in the male.[3] Typically, in the vertebra, it occurs in the posterior factors particularly, the tip of the spinous process, and it invades more than 2 spinal bodies.[4] According to the study reported by Albrecht *et al*.,[2] 49% of osteochondromas which develop in the vertebrae occur in the cervical vertebra, 26% in the thoracic vertebra, and 23% in the lumbar vertebra.

The demographic pattern as reported in the literature reveals that they are more common in males, and the mean age is 30 years in the solitary subtype.[2] It is rare in the pediatric age group.[5] Radiation-induced osteochondromas of the spine have also been reported. Majority of spinal osteochondromas are asymptomatic, and features of spinal cord or root compression are seen in few.

Although osteochondroma may be detected incidentally by radiological findings, the major symptom is the palpation of a painless lump, and occasionally, pain that is associated with mechanical compression, nerve compression, fracture of the stalk of tumor, malignant degeneration, osteomyelitis, pseudoaneurysm, and bursitis may be present.[6] The symptoms of osteochondroma that develops in the vertebra are proportional to the size of the tumor, and the major symptoms are caused by nerve compression and the compression of other adjacent organs. Nevertheless, cases associated with neurological symptoms are very rare because most lesions do not invade the spinal canal.

No treatment is necessary for an asymptomatic spinal osteochondroma. If the lesion is causing pain or neurological symptoms due to compression, it should be excised at its base. As long as the entire cartilage cap is removed, there should be no recurrence.[3] In osteochondromas which compress the nerve in the cervical vertebra and the thoracic vertebra and thus cause neurological symptoms, laminectomy and tumor resection are usually performed and result in recovery of neurological symptoms. In vertebral compression caused by osteochondroma, if the vertebra is decompressed by completely resecting the tumor, good recovery of neurological symptoms could be anticipated. In order to avoid the complications associated with instability following extensive laminectomies, the treatment should include posterior stabilization and fusion. Outcome in the majority of surgically treated patients is good. Our patient showed marked improvement in the neurological deficit during subsequent postoperative period.

In conclusion, spinal osteochondromas should be kept in the differential diagnosis as a rare cause of spinal cord root compression in children and adolescent patients.

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Quick Response Code:	Website: www.sajc.org
	DOI: 10.4103/2278-330X.114130