Osteochondroma of the L-5 vertebra: a rare cause of sciatic pain

Case report

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Soliary or multiple osteochondromas, which are benign bone tumors that usually occur in the long bones, are rarely found in the vertebral column. When present in the spine, however, they have a predilection for the cervical or upper thoracic regions.

The authors present the case of a solitary osteochondroma arising from the left L-5 articular process that contributed to sciatica; complete cure was achieved following its removal.

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 process 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.

Key Words: exostoses, nerve root compression, osteochondroma

Osteochondroma, also known as “osteeocartilaginous exostosis,” is one of the more common benign bone tumors, and it usually occurs in long bones but is occasionally found in the spine. Osteochondromas may present as a solitary lesion or as multiple lesions called “multiple exostoses.”

Spinal osteochondromas are more often located in the cervical and upper thoracic vertebrae, whereas the inferior thoracic and lumbar levels are rarely involved. To our knowledge, no case of sacral osteochondroma has been previously reported.

We report the case of a solitary osteochondroma of the left L-5 articular process that occurred in a patient who presented with sciatic pain.

Case Report

Presentation. This 35-year-old woman presented with a 5-year history of intermittent sciatica involving the left lower extremity.

Examination. Results of neurological examination included a positive left-sided Lasègue’s sign, an absent left Achilles tendon reflex, and decreased pinprick sense in the left S-1 distribution.

Findings on plain radiographs obtained of the lumbar spine were at first interpreted as normal. A computerized tomography (CT) scan demonstrated a narrowed spinal canal at the L5-S1 level, which was caused by a large sessile bone-like tumor arising from left inferior articular process of the L-5 vertebra. The cortex and spongiosis of the lesion and host vertebra were in continuity. The lesion developed as far as the disc anteriorly and the lamina posteriorly. The superior articular process of the S-1 vertebra presented a hyperostotic reaction that contributed to lateral recess stenosis (Fig. 1 upper). On T1- and T2-weighted magnetic resonance images, the tumor was shown to possess a central hyperintense core surrounded by a ringlike, low-intensity area; compression of the thecal sac and S-1 nerve root on the left was noted (Fig. 1 lower).

Based on these findings an osteochondroma of the L-5
vertebra with hyperostotic bone reaction of the superior articular process of the S-1 vertebra was diagnosed.

Operation. At surgery the tumor and the hyperostotic process were removed via a left-sided L5–S1 interlaminar approach that was performed with the aid of an operating microscope. Samples of both lesions were separately sent for histological examination.

Histopathological Findings. Histopathological examination confirmed the diagnosis of a benign osteochondroma of L-5 vertebra with hyperostotic bone fragments of the S-1 vertebra (Fig. 2).

Postoperative Course. The postoperative course was uneventful, and the patient was immediately symptom free. Postoperative CT scanning confirmed that the tumor had been completely excised.

Discussion

Dahlin and Unni17 have suggested that osteochondromas account for 36% of all benign bone tumors and that multiple exostoses constitute approximately 12% of all symptomatic lesions. Men are affected more than women (1:5.1).17 Patients most commonly present with symptoms in the second and third decades of life, with a mean age of 20 years.2,11,25

The lesions are rarely found in the spine; only 1.3 to 4.1% of solitary osteochondromas arise in the spine;17,22 approximately 9% of patients who are affected by hereditary multiple exostoses harbor spinal lesions.24 However, radiculopathy and/or myelopathy caused by osteochondromas are more rare, because the majority of these lesions grow out of the spinal canal.21,25 Spinal osteochondromas are more common in the cervical spine and C-2 is the most frequent site.3,5,10,12,25

Osteochondromas are thought to arise through a process of progressive endochondral ossification of aberrant cartilage of a growth plate22 as a consequence of congenital defect or trauma. Hereditary multiple exostoses can occur sporadically or, most often, are caused by an autosomal-dominant gene with variable expression.21,25 Albrecht and associates1 have indicated that the predominance of cervical lesions is caused by microtrauma inflicted on the epiphysial cartilage (and displacement of a portion thereof), because of the greater mobility and flexibility of these vertebrae. According to this hypothesis, the cervical and lumbar spine should be involved more than the thoracic spine. However, in the cases published in the literature the incidence of osteochondroma found in the lumbar region is definitely more rare. Therefore, in our opinion, the relationship between the incidence and location of this tumor in the vertebral column remains unclear. Knowledge of how the spine develops could help us to speculate on another explanation. In adolescence, secondary ossification centers, which lie in the spinous process, transverse process, articular process, and the endplate 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 into complete ossification in the cervical spine during adolescence; in the thoracic and the lumbar spine during the end of the second decade of life; and in the sacrum during the third decade of life.19 The cartilage of these secondary ossification centers could be the origin of aberrant islands of cartilaginous tissue that cause osteochondroma to form. It can be speculated that the more rapidly the ossification process of these centers develops, the greater is the probability that aberrant cartilage will form. Therefore, the fact that osteochondroma is more frequently located in the upper segments of the vertebral column could be explained by different durations of the ossification processes in these centers.

![Fig. 1. Preoperative imaging studies. Upper: Axial CT scan obtained through the bone window, revealing the exostosis protruding from the spinal canal, arising from left L-5 inferior articular process. Note that the cortex and spongiosa of the lesion and host articular process are in continuity (lower arrow), whereas the S-1 superior articular process has an uninterrupted cortex also in proximity to the tumor (upper arrow) and presents a hyperostotic reaction (see its dimension in relation to the contralateral articular process) that contributes to lateral recess stenosis. Lower: Sagittal spin-echo T1-weighted magnetic resonance image revealing the tumor’s central high-intensity core surrounded by a ringlike low-intensity area. Note the marked stenosis of the spinal canal.](image-url)
that the lesion originated from the inferior articular process of the L-5 vertebra; even the hyperostotic reaction of the superior articular process of the S-1 vertebra seems intriguing. In our search of the literature we were unable to find a case of osteochondroma such as our own.

In conclusion, spinal osteochondromas are rare, and they involve the inferior thoracic and lumbar spine only rarely. The cartilage of secondary ossification centers could be the origin of aberrant islands of cartilaginous tissue that cause the formation of osteochondroma. The more frequent location of osteochondroma in the higher segments of the vertebral column could be explained by different durations of the ossification processes that occur in these centers. Most patients present with a history of slowly progressive radiculopathy and/or myelopathy. Computerized tomography scanning is the diagnostic procedure of choice. Outcome in the majority of surgically treated patients is good, and malignant degeneration is a very rare event.

References


Most surgically treated patients with spinal osteochondromas have presented with a history of slowly progressive radiculopathy and/or myelopathy.12,18,20,22

On neuroradiological examination, spinal osteochondroma typically appears as a sessile or pediculate bone-like lesion within the cortex and the spongiosa are in continuity with those of the host vertebra.12,18,20,24,25 This particular feature is, without doubt, better visualized on CT scanning than on magnetic resonance imaging.18

The treatment outcome in the majority of patients in whom these lesions are surgically removed is good.12,13,18 Recurrence after surgical resection is rare and is due to incomplete removal of the cartilaginous cap.24,27 The risk of malignant degeneration into chondrosarcoma is 1 to 5% for solitary lesions and 10 to 25% in patients with multiple hereditary exostoses.12,22

Our case is peculiar for the level of the vertebral column at which osteochondroma occurred, as well as for the fact

Fig. 2. Upper: Photomicrograph showing the gross appearance of some bony fragments of the tumor. A cartilaginous layer (arrowheads) encasing an underlying trabecular bony component is evident. H & E, original magnification X 4. Lower: Photomicrograph showing a transitional zone of trabecular ossification. Trabecular bone and haemorrhagic marrow spaces are easily recognized at the bottom. H & E, original magnification X 115.

Manuscript received January 6, 1999. Accepted in final form July 19, 1999.
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