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CASE REPORT

Thoracic solitary pedunculated osteochondroma in a child: a case report

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Objective: This case report describes the rare presentation of a thoracic pedunculated osteochondroma in a child, arising from the lamina of the fourth thoracic vertebra.

Clinical features: A 7-year-old girl was referred for the evaluation of a swelling in her back. The patient was suffering from atraumatic, progressive painless back swelling, of approximately 2 years duration. The physical examination showed a healthy child, with a well-defined mass, about 4 × 6 cm, located around the midline of the upper thoracic spine. No clinical signs of hereditary multiple exostoses were detected. Plain radiographs and computerized tomography were suggestive of a pedunculated osteochondroma arising from the lamina of the fourth thoracic vertebra.

Intervention and outcome: The patient underwent surgical excision of the mass. The pathologist confirmed the diagnosis. Follow up for 2 years did not show any evidence of clinical or radiological recurrence.

Conclusion: The current report describes a rare case and the management of a solitary pedunculated osteochondroma arising from the lamina of the fourth thoracic vertebra in a child below the age of 10 years.

Keywords: benign tumors, hereditary multiple exostoses, spine column tumors, thoracic vertebra

Introduction

Osteochondromas are the most common benign bone and cartilage tumor,[1,2] with a predilection for the metaphysis of long bones, and with the distal femur, the proximal tibia, and the proximal humerus being the most affected sites.[3] Osteochondromas comprise almost 35%–40% of all primary benign bone tumors and 8%–9% of all bone tumors.[3–6] A large number of these tumors are asymptomatic and may never be identified. Therefore, the incidence probably is higher than what is reported.[3,7] Osteochondromas present as solitary lesions in around 85% of cases. The rest occur as part of hereditary multiple exostoses (HME), an autosomal dominant disease characterized by the formation of several benign cartilage-capped bone growths.[1,8]

In the context of a dysplastic disorder, osteochondromas can arise from any zone of endochondral bone formation.[4] It is thought that they originate in a laterally displaced part of the epiphyseal cartilage, resulting in a dysplastic bony growth at the expense of progressive endochondral ossification.[9]

Osteochondromas usually begin their growth in early childhood and arrest after puberty, upon closure of the epiphyses.[10] Malignant transformation of osteochondroma into a chondrosarcoma may occur in around 1% of solitary and 10% of HME.[11]

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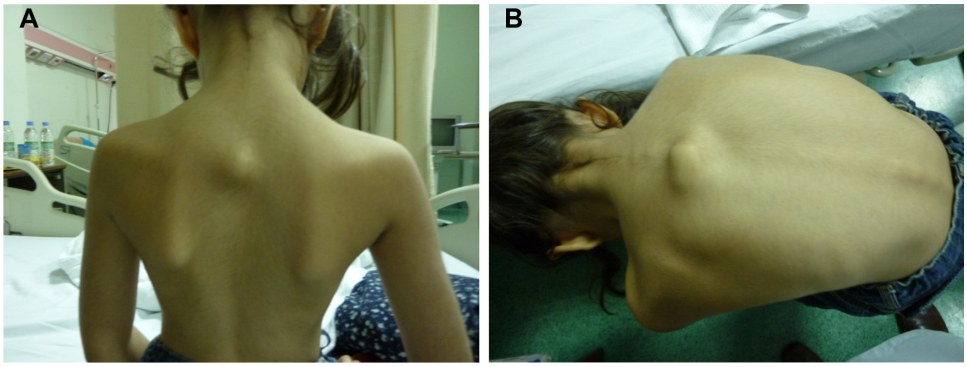

Figure 1 Clinical pictures, (**A**) standing and (**B**) bending forward, showing the presenting mass in the upper thoracic spine, near the midline.

Malignant transformation should be ruled out if the osteochondroma becomes painful or if it continues to grow after cessation of skeletal growth and if the thickness of the cartilaginous cap exceeds 2 cm in adults or 3 cm in children.[1,12]

Measurement of the thickness of the cap can be performed using ultrasound, computerized tomography (CT), or magnetic resonance imaging (MRI), but MRI scanning is the most accurate method.[1,6,12]

Asymptomatic lesions can be followed without intervention, whereas symptomatic ones are treated with surgical excision.[1] Indications for excision of a solitary osteochondroma include pain, deformity, cosmesis, continued growth, suspected malignant transformation, and neurovascular compromise.[2,3,12–14]

There are two characteristic types of osteochondromas, pedunculated and sessile. The pedunculated type has a slender pedicle directed away from the growth plate. The sessile ones are broad based.

Solitary osteochondromas originating in the spine account for only 1%–4% of all osteochondromas.[3,10,15–18] They most frequently involve the cervical spine, particularly C1 and C2.[10,19,20] The next most frequently affected sites are the thoracic and the lumbar spine.[4]

We describe in this report, a solitary asymptomatic pedunculated osteochondroma arising from the lamina of the fourth thoracic (T4) vertebra, in a 7-year-old child. Although there is a good number of cases of osteochondromas reported in the literature, there have been very few spine osteochondroma cases reported below the age of 10 years. The exact number of pedunculated spine osteochondromas could not be identified, as many of the reported cases did not mention the type of osteochondroma.

Case report

A 7-year-old girl was referred to the orthopedic clinic for evaluation of a painless back swelling. The patient reported having the swelling, which was slowly progressing, for approximately 2 years. There was no history of trauma, night pain, or fever. The family was concerned about her cosmetic appearance, psychological effect, and some discomfort during sleep when she lay on her back.

Physical examination showed a healthy child with a well-defined mass about 4 × 6 cm around the midline at the upper thoracic spine area. The mass was fixed, bony hard, nontender, deep to the skin and fascia, and nonadhered to the skin, and there were no signs of spinal deformity. (Figure 1). No other masses were palpable, and there was no clinical evidence of HME. The rest of the physical examination, including full neurovascular assessment, was normal.

Plain radiographs and CT scan (Figures 2 and 3) showed a protrusion of cortical and medullary bone relative to the cortical bone of the spinous process of the T4 vertebra, as well as zones of endochondral mineralization in the marrow underlying the osteochondroma. The medullary portion of the pedunculated osteochondroma was contiguous with the marrow of the adjacent bone.

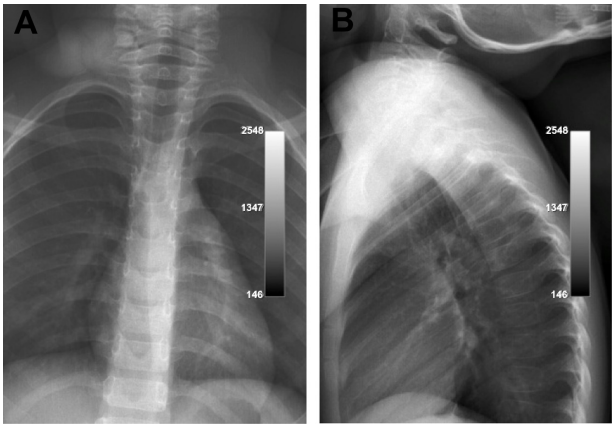

Figure 2 Plain radiographs, (**A**) posteroanterior and (**B**) lateral, showing an osteocartilagenous tumor arising from the upper thoracic vertebrae.

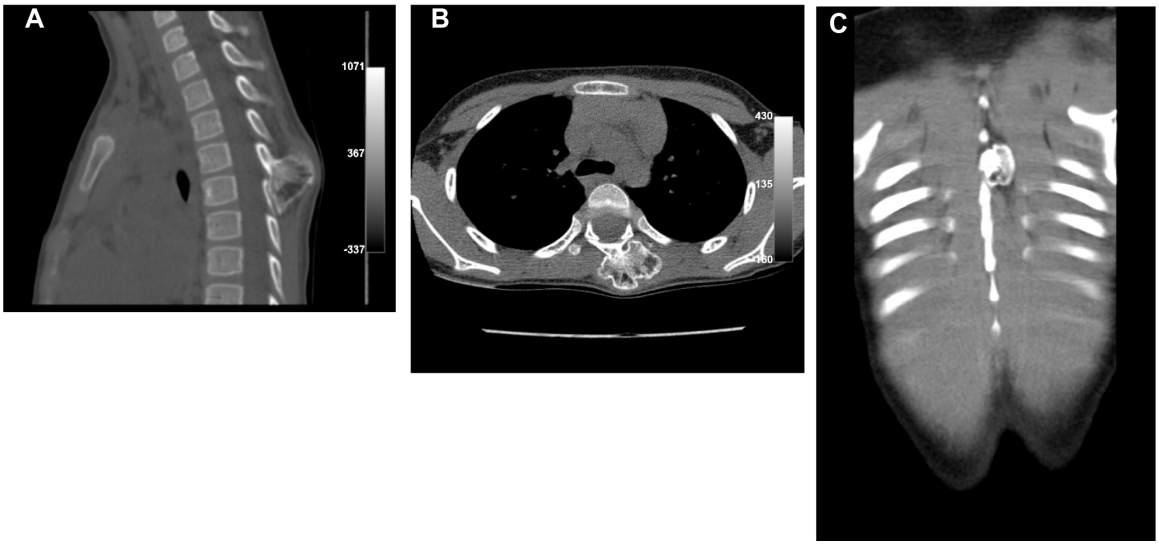

Figure 3 CT scan: (**A**) sagittal, (**B**) axial, and (**C**) coronal views. The CT showed the protrusion of cortical and medullary bone relative to the cortical bone of the spinous process of the T4 vertebra, as well as zones of endochondral mineralization in the marrow underlying the osteochondroma. The medullary portion of the pedunculated osteochondroma was contiguous with the marrow of the adjacent bone.
Abbreviation: CT, computed tomography.

After discussing the treatment options with the parents, surgical excision was chosen and an informed consent was obtained.

The tumor was approached by a posterior midline incision and separated from the lamina and spinous process of the T4 vertebra and was completely removed, including the cartilaginous cap (en bloc excision), without injuring the lamina or the supraspinous ligament, interspinous ligament, or spinous process.

Pathologically (Figure 4), the lesion consisted of multiple irregular dome-shaped structures with a vague capsule, hyaline cartilage cap (measuring 3 mm) that was continuous with bony trabeculae containing apparently normal marrow elements; a bony stalk with a cartilage cap features consistent with osteochondroma.

Follow up for 2 years did not show any signs of clinical or radiological recurrence (Figure 5).

Discussion

In the vast majority of cases, osteochondromas involve the long bones; their origin in the vertebral column is unusual,[4,21,22] with an incidence of 1%–4%. The commonest site of vertebral osteochondromas is at an eccentric position in the neural arch, with or without protrusion into the spinal canal.[23] The intraspinal extension of an osteochondroma is uncommon. Thus, affected patients rarely present with neurological symptoms (0.5%–1%).[24] Spinal column osteochondromas usually arise dorsally or dorasolaterally, and the most common surgical treatment is a decompression laminectomy or hemilaminectomy, depending on the size of the lesion.[25]

Development in conjunction with HME is more common and has been thoroughly reviewed in previous articles.[21,26–28] The average age of clinical manifestation, including all of spinal levels is, roughly, 30 years for solitary osteochondroma[10,11]

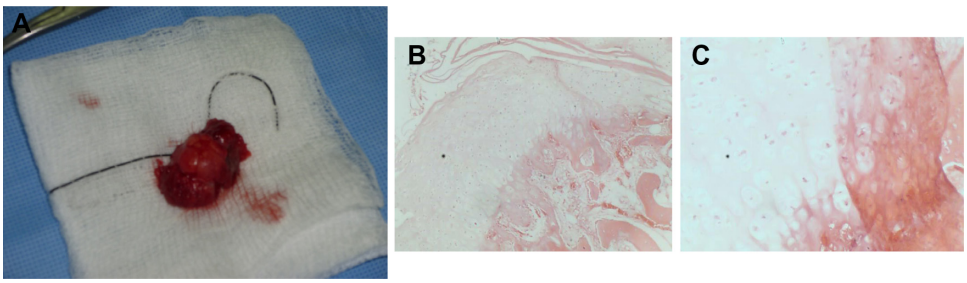

Figure 4 Pathology findings. The images show (**A**) a photograph of the gross surgical specimen, (**B**) histopathology at ×10 magnification; and (**C**) histopathology at ×40 magnification. The lesion consisted of multiple irregular dome-shaped structures with a vague capsule, hyaline cartilage cap (measuring 3 mm) that was continuous with bony trabeculae containing apparently normal marrow elements; a bony stalk with a cartilage cap features consistent with osteochondroma.

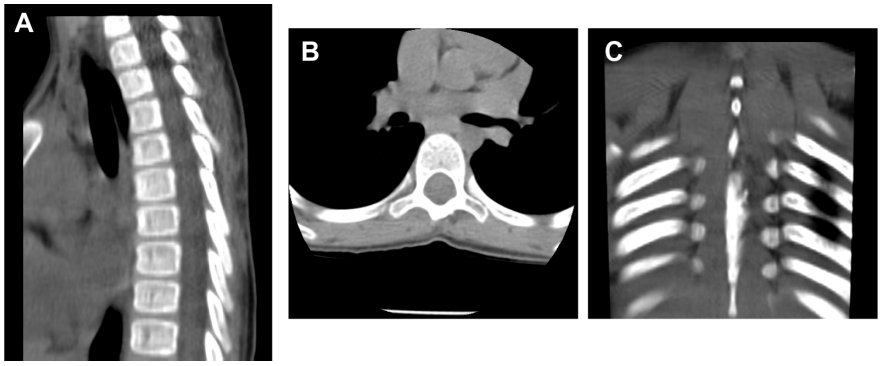

Figure 5 CT Scan, (**A**) sagittal, (**B**) axial, and (**C**) coronal views, at 2 years postoperation. The CT showed no signs of recurrence.
Abbreviation: CT, computed tomography.

and 20 years for HME.[28] The pathophysiology of both HME and solitary osteochondroma remains unknown.[28]

In the reviews of osteochondroma reported by Albrecht et al[10] and Roblot et al,[11] the thoracic spine was the site of only 26%–28% of all spinal osteochondromas, despite comprising 40% of the vertebrae. Osteochondromas usually give rise to clinical symptoms during growth in the second or third decade of life. Four cases of spinal solitary osteochondroma below the age of 10 years were reported by Roblot et al,[11] all in males and all in the cervical spine; one case of HME below the age of 10 years was reported, and it was also in the cervical spine. In the review articles of solitary thoracic osteochondromas reported by Brastianos et al, Roblot et al, and Khosla et al, only one case below the age of 10 years was reported. It was inseparable from the lamina (most likely, the sessile type).[2,11,19] None of these papers reported the type of osteochondroma. Rao and Jakheria reported one case of a giant cervical pedunculated osteochondroma of a cervical spine in an 8-year-old girl with HME.[29]

The case in hand is atypical in that the tumor arose from the posterior element of the T4 vertebra as a pedunculated type, in a 7-year-old child. Surgical intervention was effective in completely resolving the patient's symptoms without injuring the vital anatomical structure of the spine and improved the psychological well-being of the patient.

In conclusion it is important to differentiate between a pedunculate and sessile type of osteochondroma in the spine because the sessile type is inseparable, and complete excision of the tumor requires removal of part of the lamina and spinous process, and the possible neurological complications are higher. The pedunculated type is separable and amenable to en bloc excision, without injuring the posterior spinal element.

Disclosure

The authors report no conflicts of interest in this work.

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