Aneurysmal bone cyst in a lumbar pedicle of a child

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Abstract

We describe a seven-year old boy with right-sided back pain of two weeks duration. Plain radiographs showed osteolysis of the right pedicle of L1. The diagnosis of a aneurysmatic bone cyst was confirmed by biopsy. Treatment included curettage and grafting of the defect with cancellous bone and instrumentation of the deformity.
Introduction

Aneurysmal bone cysts are the most common benign lesion in the spine [3]. Most patients are below the age of 20 years [11]. Aneurysmal bone cysts are found in the entire spine [20] but occur predominantly in the posterior elements. Aneurysmal bone cysts can be found in association with other tumorous lesions e.g. chondroblastoma and osteoblastoma. The most common clinical findings are back pain, scoliosis and spinal rigidity [15,16].

Case Report

A 7-year-old boy presented with 2 weeks history of progressive right-sided back pain in the upper lumbar region. The pain was aggravated under load and alleviated by rest. The pain had become so severe that he was unable to walk. He had no history of trauma or any other illness. Neurological examination was normal. Plain radiographs revealed osteolysis of the right pedicle of the first lumbar vertebra (Fig. 1).

Figure 1: Destruction of the right pedicle of L1
Axial computed tomography (CT) demonstrated complete destruction of the right pedicle and the dorsal third of the vertebral body (Fig. 2) and magnetic resonance imaging (MRI) showed a liquid filled, cystic bone tumor with solid parts. The bone scintigraphy was negative.

*Figure 2: Coronal planes of T2 weighted MRI shows a lesion with high signal intensity and internal septums.*

In the differential diagnosis an aneurysmal bone cyst, a chordoma or the combination of an aneurysmal bone cyst in combination with another bony lesion (e.g. osteoblastoma or chondroblastoma) were considered.

A biopsy including intraoperative frozen section was performed and the diagnosis of a solitary aneurysmal bone cyst confirmed. The cyst was treated with curettage and grafting with cancellous bone from the dorsal iliac crest, in combination with dorsal transpedicular instrumentation T12-L2 [Baby-Moss-Miami Titanium System (DePuy, Warsaw, IN, USA)] without fusion (Fig. 3).
Histopathological work-up of the curettage tissue showed aneurysmatic bone cyst with thin membranes, spindle cells, fibroblasts and polinucleoided megacaryocyts. No other bony lesion came to view.

Figure 3: Postoperative radiographs

Pain disappeared after surgery. Three months after surgery a MRI revealed recurrence in the pedicle and the anterior part of L1.

In a second surgical intervention curettage of the anterior aspect of the cyst was undertaken and the defect again filled with cancellous bone. MRI three months after the second surgery showed no recurrence. Bony fusion in the anterior vertebral body became visible. In the dorsal part and in the pedicle the cyst was unchanged. Six months following the second surgical intervention removal of the dorsal instrumentation combined with curettage of the cystic rests and filling of the defect with cancellous bone took place. Further MRI showed no recurrence in the vertebral body and the pedicle.
Discussion

Benign tumors or tumor-like lesions of the spine are easily misdiagnosed in children with persistent back pain [1]. Children whose symptoms progress or fail to respond over an appropriate period of time should receive further evaluation. In children and adolescents benign tumors and tumor-like lesions of the spine are the second most common diagnosis only outnumbered by trauma [12,18].

The most common benign tumors and tumor-like lesions of the spine in children and adolescents are hemangioma, eosinophilic granuloma, osteoid osteoma, osteoblastoma, giant cell tumor, aneurysmal bone cyst and osteochondroma. The imaging features of these lesions are often characteristic. Aneurysmal bone cysts can be associated with another tumors e.g. chordoma, chondroblastoma and osteoblastoma [2,5,23]. Therefore biopsy and intraoperative frozen-section in suspected cases are indicated.

Different biopsy techniques are in use. For the patient closed techniques with a thin needle is less painful and leaves no scars. For the pathologist this technique may cause insufficient or damaged specimens. Open biopsies require general anesthesia and leave scars but will secure sufficient specimens and thus make the pathological diagnosis more exact.

Once the diagnosis has been confirmed different therapeutic strategies can be considered. Currently, curettage of the lesion and cancellous bonegrafting from the dorsal iliac crest combined with spinal instrumentation in the presence of deformity or instability is the treatment of choice. Titanium instrumentation is used to allow MRI for control of the tumorous lesion. This procedure reduces the recurrence rate and enables to correct a present deformity combined with a bony fusion of the defect [13,17,19,22].

Radiation with a dose of 30 Gy has been described but only with a 50% sucess rate. Due the high failure rate and the inherent radiation risks this therapy is currently not acceptable [4,10].
Minimal invasive techniques like selective arterial occlusion, in situ calcitonin injections and vertebroplasty have also been described for pathologic fractures in aneurysmatic bone cysts without neurological symptoms [6,7,8,9,14,21]. Due to lack of long-term follow up these measures should be avoided in children and adolescents.

References