Primary aneurysmal bone cyst of the patella: a case report

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ABSTRACT

Aneurysmal bone cysts account for less than 1% of primary bone tumours and have a predilection for the metaphyses of the long bones of the leg. Only 1% of all aneurysmal bone cysts occur in the patella. We report on a 30-year-old man with a primary aneurysmal bone cyst in the right patella treated with curettage. The defect was filled with demineralised bone matrix and allogeneic cancellous bone graft. At the 1.5-year follow-up, the bone graft was well incorporated, the patient experienced no pain or tenderness and had a full range of knee movement.

Key words: bone cysts, aneurysmal; patella

INTRODUCTION

Aneurysmal bone cysts are uncommon and account for <1% of primary bone tumours.1 Less than 1% of all cases occur in the patella.2 13 cases of aneurysmal bone cyst of the patella have been reported.1–12 Aneurysmal bone cysts are expanding osteolytic lesions, consisting of a blood-filled space of variable size separated by connective tissue containing bone trabeculae or osteoid tissue and osteoclast giant cells. They are slightly more common in females and usually occur in the first or second decade of life. They have a predilection for the metaphyses of the long leg bones; the distal femur and proximal tibia are the most common sites, followed by the spine and pelvis.13

CASE REPORT

In November 2003, a 30-year-old man presented with a 10-month history of intermittent pain and swelling of the right knee, which had increased during the previous 3 months. A physical examination revealed tenderness and swelling over the inferior pole of the patella. He had no history of trauma and had a full, active range of knee movement.
Radiographs of the right knee showed an osteolytic lesion involving the inferior two thirds of the patella. Endosteal scalloping and cortical thinning with mild expansion, and a multi-loculated appearance was observed (Fig. 1). Sagittal magnetic resonance images showed a multi-loculated lesion with multiple fluid-fluid levels in the patella. The lesion had intermediate-to-low signal intensity on the T1-weighted image, and high signal intensity on the T2-weighted image with intermediate signal intensity in the dependant fluid layers (Fig. 2). A bone scan demonstrated intense uptake in the right patella (Fig. 3).

An arthroscopic examination showed a normal patellofemoral surface (Fig. 4). A hexagonal bony window was then made in the anterior surface of the patella. Thorough curettage with a burr and alcohol (99.9%) cauterisation was performed. The defect was filled with an allogeneic cancellous bone graft with demineralised bone matrix (Orthoblast II, GenSci, Irvine [CA], US).

Histopathologic photomicrographs revealed that...
the cavernomatous space was lined with endothelial cells and contained extravasated red blood cells. Septa contained giant cells and loosely arranged spindle cells, and bony trabeculae were anastomosing and showed prominent osteoblastic activity (Fig. 5).

The knee was placed in a long leg cast for 4 weeks, followed by full weight bearing and joint movement exercises. At the 1.5-year follow-up, the bone graft had incorporated well, and the patient experienced no pain or tenderness and had a full range of knee movement (Fig. 6).

DISCUSSION

Primary aneurysmal bone cysts are those with no other associated lesions. Secondary lesions may occur along with benign or malignant lesions responsible for the aneurysmal cystic changes, and are considered to be more aggressive and have a higher recurrence rate. Primary aneurysmal bone cysts are more common than the secondary lesions (ratio, 2:1) and are often associated with a history of trauma. It has been suggested that they are more common in people of African descent.

Radiologically aneurysmal bone cysts appear as an eccentric or central osteolytic lesion with cortical expansion, giving a ‘blown-out’ appearance with extension into soft tissues. Trabeculae are coarse at the periphery of the lesion but become delicate toward the centre. Osteolytic lesions are surrounded by bony septa and the surface of the intra-osseous border shows periosteal and new bone formation.

Most patients with primary patellar tumours are young and active, and give a history of knee pain, swelling, and related trauma. An osteolytic lesion can be diagnosed and staged using radiography, bone scanning, computed tomography, and magnetic resonance imaging. Differential diagnoses include chondroblastomas and giant cell tumours. The Enneking surgical staging system can be used to standardise the operative treatment for patellar tumours. Among benign lesions, stage-I lesions have a well-defined cortex and stage-II lesions have a thinned cortex, which may be partly broken but limited to the periosteum. Stage-III lesions penetrate the cortex with small breaches around the perimeter. Curettage and autogenous grafting, and sometimes chemical adjuvants should be considered in stage-I and -II lesions, whereas total patellectomy may be satisfactory for aggressive benign lesions. Stage-III lesions with pathologic fractures should be excised with wide margins and reconstructed using joint sparing surgery with an endoprosthesis or bone graft, or using an arthrodesis with an autograft or allograft. A case involving the articular surface was treated with a plastic patellar prosthesis after curettage, with good results at the 3.5-year follow-up.

Our patient had a stage-II lesion, with a thinned but intact cortex, based on the arthroscopic examination. Aneurysmal bone cysts of the patella can be differentiated from other expansile osteolytic lesions radiologically. They are eccentric and multi-septate osteolytic lesions with multiple fluid-fluid levels. Thorough curettage, alcohol cautery, followed by filling of the defect with demineralised bone matrix and cancellous bone graft was a successful treatment option.
REFERENCES