Chondroblastoma of the Patella With Aneurysmal Bone Cyst

Honglue Tan, MD; Mengning Yan, MD; Bing Yue, MD; Yiming Zeng, MD; You Wang, MD

Abstract

Chondroblastoma of the patella is rare. Aneurysmal bone cysts, which develop from a prior lesion such as a chondroblastoma, are seldom seen in the patella. The authors report a case of a 36-year-old man who presented with 2 years of right knee pain without calor, erythema, pain on palpation, or abnormal range of motion. Radiological studies suggested aneurysmal bone cyst. The lesion was excised with curettage and the residual cavity filled with autogenous bone graft. Histopathology revealed chondroblastoma associated with a secondary aneurysmal bone cyst. In the follow-up period, the patient demonstrated normal joint activities with no pain. Normal configuration of the patella and bone union were shown on plain radiographs. The authors present a review of the literature of all cases of patellar chondroblastoma with aneurysmal bone cyst. This case is the 14th report of aneurysmal bone cyst arising in a chondroblastoma of the patella. According to the literature, computed tomography and magnetic resonance imaging are useful in the study of these lesions. The pathologic diagnosis is based on the presence of chondroblastoma and aneurysmal bone cyst. Treatment of this lesion includes patellectomy, curettage alone, and curettage with bone grafting. Despite the risk of recurrence of this lesion in the patella, the authors first recommend curettage followed by filling the cavity with bone graft. To protect the anterior tension of the patella intraoperatively, the bone window should be made at the medial edge of the patella to perform the curettage and bone grafting.

Figure: Anteroposterior (left) and lateral (right) radiographs showing satisfactory autogenous bone graft of the patella 2 days postoperatively (A) and normal configuration of the patella and bone union 3 months postoperatively (B).
Tumors of the patella are rare. Only a few studies have reported these lesions, and most are case reports.\textsuperscript{1-17} The most frequent tumors in this location are giant cell tumor, chondroblastoma, and aneurysmal bone cyst.\textsuperscript{7,8} Chondroblastoma accounts for 1\% to 3\% of all primary benign bone tumors and 22\% of benign bone tumors in the patella.\textsuperscript{8,9} Aneurysmal bone cyst accounts for 1\% of primary bone lesions and 4\% to 7\% of all benign patellar tumors.\textsuperscript{9,10} Secondary aneurysmal bone cysts are occasionally observed in giant cell tumor or chondroblastoma.\textsuperscript{7,11} In the current study, the authors report a case of chondroblastoma in the patella with aneurysmal bone cyst.

**Case Report**

A 36-year-old man reported a 2-year history of right knee pain aggravated by exercise and improved at rest. On physical examination, there was no joint effusion, no pain on palpation, and no skin calor. There was no difference in appearance of the right patella compared with the left, and the knee had full range of active motion. Laboratory studies, including a hemogram, erythrocyte sedimentation rate, and routine biochemistry of the joint fluid, were all within normal ranges. Plain radiographs demonstrated a radiolucent lesion in the right patella with well-defined, lobulated margins. A thin cortex, thin septations, and a sclerotic rim were also observed (Figures 1A-1B). Computed tomography scan revealed an osteolytic lesion with septations and sclerotic margins in the middle portion of the patella (Figures 1C-1D). Magnetic resonance imaging showed a lobulated lesion occupying greater than 75\% of the patella. In addition, horizontal fluid-fluid levels in the patella with normal cartilage structure were seen, suspicious for aneurysmal bone cyst (Figures 1E-1H).

Intraoperatively, no abnormality was found in the soft tissue. The anterior bone cortex and cartilage structures were integrated (Figures 2A-2B). To protect the anterior tension of the patella, a 1.5×1-cm bone window was made at the medial edge of the patella, keeping the dorsal perios- teum of the small bone segment intact. The patellar cystic lesions displayed a septal pattern. Both the larger and smaller cavities with a connection under the thin septum contained serosanguinous fluid and dark-colored soft tissue (Figures 2C-2D). The osteolytic lesions were thoroughly curetted and filled with autogenous bone graft taken from the iliac crest. The bone window was then closed using the small bone segment of the patella and fixed with absorbable suture (Figures 2E-2F). The soft tissue and fluid were sent for histopathologic analysis.

Postoperatively, the patient was managed with dorsal cast immobilization for...
2 weeks, followed by static quadriceps exercises. During the short follow-up period, the patient demonstrated normal joint activities with no pain. Normal configuration of the patella and bone union were shown on plain radiographs (Figure 3).

On histopathology, hypocellular chondroid matrix with dispersed chondroblast-like cells were observed; on high-power views, polyhedral chondroblasts with distinct cytoplasmic borders, pale pink cytoplasm, and hyperlobulated nuclei intermingled with an osteoclastic type of benign multinucleated giant cells surrounding a poorly formed chondroid matrix were seen (Figures 4A-4B). Light microscopy also showed several walled cystic spaces filled with blood; within the fibrous septum were immature bone formation and a few multinucleated giant cells, compatible with aneurysmal bone cyst (Figures 4C-4D). Based on histopathology, chondroblastoma with aneurysmal bone cyst was diagnosed.

**DISCUSSION**

Chondroblastoma is a rare benign cartilaginous neoplasm that typically occurs in the epiphyses of the tubular long bones in the second or third decades of life.10 The distal femoral and proximal tibial epiphyses are most frequently involved, followed by the proximal humerus.5-8 Chondroblastoma is seen in conjunction with aneurysmal bone cyst in 10% to 15% of patients.12 Schajowicz and Gallardo18 reported that 17% of their cases of chondroblastoma showed cystic changes similar histologically to aneurysmal bone cyst.18 Biesecker et al19 studied 66 cases of aneurysmal bone cyst and found that 32% were associated with another benign bone lesion, including 5 chondroblastomas. However, aneurysmal bone cyst occurring in chondroblastoma of the patella has not been frequently reported.

Chondroblastoma or aneurysmal bone cyst rarely occurs in the patella. Only 14 cases of chondroblastoma of the patella with aneurysmal bone cyst have been reported to date (Table).

Of these 14 cases, 10 patients had joint pain and swelling, except for 2 patellar fractures. The swelling was due to the proximity of the patellar lesions to the joint. The association of patellar lesions with chondroblastoma or aneurysmal bone cyst alone is rare. Pathologic fracture of the patella due to chondroblastoma with aneurysmal bone cyst was reported in 2 (14.3%) patients (Table). Therefore, when knee pain and signs of swelling are seen in a young man with a patellar lesion, a pathological fracture may be present, and the diagnosis of chondroblastoma with aneurysmal bone cyst should be considered.

Eccentric, osteolytic destruction with lobulated margins, thinned cortices, and a well-defined sclerotic rim are common radiographic findings in chondroblastoma of the patella. The presence of patel-
lar expansion may suggest formation of a secondary aneurysmal bone cyst, and fluid levels are observed only when secondary aneurysmal bone cyst is found.\textsuperscript{7,11} Computed tomography may be useful to better characterize the osteolytic lesions, with a thin cortex and septations inside the lesion. Magnetic resonance imaging is useful to demonstrate the typical cartilaginous pattern and fluid layers distinctive for this tumor.\textsuperscript{7,8} The presence of a hypocellular chondroid matrix with dispersed chondroblast-like cells and cystic spaces filled with blood are typical pathological features for this lesion.

The treatment of chondroblastoma of the patella with aneurysmal bone cyst includes patellectomy, curettage alone, and curettage with bone grafting. According to a literature review (Table),\textsuperscript{7,10,11,13-17} single-stage patellectomy was performed in 3 patients; 2-stage patellectomy was performed in 1 patient due to recurrence after curettage and bone graft; 2-stage curettage and bone graft was performed in 2 patients after curettage alone or curettage and bone graft; and single-stage curettage and bone grafting was performed in 8 patients. The selection of treatment depends on the size of the cyst and whether recurrence has occurred. If small, curettage with bone grafts may be sufficient; if large or recurrent, curettage and bone grafting or patellectomy may be advised. Recurrence after curettage, with or without bone graft, occurred in 3 patients. Despite the risk of recurrence of this lesion in the patella, the authors recommend curettage followed by filling the cavity with bone graft; patellectomy is not the first choice because loss of the patella disturbs the biomechanics of the knee joint, ultimately leading to early osteoarthritis. To protect the anterior tension of the patella intraoperatively, the bone win-

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Abbreviation: N/A, not available.
 should be made at the medial edge to perform curettage and bone grafting.

CONCLUSION

Chondroblastoma with aneurysmal bone cyst should be suspected in a young patient with an osteolytic lesion of the patella. It is a localized lesion that demonstrates osteolytic destruction with lobulated margins, thinned cortices, fluid levels, and a well-defined sclerotic rim. Computed tomography and magnetic resonance imaging are useful in the study of these lesions. The pathologic diagnosis is based on the presence of chondroblastoma and aneurysmal bone cyst. Curettage followed by filling the cavity with bone graft is recommend.

REFERENCES