Synovial Chondromatosis of Pes Anserine Bursa Secondary to Osteochondroma

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abstract

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Osteochondromas are common benign bone tumors. Synovial chondromatosis is a benign cartilaginous metaplasia that occurs in the synovium. The authors describe a unique case of synovial chondromatosis developing in the pes anserine bursa secondary to an underlying osteochondroma of the proximal medial tibia. It is unusual to see both of these processes occurring simultaneously in 1 location. After appropriate consent was obtained, the patient’s case was reviewed. A 17-year-old boy presented with a painless mass in the medial aspect of the right leg. Initial imaging of the right leg showed a cartilaginous-appearing lesion arising from the tibia and several distinct additional cartilaginous masses in the adjacent soft tissue. After 16 months of observation, the patient began to have increasing pain in the region of the lesion. The patient underwent surgery for excision of suspected synovial chondromatosis of the right pes anserine bursa and osteochondroma of the proximal right tibia. Postoperatively, the patient had complete resolution of symptoms and regained full range of motion of the knee. He returned to full activities, including walking and running. Osteochondromas are common benign bone tumors. Synovial chondromatosis is a benign synovial metaplastic cartilaginous proliferation that occurs primarily in joints, but can occur in any synovial-lined space. In this case report, the authors describe a unique occurrence of both of these lesions simultaneously. The treatment was excision of the osteochondroma and resection of the chondromatosis lesions, which resulted in an excellent outcome.

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Osteochondromas are the most common benign tumor of bone. These tumors are composed of a histologically normal osseous projection and a cartilaginous cap. The lesion is commonly metaphyseal, likely arising from a physis. Clinically, osteochondromas usually present as a painless protrusion, or bump, on the affected extremity. The most common age at presentation is 10 to 20 years. A reactive bursa can develop between an osteochondroma and the overlying soft tissue as a result of friction and mechanical impingement.\(^1,4\)

Synovial chondromatosis is a disorder in which the synovium undergoes metaplastic transformation and forms osteochondral bodies in the synovial cavity.\(^5-8\) It has been documented to occur in every synovial joint, with the knee most commonly affected.\(^5-8\) Metaplastic changes of the synovium are believed to be nonaggressive, but the formation of multiple osteochondral loose bodies leads to mechanical damage to the articular cartilage and has been shown to lead to degenerative osteoarthritis.\(^5,6\)

Extra-articular lesions of the synovial chondromatosis are rare and tend to occur in tenosynovial or bursal tissue, almost exclusively in the hands and feet.\(^7\) Synovial chondromatosis rarely develops in these secondary reactive bursal or tenosynovial spaces formed by primary underlying osteochondromas.\(^1,3,5,10\) This report describes an interesting case of synovial chondromatosis that developed in the pes anserine bursa secondary to an underlying osteochondroma of the proximal medial tibia.

**Case Report**

A 17-year-old boy presented with a mass in the medial aspect of the right leg. He was unsure how long it had been present, but believed that it had been there for about a year. The patient had a soccer injury a few months before presentation and stated that the mass had felt more prominent since that time. The mass had never caused pain or discomfort.

Examination showed a mobile mass that protruded from the medial aspect of the proximal tibia. The mass changed position on flexion and extension of the knee and was nearly unappreciable in flexion. The mass was not located within the knee, but was directly adjacent to the joint. On examination, it felt like multiple small masses. The patient reported no pain with motion of the right leg or knee joint and had full range of motion on examination. On presentation, the patient underwent radiographic imaging of the right leg that showed a cartilaginous-appearing lesion in direct opposition to the proximal tibia, which was likely along the hamstring tendon (Figure 1). Initial magnetic resonance imaging (MRI) scan suggested an osteochondroma in the same region of the tibia, but this was not seen on initial radiographs (Figure 2A).

An MRI scan showed a mass projecting posteriorly off the tibia. There was continuity of the cortex with the posterior tibial cortex and normal MRI appearance of the bone within the mass. These findings were diagnostic of osteochondroma. A distinct cartilage cap could be identified that was separate from, although similar in appearance to, the additional masses in the pes anserine bursa. These masses had a lobulated appearance and imaging characteristics that were highly suggestive of cartilage, leading to the presumed diagnosis of synovial chondromatosis. The patient was observed initially and followed at 6-month intervals.

At 16 months, the patient returned for follow-up examination. He reported increased pain and swelling in the region of the lesion. He also mentioned that he believed that the lesion might be growing. On examination, the mass appeared slightly larger than it was at the previous examination. It was nontender and mobile, and there was no erythema. Repeat MRI scan during the follow-up visit showed persistence of the osteochondromatosis masses as well as the underlying osteochondroma of the proximal medial tibia (Figure 2B).

No aggressive features were appreciated on imaging.

At the follow-up appointment, because the lesion was causing pain and mechanical discomfort, excision was recommended. The patient underwent surgical excision of the synovial chondromatosis of the right pes anserine bursa and the osteochondroma of the proximal right tibia. Specimens were sent for pathologic analysis (Figure 3).

**Pathology**

Two separate surgical specimens were sent. The first, the osteochondroma, showed histologically normal bone with a cap or cartilaginous matrix. The cartilage was relatively hypocellular and showed no atypia or pleomorphism. The second specimen consisted of multiple loose cartilaginous bodies with a glistening white gross appearance. The microscopic appearance showed a lobulated cartilage matrix with low cellularity. Occasional binucleate forms were seen, but overall the cells had a low-grade appearance, with no
significant atypia, necrosis, or pleomorphism (Figure 4).

DISCUSSION

Osteochondromas are the most common benign tumor of bone. A reactive bursa can develop between an osteochondroma and the overlying soft tissue as a result of friction and mechanical impingement. Synovial chondromatosis is a rare disorder in which the synovium undergoes metaplastic transformation and forms osteochondral bodies. Extra-articular lesions of synovial chondromatosis are even rarer and have been reported in the secondary reactive bursal spaces formed by primary underlying osteochondromas.

This case describes a young patient who had synovial chondromatosis in the pes anserine bursa as a result of an underlying osteochondroma. It is likely that the osteochondroma caused an inflammatory reaction within the tenosynovium of the overlying hamstring tendons. Over time, this reaction likely led to osteochondromatous metaplasia and development of synovial chondromatosis.

Cases such as the one described, although rare, are important to diagnose accurately because on imaging such lesions can often resemble chondrosarcoma. Both osteochondroma and synovial chondromatosis have the potential for malignant transformation, and careful review of imaging should be undertaken to rule out this possibility. Between 1% and 5% of solitary osteochondromas undergo malignant transformation to secondary chondrosarcoma. Local recurrence after complete resection, continued growth despite skeletal maturity, and sudden increases in pain without evidence of neuropathy are concerning for malignant change.

In rare instances, synovial chondromatosis also has the potential to develop into chondrosarcoma. In 1998, Davis et al reviewed a series of 53 cases of primary synovial chondromatosis and identified 3 instances of malignant transformation to chondrosarcoma, representing a 5% prevalence. The actual prevalence of malignant transformation is unknown because the literature described this process primarily via case reports. Most patients with malignant transformation of synovial chondromatosis have long-standing disease with multiple local recurrences. Patients present with pain and swelling, clinical symptoms similar to those of primary synovial chondromatosis, making the diagnosis of malignant transformation difficult. However, a rapid increase in the size of the lesion in a patient with known primary synovial chondromatosis or a rapidly deteriorating clinical course should prompt suspicion of malignant transformation and biopsy of the lesion.

On computed tomography and MRI scan, osteochondroma characteristically shows continuity with the medullary cavity of native bone, as seen in this case. On MRI, the cartilaginous cap shows intermediate intensity on T1-weighted images and high signal intensity on T2-weighted images. In general, there is consensus that cartilaginous cap thickness greater than 2 cm on T2-weighted images is worrisome for transformation to chondrosarcoma. However, this may not be accurate for all patients because the car-

Figure 2: Axial proton density magnetic resonance imaging scan from initial presentation showing osteochondroma at the posterior medial tibia, sharing a cortex with normal bone and a distinct cartilage cap. Multiple cartilaginous masses with lobulated architecture are seen in the pes anserine bursa, along with bursal fluid suggestive of synovial chondromatosis (A). Follow-up magnetic resonance imaging scan at 16 months preoperatively showing similar features, with no significant change in the size of the osteochondroma cartilage cap (B).

Figure 3: Intraoperative photograph showing resected osteochondroma (top) and synovial chondromatosis fragments and bursa (bottom).

Figure 4: High-magnification image showing chondrocytes in a columnar pattern with nuclei lacking pleomorphism, nuclear hyperchromasia, or binucleation (hematoxylin and eosin stain; original magnification, ×40).
tilage cap may be larger in the pediatric population.14 Imaging features of synovial chondromatosis are frequently pathognomonic for this disease. Radiographic features include multiple intra-articular chondral bodies with “ring-and-arc” chondroid mineralization and extrinsic erosion of bone on both sides of the joint.10 Computed tomography scan has been described as the optimal radiologic modality to identify and characterize these calcified intra-articular fragments and extrinsic erosion of bone.10 Recurrent synovial chondromatosis and malignant transformation to chondrosarcoma may have radiologically similar appearances. Extension into the adjacent soft tissue (particularly into the bursa) and extrinsic erosion of bone may be seen in both synovial chondromatosis and chondrosarcoma. Therefore, these are not adequate distinguishing features on imaging.10,17 Schofield et al10 and Davis et al13 stated that true cortical destruction with bone marrow invasion and permeation should be considered a sign of malignancy. For this reason, MRI is optimal for detecting true marrow invasion and differentiating this feature from deep extrinsic erosion.10,13

CONCLUSION

Although individually each of these diagnoses is common, it is rare that both processes are seen in the same anatomic location concurrently. The only treatment option for symptomatic management of osteochondromas and primary synovial chondromatosis is surgical excision. As described in this case, adequate excision led to resolution of symptoms immediately postoperatively and pathologic analysis reassured both the patient and the physician that these concurrent processes were benign. Malignant transformation of both lesions is a concern, and careful observation is necessary for patients presenting with either of these conditions.

REFERENCES