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Case Report

Localized Chondrocalcinosis of the Lateral Tibial Condyle Presenting as a Loose Body in a Young Athlete

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Summary: Chondrocalcinosis, although very rare in young adults, can occur in some young patients. Although its presenting clinical history or radiographic findings may resemble those of an intraarticular loose body, chondrocalcinosis can occur in young athletes, possibly after repetitive microtrauma, and should be included in the differential diagnosis of calcified intraarticular lesions in the young athlete. **Key Words:** Chondrocalcinosis—Athletes—Intraarticular lesion.

Chondrocalcinosis is primarily a finding in the middle-aged or elderly patient and has rarely been reported in young adults. The authors present a case of chondrocalcinosis that initially presented clinically and radiographically as an intraarticular loose body. It is believed to be the first reported case of chondrocalcinosis possibly caused by activity or sports-related repetitive microtrauma. A discussion of chondrocalcinosis and its possible traumatic etiology in this athlete are reviewed.

CASE REPORT

A 20-year-old white male presented with a history of left knee discomfort for several months while training for and participating in the 800 m run in intercollegiate varsity track. His discomfort was primarily located laterally in his left knee and he described an occasional grinding sensation when his knee was fully extended. He could recall no episodes of significant trauma and had no history of effusion or locking. His training regimen consisted of running 50–90 mi per week for 6 years. He denied any known medical problems, medications, steroid use, or family history of arthritis.

Physical examination of his left knee revealed no effusion, erythema, or warmth. He demonstrated no patellofemoral, medical, or lateral joint knee pain. Lachman's, McMurray's, and pivot shift exams were all negative. Radiographs revealed what appeared to be a 2–3 mm round calcified loose body in the lateral compartment. Initially, it was felt the patient had a normal knee exam with a possible intraarticular loose body. The differential diagnosis at this time was an osteochondral fracture or osteochondritis dissecans. His symptoms continued to persist and his discomfort localized more in the posterior aspect of his lateral knee compartment.

A left knee arthroscopy was performed under local anesthesia. Initial examination revealed some mild chondromalacia of the medial facet of the patella, with apparent normal appearing menisci, cruciates, femoral condyles, tibial plateaus, and patellofemoral joint. The medial and lateral gutters as well as the posterior intercondylar notch were well visualized with no evidence of a loose body. At this point intraoperative radiographs were repeated of the left knee. These radiographs again revealed what appeared to be a 3 mm round calcified loose body in the lateral compartment (Fig. 1). The arthroscopy equipment was reinserted and the lateral joint space was again examined. An area of the pos-

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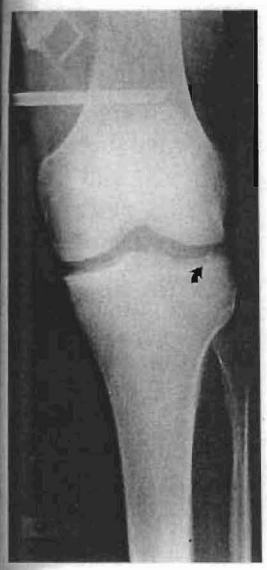

FIG. 1. Anteroposterior radiograph of the left knee demonstrating a 3-mm diameter round calcification over the lateral tibial plateau. Initially felt to be a loose body, this lesion was subsequently found to be an area of chondrocalcinosis.

terolateral lateral tibial plateau articular cartilage was noticed to have some yellow discoloration. This area was palpated with a probe until the probe fell into a small cavity. A thick, white semisolid material of toothpaste consistency immediately rose from this cavity (Fig. 2). The patient noted at this point, without being questioned, that this was the type of discomfort he experienced with running. The cavity was felt to be a maximum of 3–4 mm deep and superficial to be subchondral bone. All material appeared to be flushed from the knee. Synovial biopsies revealed no evidence of an inflammatory process. A diagnosis of chondrocalcinosis was made. Postoperatively, a uric acid level was 5.7 mg/dl and thyroid function tests were normal.

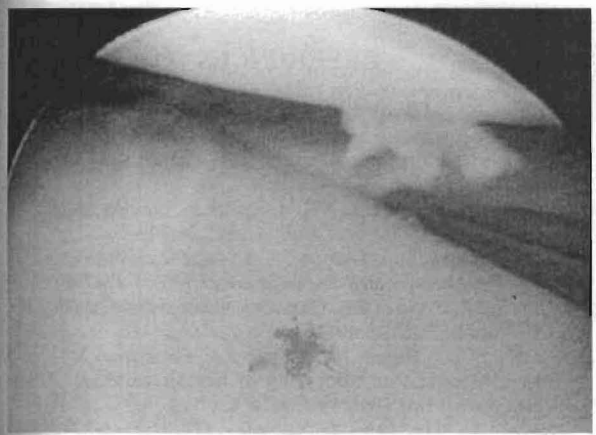

FIG. 2. Intraoperative photograph demonstrating the thick, white semisolid material of toothpaste consistency that arose from the area of chondrocalcinosis when probed during arthroscopy.

Radiographs taken 3 weeks postoperatively revealed that the calcification was absent (Fig. 3). He remained asymptomatic at 10 months of follow-up and had resumed his normal training schedule.

DISCUSSION

Chondrocalcinosis is a term used to describe, either pathologically or radiographically, the calcification of fibrocartilage or hyaline cartilage in one or more joints. The types of calcium-containing salts presently identified in this condition include calcium pyrophosphate dihydrate, dicalcium phosphate dihydrate (brushite), and calcium hydroxyapatite (1–7). Chondrocalcinosis is primarily caused by calcium pyrophosphate dihydrate deposition (3), or pseudogout, and the terms were often used interchangeable in the past, prior to the discovery of additional calcium crystals in cartilage (8–10). Presently, the proper use of the term chondrocalcinosis applies to any type of cartilage calcification and not to any specific etiology (11,12).

The cause of chondrocalcinosis is unclear, but it has been associated with a number of medical and hereditary problems. It has been reported to be common in patients with hemochromatosis (13,14), primary hyperparathyroidism (15–18), and gout (10–12,19). Its association with hyperparathyroidism and hemochromatosis is common enough that screening labs for these two conditions have been recommended when a patient is found to have chon-

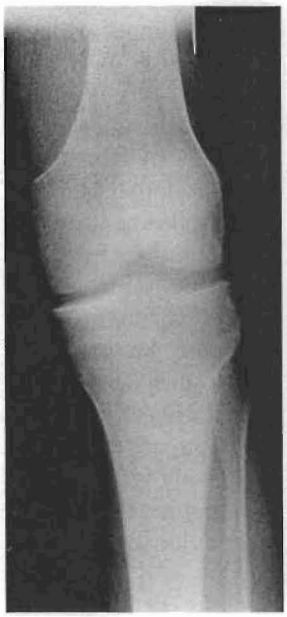

FIG. 3. Anteroposterior radiograph of the left knee taken 3 weeks postoperatively. The calcified lesion in the lateral tibial plateau articular cartilage was absent.

drocalcinosis (20). Chondrocalcinosis has also been observed in rheumatoid arthritis (10,12), osteoarthritis (4), hypothyroidism (21), hypophosphatemia (22), tabetic neuropathy (23), systemic lupus erythematosus (10), ochronosis (18), acromegaly (24), hemophilia (4), diabetes (25), Wilson's disease (26), after steroid injections (27), osteonecrosis (28), postirradiation (29), and trauma (2,30–33). Familial forms of chondrocalcinosis have also been reported (34,35).

Except for familial cases, chondrocalcinosis is generally felt to be an age-related phenomenon. It typically occurs in middle-aged or older patients with an increasing incidence with age (5,36–38). It is felt to be uncommon prior to age 60 years (35, 37,39), but by age 80 years up to 20% of patients may have this pathologic or radiographic finding (37). The onset of familiar cases of chondrocalcinosis is as early as the third or fourth decades of life (34,35). Polyarticular involvement and severe degenerative changes are usually seen in these patients.

In addition to familial cases, another cause of chondrocalcinosis in young adults is felt to be trauma. Trauma-induced chondrocalcinosis tends to be monoarticular, involving the traumatized joint, and in a relatively young age group without any known underlying medical conditions associated with this entity. Trauma-induced monoarticular chondrocalcinosis has been found in internal derangements of the knee (2,30,33), hypermobile joints (32), and after surgery (3,31).

The articular calcifications of chondrocalcinosis occur in either fibrocartilage or hyaline cartilage. Fibrocartilage deposits typically appear as diffuse calcific deposits involving the knees, wrists, pubic symphysis, and lumbar spine (6,40). Hyaline articular cartilage deposits, first described by Harmon in 1944 (41), typically occur as a radiodense line parallel to, but separate from, the underlying subchondral bone (7,8,19,34,37,42). Occasionally, the radiographic appearance may resemble puncture or speckled regions in the articular cartilage (6,43). The thin linear deposits appear to be primarily caused by calcium pyrophosphate dihydrate (6,44) and involve multiple joints, primarily the knees, wrists, and pelvis (6,20). Hydroxyapatite deposits have been described as round or oval (44), and both hydroxyapatite and dicalcium phosphate dihydrate deposition usually have monoarticular involvement (34,45).

The case of chondrocalcinosis in the young athlete in this case report was possibly caused by the repetitive microtrauma of long-distance running. He had no medical problems associated with this condition and no family history of chondrocalcinosis, degenerative joint disease, or total joint arthroplasties. His lesion was monoarticular and isolated to the hyaline cartilage, unlike older patients who nearly always have accompanying fibrocartilage (meniscal) calcifications (19,46). The findings at arthroscopy probably represented an earlier stage of lesion, prior to any crystal release from an intracartilage location, than the cases previously described in arthroscopy (30). The subchondral cysts and radiolucencies described in advanced chondrocalcinosis (25,47) may represent a stage of the disease after the calcium crystals are released or resorbed from their intracartilaginous location. In addition, in contrast to synovial biopsies in previous reports that have demonstrated inflammatory and reparative changes indicative of an intraarticular calcium crystal presence (4,7,21,25), the synovium was normal in this patient. The long-term significance of the finding in this athlete is unknown.

The initial diagnosis for this patient, an intraarticular loose body, was based on the presenting radiographic and clinical findings. It is felt that chondrocalcinosis needs to be included in the differential diagnosis of intraarticular calcified lesions in young athletes with knee pain. A high level of suspicion needs to be maintained in cases when a loose body is not seen at arthroscopy. In fact, since this case was seen, another case was seen in referral after an arthroscopy for a suspected loose body was unsuccessful. In retrospect, the radiographs revealed a typical case of chondrocalcinosis.

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