Case Report

Calcium Pyrophosphate Dihydrate Deposition Disease (Pseudogout) after Total Knee Arthroplasty

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Abstract: The authors report a case of calcium pyrophosphate dihydrate deposition disease (pseudogout) presenting in the early period after primary total knee arthroplasty. The patient's symptoms resolved with conservative management including colchicine and indomethacin. The presentation of pseudogout resembles septic arthritis and should be included in the differential diagnosis to prevent unnecessary surgery in these patients. **Key words:** pseudogout, pyrophosphate dihydrate deposition disease, total knee arthroplasty.

Calcium pyrophosphate dihydrate (CPPD) deposition disease, or *pseudogout*, is a term first used by McCarty et al [1] to describe a syndrome similar to classic gouty arthritis. This is a disease of acute or chronic inflammatory synovitis characterized by calcium pyrophosphate dihydrate crystals within a joint.

Calcium pyrophosphate dihydrate deposition disease usually presents as an inflammatory synovitis, involving one or multiple large joints. Acute attacks are defined by severe joint pain, large joint effusions, and microscopic CPPD crystals in the synovial fluid. If left untreated, acute attacks are self-limiting, lasting on average 10 days. After recurrent attacks, others may develop chronic arthritis with symptoms mimicking degenerative osteoarthritis: low-grade arthralgias, pain with range of motion, and a decreased range of motion of the joint.

Symmetric cartilage calcification, or chondrocalcinosis, is found radiographically in most patients with pseudogout syndrome. The calcification is found not only in fibrocartilage, but also in articular hyaline cartilage in the knees, wrists, symphysis pubis, annulus fibrosis, hips, shoulders, and elbows. The pattern of calcification is linear, paralleling joint lines. There appears to be no association between radiographic findings of cartilage calcification and clinical symptoms, as symptoms may be found without cartilage calcification, and calcification may be found in the asymptomatic.

The true prevalence of CPPD is unknown because calcified cartilage is often asymptomatic. One study demonstrated a 7% prevalence of knee cartilage calcification radiographically, and among those, roughly half had CPPD crystals in the synovial fluid [2].

It is unknown which patients with chondrocalcinosis will progress on to severe degenerative osteoarthritis, as many remain symptom-free. For those who do progress, joint pathology mimics degenerative osteoarthritis, with joint space narrowing,

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subchondral sclerosis, marginal osteophytes, and subchondral cysts. These patients are candidates for total knee arthroplasty.

Although there have been a few cases describing acute gout attacks after total hip and total knee arthroplasty, we know of no description of calcium pyrophosphate deposition disease (pseudogout) attacks after major joint arthroplasty [3-5]. Symptoms mimic postsurgical septic arthritis, and making the correct clinical diagnosis is complex but essential. The correct diagnosis can protect the patient from multiple unnecessary surgical procedures, which may include debridement, synovectomy, or explant.

The purpose of this report is to alert the clinician of the occurrence of calcium pyrophosphate deposition disease after total joint arthroplasty and to help distinguish this disease from septic arthritis. Here we describe a patient who was presumed to have had an acute infection after total knee arthroplasty, but instead was diagnosed with an acute attack of calcium pyrophosphate deposition disease.

Case Report

A 59-year-old woman came to the Barnes-Jewish Hospital (St Louis, Mo) on May 23, 2002, with a chief complaint of right-sided knee pain. Radiographs of her right knee revealed degenerative arthritis. She had been taking nonsteroidal anti-inflammatory medication without success. Steroid injections no longer provided relief. She was ambulatory with the aid of a wheeled walker. Her medical history was notable for bilateral knee and hip osteoarthritis, shoulder osteoarthritis, degenerative joint disease of her spine, pulmonary fibrosis, diabetes mellitus, hypertension, hypercholesterolemia, and a history of rheumatic fever. She had undergone a previous left total knee arthroplasty in April 25, 2000, with an uneventful recovery.

On physical examination, her right knee had a varus deformity. She had medial joint line tenderness to palpation and pain with weight bearing. Her range of motion was from 0° to 125°.

She underwent an uneventful right-sided total knee arthroplasty with a Wright Medical Advance Posterior Stabilized knee (Wright Medical, Memphis, Tenn). A standard midline incision with a medial parapatellar arthrotomy was performed. One gram of preoperative intravenous (IV) cefazolin was administered 1 hour preoperatively, and 3 g of cefazolin was used in the irrigation fluid before closure. The menisci contained chalky white deposits consistent with CPPD. There were no intraoperative complications. Tourniquet time was 74 minutes.

On postoperative day 2, her bandage was removed, and her incision was found to be clean, dry, and intact with minimal surrounding erythema and swelling consistent with postsurgical trauma. Intravenous cefazolin was discontinued at 48 hours postoperatively. Her knee drain was also discontinued at that time. She had been started on warfarin sodium for deep venous thrombosis prophylaxis and was discharged to home on postoperative day 3 with an international normalized ratio of 2.04.

On postoperative day 7, she was seen back in the Barnes-Jewish Hospital Emergency Department with complaints of an acute onset of severe right knee pain. She had been off of her antibiotics since postoperative day 2. Her temperature was 38.3°C, her blood pressure 122/88 mm Hg, and her pulse rate was 88 beats per minute. The incision on her right knee was found to be clean, dry, intact with minimal surrounding erythema, but with a moderate effusion and moderate warmth. Range of motion of her right knee was limited from 0° to 80° with severe discomfort. Radiographs revealed a well-fixed, well-aligned total knee arthroplasty.

Her peripheral white blood cell count was 10 300/μL (10.3 $\times$ 10^9/L). The right knee was aspirated under sterile conditions and a turbid serosanguinous fluid was obtained. A Gram stain revealed no organisms, but was positive for polymorphonuclear leukocyte. The nucleated cell count was 43 200 cells/μL with 99% polymorphonuclear leukocytes. In addition, the specimen contained calcium pyrophosphate crystals.

She remained in the emergency department for an extended period because of bed unavailability in the main hospital. While in the emergency department she was started on IV vancomycin and ciprofloxacin without the surgeon's knowledge. The antibiotics were discontinued at 48 hours when their administration was identified. After 72 hours when her culture results showed no growth of aerobes, anaerobes, or fungi, she was discharged home on indomethacin (50 mg, 3 times daily) with no oral or IV antibiotics. Culture results of the knee aspiration for aerobic, anaerobic, and fungal growth remained negative. Follow-up 1 week later revealed resolution of her acute pain. She noted only mild incisional tenderness.

Twelve months after total knee arthroplasty, she was ambulatory without assisting devices. Weight bearing was pain-free. Her knee range of motion improved from 0° to 120° without pain. Her incision was without effusion, erythema, or swelling. She no