CLINICAL VIGNETTE

A 75-Year-Old Woman with Left Wrist Pain and Swelling

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Case Summary

A 75-year-old female presented to rheumatology with one week of severe pain and swelling in her left wrist. There was no history of injury. She reported frequent sewing, crocheting, and jewelry-making, and felt she may have overused her hands. The swelling and pain came on unexpectedly and persisted since onset. Symptoms were more noticeable in the morning. She tried icing and acetaminophen without benefit. She denied fever, chills, or rash in the area of the wrist. In the past, the wrist had "acted up" but the discomfort usually only lasted a few days. Over the preceding year, she also noticed that all her fingers had become stiffer and "crooked".

Past medical history included coronary artery disease, type 2 diabetes mellitus, hyperlipidemia, hypothyroidism, knee osteoarthritis, and sleep apnea. There was no relevant surgical or family history. She had been a smoker for two years in her twenties and did not consume alcohol.

She had no allergies. Medications included amlodipine, lisinopril, evolocumab, aspirin, cholecalciferol, ezetimibe, hydrochlorothiazide, insulin, levothyroxine, and sertraline.

Vital signs included T 98.8° F, pulse 67, BP 150/78, and RR 20. Exam was remarkable for a swollen, tender, and warm left wrist with reduced flexion and extension. Knees were crepitant without effusion or laxity. The rest of the physical exam was unremarkable.

Labs were notable for normal complete blood count, phosphorus, and comprehensive metabolic panel, except for glucose of 231 mg/dL. Other labs included hemoglobin A1c 7.8%, uric acid 4.5 mg/dL, magnesium 2.0 mg/dL, and erythrocyte sedimentation rate of 27 mm/hr.

Left hand and wrist x-rays revealed severe multifocal osteoarthritis, primarily affecting the first carpometacarpal and interphalangeal joints. There was chondrocalcinosis along the proximal wrist. There was no fracture.

Left wrist aspiration yielded 4 ml of cloudy fluid. Synovial fluid analysis showed phagocytosed positively birefringent calcium pyrophosphate crystals.

Discussion

Calcium pyrophosphate dihydrate deposition disease pseudogout is frequently associated with osteoarthritis.[1] Other common associations include hyperparathyroidism, hemochromatosis, and hypomagnesemia.[2-4] The prevalence of pseudogout increases with age. One study of 100 geriatric patients, reported prevalence of 15% in those aged 65 to 74 years; 36% in patients aged 75 to 84 years; and nearly 50% of patients aged over 84 years, had radiographic evidence of calcium pyrophosphate deposition.[5] There does not appear to be a gender preference.

McCarthy and colleagues reported six patterns of disease.[6] First, is asymptomatic disease found incidentally on x-ray. Second, involves acute monoarticular or polyarticular attacks of pseudogout that last a few days to a few weeks. These most frequently affect the knees but also can involve wrists, elbows, shoulders, and ankles. Older patients, may have fever and confusion. Third, is a chronic nonerosive inflammatory form that can mimic rheumatoid arthritis, including morning stiffness and symmetrical polyarthritis. The fourth variant is most common: osteoarthritis with calcium pyrophosphate dihydrate disease, known as pseudo-osteoarthritis. Half of these patients have intermittent acute inflammatory arthritis. The fifth pattern is severe joint destruction that resembles neuropathic arthropathy, called Charcot joints, with severe destruction and disarray.[7] Associated conditions include diabetes mellitus, late syphilis, and syringomyelia. The sixth variant is spinal disease, where the deposition of calcium pyrophosphate crystals causes spinal stiffness, which can evolve to ankylosis. Differential considerations include ankylosing spondylitis and diffuse idiopathic skeletal hyperostosis. This variant can rarely present as crowned dens syndrome, with severe acute or recurrent neck pain, shoulder girdle stiffness, elevated erythrocyte sedimentation rate, and calcium phosphate crystal deposition adjacent to the atlanto-axial joint noted on CT.

Diagnosis of pseudogout is typically made by finding characteristic rod-shaped crystals on synovial fluid analysis, with weakly positive birefringence. The total synovial fluid white blood cell count typically ranges from 15,000 to 50,000, with neutrophil predominance. In contrast, gout crystals are needle-shaped, larger, and negatively birefringent.

Radiography in patients with pseudogout typically reveals linear calcifications in the fibrocartilage of the joint. Common locations for calcifications include the triangular fibrocartilage of the wrist, pubic symphysis, and knee menisci, but have also been found in the Achilles tendon, plantar fascia, bursae, and joint capsules.[8] Other radiographic findings in calcium pyrophosphate disease include squared-off bone ends and hook-like osteophytes in the second and third metacarpophalangeal joints. This can be seen in hemochromatosis-associated calcium pyrophosphate disease.[9]

Ultrasound can be helpful in diagnosing calcium pyrophosphate dihydrate disease because crystals deposit within the substance of the hyaline cartilage, unlike the urate crystals of gout. The lines of calcification are hyperechoic and can be parallel to tendon fibers.[10]

For a definite diagnosis of calcium pyrophosphate disease, McCarthy suggested that both positively birefringent crystals on synovial fluid analysis, and cartilage calcification on imaging should be present.[11] A diagnosis of calcium pyrophosphate disease is probable only if one of these findings is present.

Our Patient

Our patient did very well after an intra-articular cortisone injection. Her parathyroid hormone level and ferritin returned normal. Chondrocalcinosis was also subsequently seen on knee x-ray. If she had not responded to the injection, a short course of a nonsteroidal anti-inflammatory or colchicine would have been considered.

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