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Calcium Pyrophosphate Dihydrate Crystal Deposition Disease Simulating Osteoarthritis of the Knee: A Case Report

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Abstract

Objective: The purpose of this case report is to describe a case where calcium pyrophosphate dehydrate crystal deposition disease (CPPD) simulated osteoarthritis of the knee.

Clinical Features: A 78-year-old woman had a 2-week history of severe right knee pain accompanied by mild swelling. The onset was sudden and did not involve a history of trauma or previous injury to the right knee. Inspection and palpation revealed pain along the medial joint line and marked difficulty ambulating. Results of Lachman's test, anterior drawer test, and posterior sag sign were negative upon orthopedic assessment. Diagnostic imaging was performed and showed degenerative changes with diffuse calcification of the fibrocartilage and hyaline articular cartilage within the knee joint and the medial collateral ligament consistent with the appearance of CPPD crystal deposition.

Intervention and Outcome: Low-level laser therapy was performed to the affected medial joint line of the knee, and knee stabilization exercises were given. Lower Extremity Function Scale changed from 34% to 60% after 4 weeks of care.

Conclusion: Although knee osteoarthritis is much more common than knee CPPD, it is important to consider both diagnoses in elderly patients who present with unilateral knee pain. Diagnosis should be based on clinical presentation, history, and radiographic or histological means to ensure accuracy and proper diagnosis.

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Introduction

Radiographs are the most important imaging tests in evaluation of calcium pyrophosphate dehydrate crystal

deposition disease (CPPD). The hallmark finding is chondrocalcinosis of hyaline or fibrocartilage.¹ CPPD is the third most common inflammatory arthritis, and it tends to affect areas not typically involved by

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degenerative joint disease.² Chondrocalcinosis is depicted as radiopaque calcifications that are linear, punctate, or granular in shape and are seen in the cartilage within affected joint spaces.³ In the knee, meniscal involvement is seen as coarse granular calcifications, whereas hyaline cartilage involvement appears more as linear densities that parallel the articular surfaces.⁵ Chondrocalcinosis is often asymptomatic and occurs most commonly in women older than 80 years.³ It predominantly affects large joints including the knees, wrists, and hips (Table 1).^{6,7} It most commonly affects the knee, where cartilage space narrowing and osteophytes may involve all 3 compartments.

CPPD may be asymptomatic or present as pseudogout characterized by severe, intermittent attacks of pain.⁸ The term *pseudogout* came about because of the similarity in symptoms to another common inflammatory arthritis known as *gout*.⁸ Both involve intraarticular crystal formation and present with acute flare-ups characterized by intense pain usually affecting a single joint. Although both pseudogout and gout involve abnormal crystal deposition, the composition of crystals differs. Gout is characterized by a deposition of uric acid crystals, whereas the crystals of pseudogout are comprised of calcium salt called *calcium pyrophosphate dihydrate* that accumulates in periarticular and articular tissues described on radiographs as chondrocalcinosis.^{6,9,10} Pseudogout accounts for about 25% of all cases of CPPD.⁶ Overall, the lack of erosion differentiates CPPD disease from gout and rheumatoid arthritis.¹¹

Treatment Options

Recurrent acute calcium pyrophosphate (CPP) arthritis and chronic recurrent CPP arthropathy can lead to severe joint destruction.¹² It is important to seek the most evidence-based practice approaches to treating

patients with this condition. Unfortunately, the newest research suggests that there is no specific treatment to prevent or slow the progression of CPP deposition.¹² Although there is specific treatment, it is nonspecifically treated by nonsteroidal anti-inflammatory agents, glucocorticoids, or colchicine. However, these tend to be ineffective, particularly in recurrent or chronic cases.¹² CPPD disease is often misdiagnosed and frequently only treated symptomatically, which can lead to accelerated joint destruction. There has been little representation of conservative nonpharmaceutical therapy for CPPD. There was 1 case report found through a PubMed search that resulted in a patient with CPPD being cared for with exercises and over-the-counter glucosamine sulfate supplementation.¹³

The purpose of this study is to describe a case of CPPD simulating osteoarthritis (OA) of the knee presenting to a chiropractic clinic.

Case Report

History

A 78-year-old woman presented to a chiropractic clinic with a 2-week history of severe right knee pain and mild swelling. The onset of symptoms occurred suddenly with no known history of recent trauma or previous injury to her right knee. The pain was localized along the medial joint line and resulted in marked difficulty ambulating. The pain was described as a constant, deep, achy pain that became sharp upon walking. The pain did not refer into the lower extremity. Although in her retirement years, this patient worked part-time and has an active lifestyle, participating in yoga and Pilates 3 to 4 times per week. She does not drive; however, she primarily walks to and from her destinations. She claimed that the intense knee pain was interfering with work-related tasks and activities of daily living. In addition, she reported that extended periods of standing or walking increased her knee pain and that rest offered minimal relief. The patient has a medical history of a severe degenerative disease throughout the cervical spine, which was demonstrated through radiographs.

Functional Outcome Assessment

The severity of pain was rated as 9 of 10 on a numerical rating scale. The scale is represented through a pain scale in which a pain level of 0 indicates the absence of pain and 10 represents the most intense pain possible. On the Lower Extremity Functional Scale (LEFS), she scored 34% of

Table 1 Most Common Sites of Symptoms in Patients With CPPD⁴

Site	% of Patients With Symptoms (n = 85)
Knees	24.5%
Wrists	14.0%
Hands	7.2%
Ankles	6.8%
Hips	6.3%
Elbows	5.9%
Shoulders	5.9%
Neck	4.2%
Low back	2.5%
Feet	2.1%
Hands	1.7%

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