Calcium pyrophosphate dihydrate deposition disease has various clinical features, and pseudogout is one of the six clinical forms. Chondrocalcinosis is the term used to describe the radiographic appearance of the disease. A review of the literature revealed that the appearance of this type of arthropathy in the foot is infrequent. We offer a review of the disease and report an atypical bilateral case of pseudogout in a patient 56 years of age without a history who presented with symptoms of arthritis localized in the first metatarsophalangeal joint associated with hallux valgus and was treated surgically. Radiographic evaluation of the feet did not reveal signs of chondrocalcinosis. The patient had no metabolic abnormalities, except for high uric acid values. Chemical analysis of the surgical samples demonstrated the presence of calcium pyrophosphate dihydrate crystals, confirming the diagnosis. We believe that arthropathy by deposition of calcium pyrophosphate dihydrate in the foot, although rare, must be considered in the podiatric physician’s differential diagnosis when a patient presents with articular pain in the foot associated or not with deformities. (J Am Podiatr Med Assoc 100(2): 138-142, 2010)

*Department of Podiatry, Seville University, Seville, Spain.
Corresponding author: Antonio Córdoba-Fernández, Lic Pod, PhD, Department of Podiatry, Seville University, Avicena s/n, Seville, Seville 41009, Spain. (E-mail: acordoba@us.es)
synovial fluid has inflammatory characteristics (15,000–30,000 cells/µL, with a strong predominance of polymorphonuclear cells). Calcium pyrophosphate dihydrate crystals in synovial fluid can be easily detected by chemical analysis or by demonstrating the presence of the weakly birefringent crystals with a polarized light microscope. The presence of these crystals confirms the diagnosis, with no margin of error.

The literature reports few cases of chondrocalcinosis localized in the foot and, specifically, in the metatarsophalangeal joints. This is largely because the most frequent clinical form of the disease is type E or asymptomatic, according to the classification of McCarty, and it is revealed casually in a radiologic examination. The presence of crystals with positive birefringence by polarized light microscopy, confirming the diagnosis of periarthritis pseudogout.12

A descriptive study was performed by Fam et al7 in 50 patients affected by arthropathies by deposition of calcium pyrophosphate dihydrate in one or more joints. It was observed that of the 117 joints affected by chondrocalcinosis, the knee, the wrist, and the pubic synphysis were affected in 80.41% and the shoulders, elbows, and interphalangeal joints of the hand and intervertebral disks in 17.09%; only 2.5% of the joints affected were in the foot (tarsus and metatarsophalangeal joints). The joints of the foot most frequently affected are those of the rearfoot and midtarsus and, to a lesser degree, those of the forefoot (tarsometatarsal and metatarsophalangeal joints). The interphalangeal joints seem not to be affected.

A literature review revealed few reported cases of the disorder localized in the foot in either its primary or secondary presentation. In most cases, it is manifested as a set of symptoms of arthritis associated or not with chondrocalcinosis. Hanft et al10 describe a case of pseudogout in the ankle of a 78-year-old woman without family history of arthritis who had pain and inflammation in the first metatarsophalangeal joint of her right foot. Radiologic examination revealed a considerable subcutaneous periarthritis pseudogout associated with primary hyperparathyroidism, one of which was manifested by acute pain and swelling of the ankle and dorsum of the patient’s right foot.

In a series of 439 patients treated surgically for osteoarthritis in the first metatarsophalangeal joint by Weinfield and Schon11 in 1998, not a single case of arthropathy by deposition of calcium pyrophosphate dihydrate was found. The most frequent cause of arthritis by deposition was gout, with 19 cases.11 Luísiri et al12 described a case of the disorder in a 79-year-old woman without a family history of arthritis who had pain and inflammation in the first metatarsophalangeal joint of her right foot. Radiologic examination revealed a considerable subcutaneous periarthritis pseudogout associated with primary hyperparathyroidism, one of which was manifested by acute pain and swelling of the ankle and dorsum of the patient’s right foot.

The simultaneous occurrence of a combined arthropathy (septic arthritis and calcium pyrophosphate disease) in the same joint has previously been reported.13, 14 The authors described cases in which large joints, such as the knees, wrists, and elbows, are affected. Feller and Block15 observed a patient in whom septic arthritis and calcium pyrophosphate deposition disease were found in the first metatarsophalangeal joint of his left foot.

Case Report

A 56-year-old woman who communicated no pathologic history of interest presented to the Aljarafe Podiatric Center (a private facility) at Castilleja de la Cuesta, Seville, on October 5, 2007, with severe pain and functional weakness for the preceding week in the first metatarsophalangeal joint of the right foot. The pain was accompanied by swelling and erythema, but there were no chills or fever.

Physical examination revealed articular pain under palpation, which worsened under passive mobilization of the joint, and moderate hallux valgus. The skin of the area had cutaneous depigmentation dorsomedial to the metatarsophalangeal joint in both feet as a consequence of contact dermatitis, according to the patient, produced by a shoe 11 months earlier (Fig. 1).

Radiologic exploration showed swelling of the soft parts, moderate hallux abductus valgus, and the absence of an articular degenerative process (Fig. 2).
Because of suspected bursitis, a needle puncture aspiration was performed to extract synovial fluid. The result was negative, but removal of the needle was accompanied by the appearance of whitish-crystalline material, leading to the suspected presence of acute symptoms of gout. Treatment with colchicine was begun, and a control analysis was requested. The treatment was stopped after 3 days because of gastrointestinal intolerance; instead, ibuprofen, 600 mg every 8 hours, was given. The patient was reexamined after a week and showed substantial improvement in symptoms. The analysis showed an increased globular sedimentation rate (48 mm/h), slight hypercholesterolemia, and a high uric acid value (9.9 mg/dL). The patient was referred to the internal medicine department for monitoring, and once the symptoms abated, she was scheduled for surgery a month later to correct the hallux valgus.

During surgery, the presence of multiple deposits of intra-articular material slightly affecting the cartilage was observed (Fig. 3). The joint was cleaned, and a biopsy was performed for histochemical study. The surgical correction of the deformity was performed by Austin and Akin proximal osteotomies (Fig. 4). The postoperative evolution was normal. Chemical analysis of the sample demonstrated the presence of calcium pyrophosphate dihydrate crystals, confirming the diagnosis of pseudogout.

To rule out chondrocalcinosis associated with other diseases, a subsequent full analysis was performed, including general biochemistry, thyroid (thyrotropin, triiodothyronine, and thyroxine), and hepatic tests and blood magnesium, calcium, and phosphorus. It did not reveal abnormalities, except for high cholesterol and uric acid values.

On September 12, 2008, she was seen again with acute inflammatory symptoms that affected the first metatarsophalangeal joint of the left foot, accompa-
Although pseudogout is a disorder that rarely presents clinical signs in the foot, it must be considered in the differential diagnosis as a clinical syndrome in patients (especially women) with inflammatory arthropathies with or without radiologic signs. There is controversy about the association between gout and chondrocalcinosis. However, the coexistence of chondrocalcinosis and hyperuricemia in the same patient, as in the case presented herein, is not infrequent, and some studies indicate that it is an actual association, although only to a moderate degree.

Despite the low prevalence of clinical signs of chondrocalcinosis in the foot compared with other anatomical locations, some recent studies seem to demonstrate a greater prevalence of asymptomatic calcifications of soft parts of the rearfoot in patients with arthropathies by deposition of calcium pyrophosphate dihydrate without radiologic signs of articular chondrocalcinosis in the foot.

Falsetti et al performed a masked study using ultrasonography in a group of 57 individuals with osteoarthritis in different locations and secondary to different clinical presentations of chondrocalcinosis in accord with the criteria described by McCarty. The subjects were diagnosed by visualization of calcium pyrophosphate dihydrate crystals in the synovial fluid of the affected joint. Two control groups were used: one of 50 patients with osteoarthritis without radiologic signs of chondrocalcinosis and the other of volunteer healthy subjects. Echographic explorations were made in the heels of all of the subjects. The

Discussion

Although it is certain that the most common clinical form of chondrocalcinosis is idiopathic, it cannot be ruled out that it might coexist with other pathologic conditions. Numerous metabolic disorders associated with arthropathy by deposition of calcium pyrophosphate dihydrate have been described, many of which can be a coincidence of the two in the same patient. Various disorders are associated with articular chondrocalcinosis, although there is discussion as to whether in some it is an actual association or a casual coexistence. There is evidence of an actual association in hemochromatosis (association of up to 50%), primary hyperparathyroidism, hypomagnesemia, and hypophosphatasia in the adult.
study revealed calcifications in 57.9% of patients with chondrocalcinosis and in no controls. Calcifications were found in the insertion of the fascia plantar in 15.8% of patients with chondrocalcinosis and in 2% of the group with osteoarthritis. The authors concluded that asymptomatic calcifications of the Achilles tendon are frequent in patients with chondrocalcinosis and that such findings are, thus, intimately related to the disease.21

Conclusions

Arthropathy by deposition of calcium pyrophosphate dihydrate in the foot, although rare, must be considered in the podiatric physician’s differential diagnosis when a patient is first seen with articular pain in the foot associated or not with deformities. In the present case, the suspected diagnosis of the disease by deposition (gout), after the needle puncture, enabled an early surgical procedure that facilitated not only the cleaning of the joint but also the correction of the deformity, preserving the articular functionality in a middle-aged woman with an atypical bilateral syndrome.

Early surgical treatment must, therefore, be contemplated in a suspected diagnosis of the disease, once the acute symptoms abate, given that there is no therapeutic method to slow the process of calcium pyrophosphate dihydrate deposition. The cases of advanced chondrocalcinosis are only ancillary to radical surgical treatments such as the use of articular prostheses, showing the importance of early diagnosis.

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References