Dual-energy computed tomography (DECT) is a novel technique that enables monosodium urate (MSU) crystal visualization and virtual imaging by acquiring 2 energy data sets. We had an opportunity to use this diagnostic technique in 2 different cases. The first case was a patient with an aggressive course of chronic tophaceous gout to assess the distribution of crystals and to monitor the effectiveness of treatment. The second case was a patient with a rare coexistence of gout and ankylosing spondylitis.

The first patient was a 56-year-old man with gout diagnosed 30 years earlier. He presented with enormous tophi that deformed the upper and lower extremities, and with recurrent attacks of acute arthritis. Monosodium urate crystal deposits ulcerated through the skin and formed numerous fistulas on the surface of the metacarpophalangeal joints and lower extremities, with secondary *Staphylococcus aureus* infection. Small tophi formed also in the helix of the ears. The presence of MSU crystals was confirmed in the material obtained from the tophi. The serum uric acid concentration over the years was on average 9 to 10 mg/dl, despite combined treatment with probenecid and febuxostat. The patient experienced an allergic reaction to allopurinol. He was ineligible for surgical treatment due to infected skin ulcerations.

Imaging examinations were performed to assess the degree of joint destruction. Plain radiograph of the affected joints revealed soft tissue swelling with calcifications, periarticular osteoporosis, erosions, and destructive arthropathy. Additionally, DECT was performed, which showed massive aggregates of MSU in the elbow, hand, knee, and foot joints and in periarticular soft tissue, as well as calcifications. We also obtained a volume estimate and 3-dimensional reconstruction (FIGURE 1A-1D).

The second patient was a 44-year-old man with ankylosing spondylitis diagnosed 2 years earlier, positive HLA-B27 antigen, and typical inflammatory back pain, bilateral sacroiliitis documented on X-rays, and recurrent acute peripheral (knee, ankle) arthritis. He was treated with sulfasalazine and nonsteroidal anti-inflammatory drugs. The course of the disease was atypical, with sudden-onset symptoms (redness, swelling, and severe pain of affected joints). Laboratory tests revealed elevated serum uric acid concentrations of 13 mg/dl. We performed DECT, which showed areas of MSU deposits in the wrists, elbows, ankles, and knees (FIGURE 1E). Therefore, coexisting gout was diagnosed and treatment with allopurinol and colchicine was introduced.

Although identification of MSU crystals in synovial fluid or in soft tissue remains the gold standard of gout diagnosis, DECT, as well as ultrasonography and plain radiography, was included in the 2015 American College of Rheumatology/Rheumatology and Rehabilitation, Warsaw, Poland

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**FIGURE 1** A – gout tophi on both hands
European League against Rheumatism gout classification criteria. Dual-energy computed tomography enables an accurate assessment of the distribution of the MSU crystals and their quantification. It also helps detect the presence of tophi in atypical locations such as the spine. It can also be used as a method for monitoring the effectiveness of treatment. Finally, it is a unique technique that enables the detection of early gout as well as assessment of disease progression in advanced stages.  

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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