**FIGURE 393-7 Dual-energy computed tomography (DECT) scan from a 45-year-old woman with right ankle swelling around the lateral malleolus.** Three-dimensional volume-rendered coronal reformatted DECT image shows that the mass is composed of monosodium urate (*red*) in keeping with tophus (*arrow*). *(Used with permission from S Nicolaou et al: AJR 194:1072, 2010.)*

in diagnosing pulmonary embolism or obscure fractures, often in the setting of initially equivocal findings. High-resolution CT can be advocated in the evaluation of suspected or established infiltrative lung disease (e.g., scleroderma or rheumatoid lung). The recent use of hybrid (positron emission tomography [PET] or single-photon emission CT [SPECT]) CT scans in metastatic evaluations has incorporated CT to provide better anatomic localization of scintigraphic abnormalities.

$^{18}$F-Fluorodeoxyglucose (FDG) is the most commonly used radiopharmaceutical in PET scanning. FDG-PET/CT scans have been seldom used in the evaluation of septic or inflammatory arthritis. Dual-energy CT (DECT) scanning, developed in urology to identify urinary calculi, has been a highly sensitive and specific method used to identify and quantify uric acid deposition in tissues **(Fig. 393-7)**.

*MRI* has significantly advanced the ability to image musculoskeletal structures. MRI has the advantages of providing multiplanar images with fine anatomic detail and contrast resolution **(Fig. 393-8)** that allows for the superior ability to visualize bone marrow and soft tissue periarticular structures. Although more costly with a longer procedural time than CT, the MRI has become the preferred technique when evaluating complex musculoskeletal disorders.

MRI can image fascia, vessels, nerve, muscle, cartilage, ligaments, tendons, pannus, synovial effusions, and bone marrow. Visualization of particular structures can be enhanced by altering the pulse sequence to produce either T1- or T2-weighted spin echo, gradient echo, or inversion recovery (including short tau inversion recovery [STIR]) images. Because of its sensitivity to changes in marrow fat, MRI is a sensitive but nonspecific means of detecting osteonecrosis, osteomyelitis, and marrow inflammation indicating overlying synovitis or osteitis (Fig. 393-8). Because of its enhanced soft tissue resolution, MRI is more sensitive than arthrography or CT in the diagnosis of soft tissue injuries (e.g., meniscal and rotator cuff tears); intraarticular derangements; marrow abnormalities (osteonecrosis, myeloma); and spinal cord or nerve root damage, synovitis, or cartilage damage or loss.

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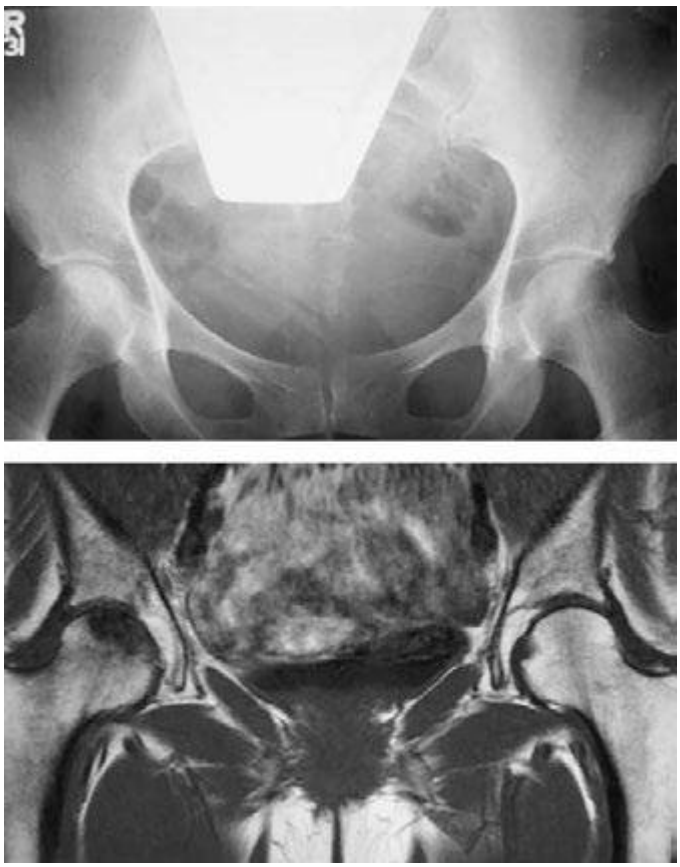

**FIGURE 393-8 Superior sensitivity of magnetic resonance imaging (MRI) in the diagnosis of osteonecrosis of the femoral head.** A 45-year-old woman receiving high-dose glucocorticoids developed right hip pain. Conventional x-rays (*top*) demonstrated only mild sclerosis of the right femoral head. T1-weighted MRI (*bottom*) demonstrated low-density signal in the right femoral head, diagnostic of osteonecrosis.