Donald L. Renfrew, MD
Radiology Associates of the Fox Valley, 333 N. Commercial Street, Suite 100, Neenah, WI 54956

CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

A 69 year old man comes in for a yearly physical examination. The patient is 5' 10" tall and weighs 231 lbs. His temperature is 97.9, pulse 40 (the patient has chronic asymptomatic bradycardia), respirations 16, and blood pressure 124/76. Ongoing issues include nonischemic cardiomyopathy, chronic renal insufficiency, hypertriglyceridemia, GERD, diabetes mellitus type 2, hypertension, chronic sinus bradycardia, gout, and osteoarthritis. His main complaint is ongoing hand and wrist pain with decreased range of motion. He also has bilateral knee and ankle pain. On physical examination, he has nodules along the proximal interphalangeal joints of both hands and the third toes bilaterally.

Which of the following imaging studies is the best first step for imaging evaluation?

(a) bilateral plain film examination of the hands
(b) ultrasound study of both hands
(c) computed tomography (CT) examination of the hands
(d) magnetic resonance (MR) imaging of both hands

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

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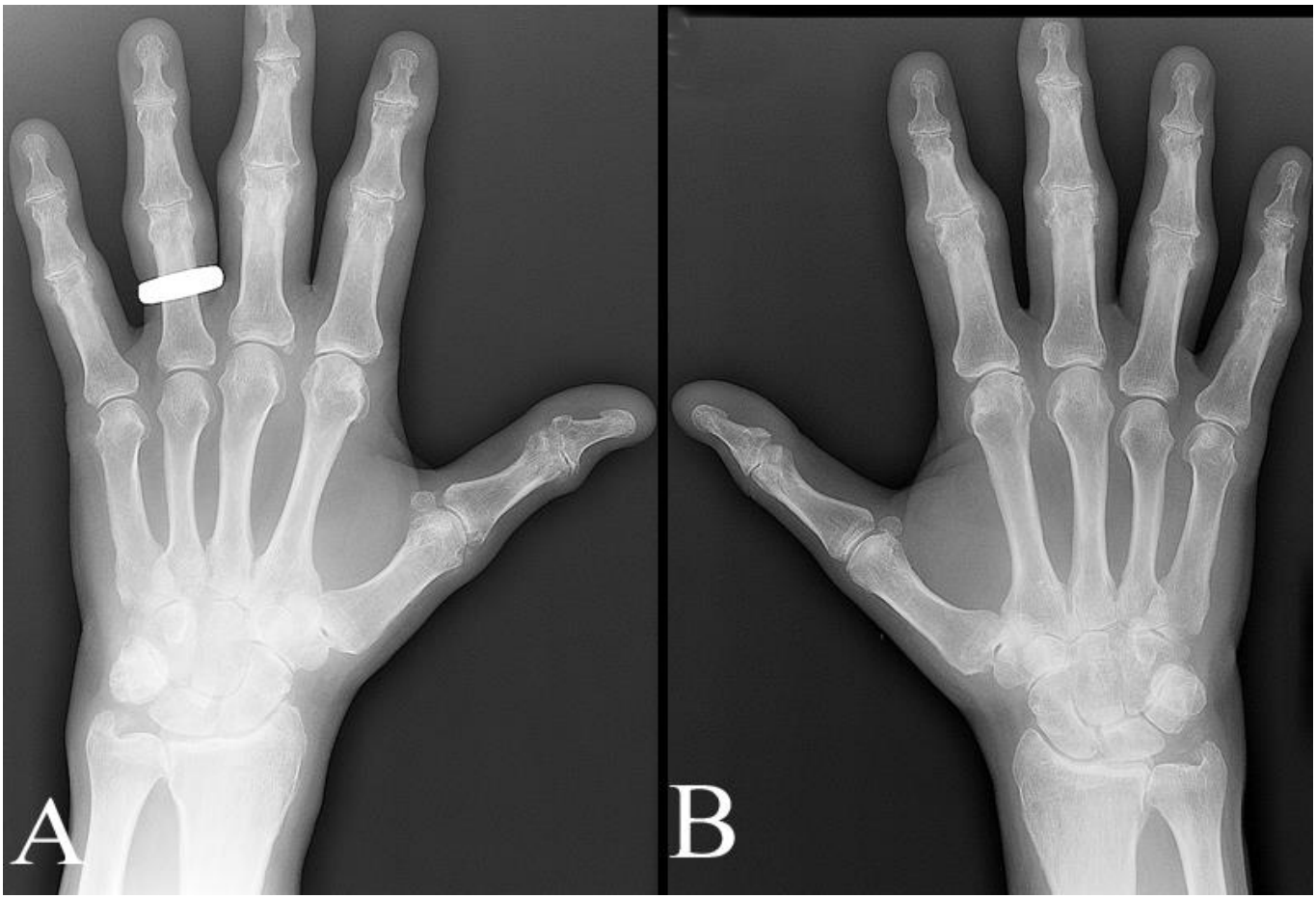
Bilateral plain film examination of the hands (a) is the correct answer. In general, if imaging of the extremities is done, the best first step is usually a plain film examination. The patient's clinical history and symptoms suggest gouty arthritis, and plain films offer an excellent first imaging study in the evaluation of this process.

Ultrasound of both hands (b) is beginning to be used in some centers for evaluation of synovitis in known or suspected rheumatoid arthritis, but is not part of the workup (and is not the best initial study) in patients with known or suspected gout, and (b) is incorrect. CT is generally used in evaluation of known or suspected fractures (in the setting of normal or equivocal plain films) or when MR is contraindicated (in which case CT may be performed after intra-articular contrast material injection). Dual-energy CT is also beginning to be used in some centers to differentiate urate crystals from calcium, and to quantify the amount of tophus which is helpful in evaluating response to treatment. CT is generally performed only *after* plain film examination, however, and (c) is incorrect. MR may be used to evaluate for synovial inflammation and early erosions in patients with suspected rheumatoid arthritis. However, as with CT, MR is generally performed only *after* plain film evaluation, and (d) is incorrect.

IMAGING STUDY AND QUESTIONS

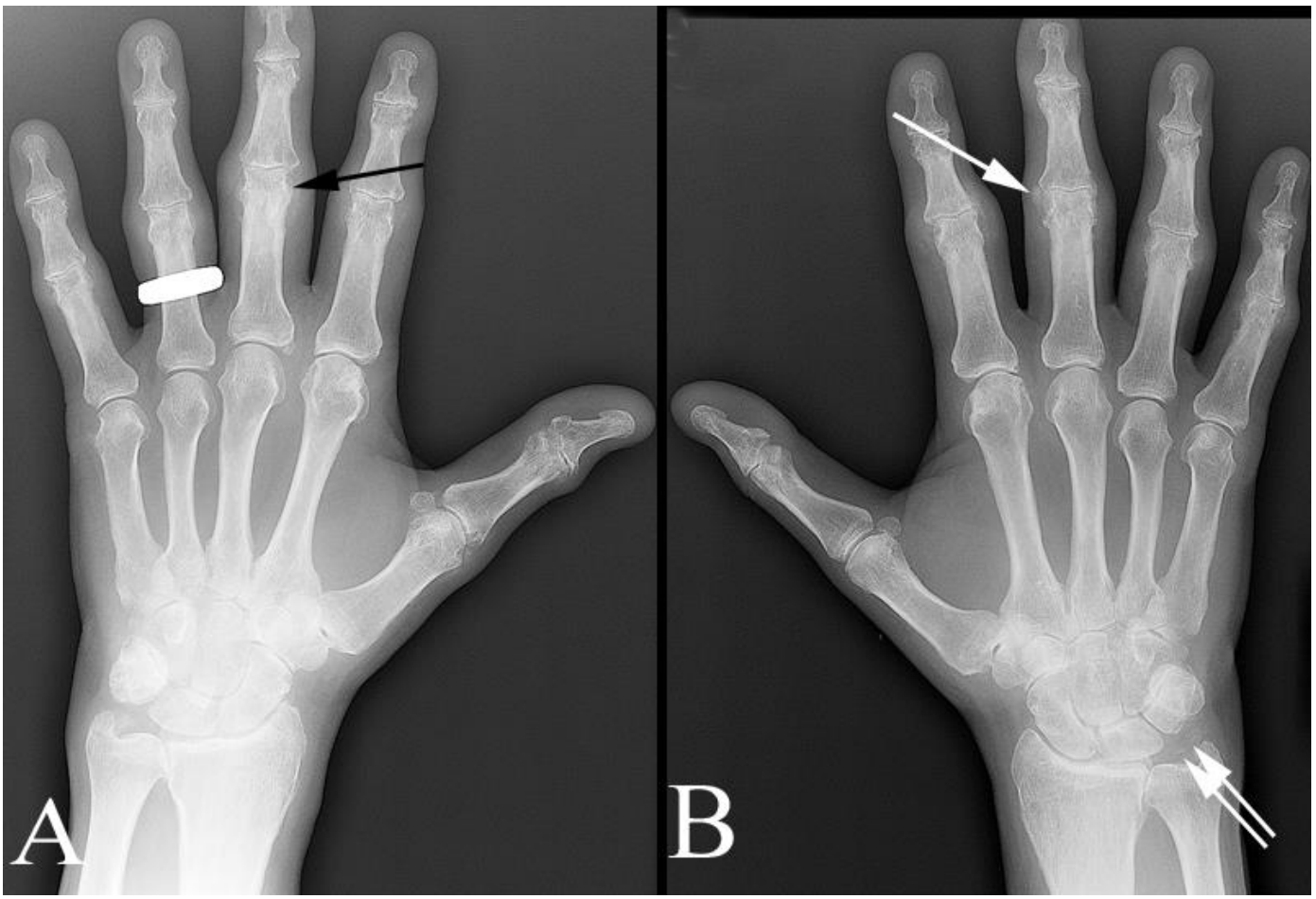
The patient underwent an imaging study:



Imaging questions:

1) What type of study is shown?
2) Are there any abnormalities?
3) What is the most likely diagnosis?
4) What is the next step in management?

IMAGING STUDY QUESTIONS AND ANSWER

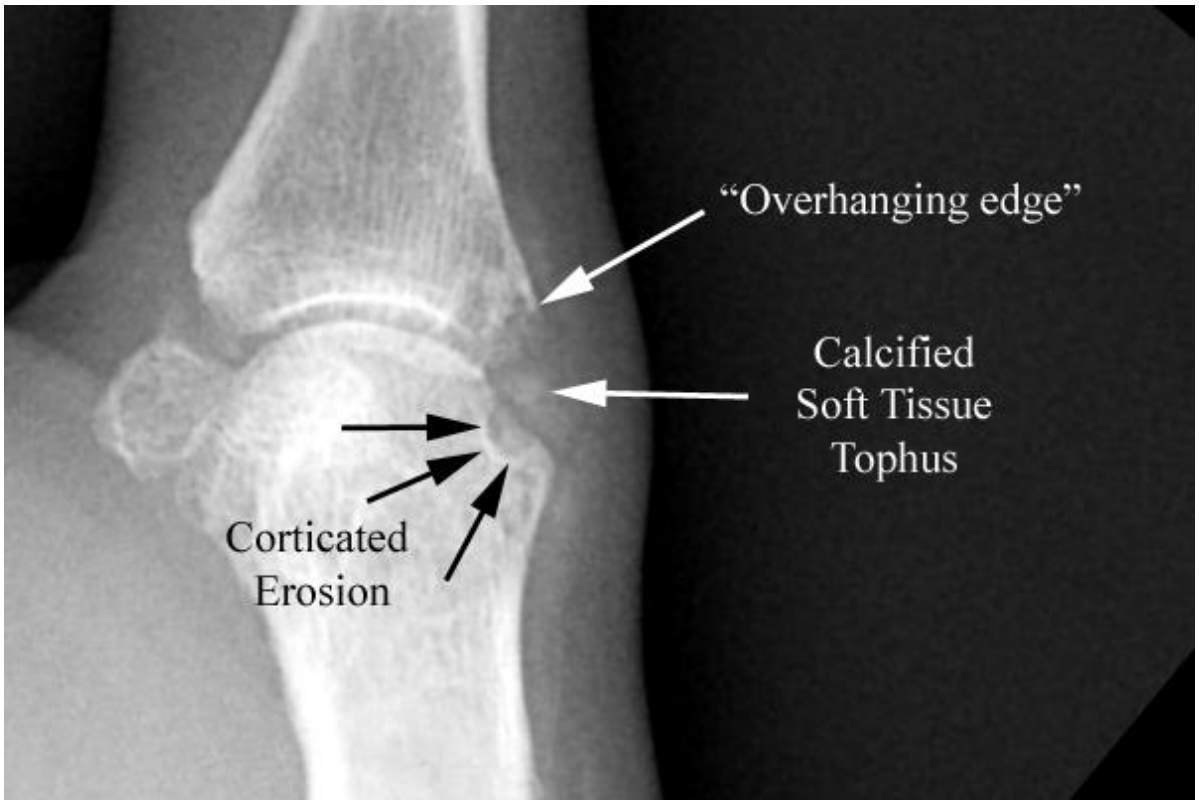


Imaging questions:

1) What type of study is shown? Plain film PA study of the left (A) and right (B) hands.
2) Are there any abnormalities? Yes. There is soft tissue swelling including calcified soft tissue along the radial aspect of the right long finger proximal interphalangeal joint (white arrow), multiple erosions including along the left finger proximal phalanx(black arrow) and chondrocalcinosis of the wrist joint triangular fibrocartilage (white double arrows).
3) What is the most likely diagnosis? Gout with associated soft tissue tophus, erosions, and chondrocalcinosis.
4) What is the next step in management? Management of the patient's current symptoms, followed by measures to prevent recurrent gout. Consider referral to rheumatologist.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP

The patient was referred to a rheumatologist. Further clinical history indicated that the patient had been treated in the past for gout, and to the patient's knowledge he felt that he had been diagnosed at least ten years before, but he noted that his symptoms were getting worse. He had approximately two attacks of gout per year, with ongoing difficulty golfing (his favorite hobby) because of the inability to close his fist around the golf club handle. The patient takes colchicine 0.6 mg once daily. On physical examination, the patient has nodules compatible with soft tissue tophi over all of the proximal interphalangeal joints of the hand as well as the right middle toe interphalangeal joint. Laboratory values included a sedimentation rate of 10. The patient had taken allopurinol in the remote past. He was restarted on allopurinol. His serum uric acid improved from 12.6 to 6.9 over an approximately 1 year period. He had occasional flares of gout, treated with either oral steroids or steroid injections.



69 year old man with gout. A plain film of the left thumb metacarpal-phalangeal joint demonstrates characteristic radiographic features of gout, including a calcified soft tissue tophus, a corticated erosion of the thumb metacarpal head, and an "overhanging edge" along the margin of an additional erosion along the proximal phalanx.

SUMMARY

Presenting symptoms: The patient had polyarthritis. He was also known to have gout, and he had multiple soft tissue nodules on physical examination that were typical of gout.

Imaging work-up: Plain films may be helpful by demonstrating calcification of soft tissue nodules in gout and bone erosions with an "overhanging edge," and to exclude peri-articular osteopenia and noncorticated erosions typical of rheumatoid arthritis, but are not necessary for the diagnosis. While ultrasound, dual-energy CT, and magnetic resonance imaging have all been used for the evaluation of polyarthropathy, these imaging examinations are generally ordered by rheumatologists rather than primary care providers in a select subgroup of patients. Imaging features of gout are often *not* detectable at the time of the first acute attack of the disease, so a negative imaging study does *not* exclude the diagnosis.

Establishing the diagnosis: The diagnosis is most secure when urate crystals are demonstrated on a joint or bursal aspirate. If no aspirate is available, a scheme developed by Janssens et al may be used to categorize patients into groups with low, intermediate, and high probability of having the disease.

Take-home message: In patients with polyarthritis and pain in the hands, plain films of the hands are generally the best first imaging study, *if imaging is required.* Plain films often demonstrate characteristic features in patients who have longstanding disease, as seen in the patient presented here. Note that early in the disease process, plain films are many times normal or otherwise lack characteristic features and may not be helpful. Ordering other or additional imaging studies (for example, ultrasound, computed tomography, and magnetic resonance imaging) of patients with polyarthropathy is generally best left to rheumatologists or orthopedic surgeons.

FURTHER READING

Becker MA. Clinical manifestations and diagnosis of gout. UpToDate, accessed 3/16/12.

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Janssens JH, Fransen J, van de Lisdonk EH et al. A diagnostic rule for acute gouty arthritis in primary care without joint fluid analysis. Arch Intern Med 2010; 170:1120-1126.

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