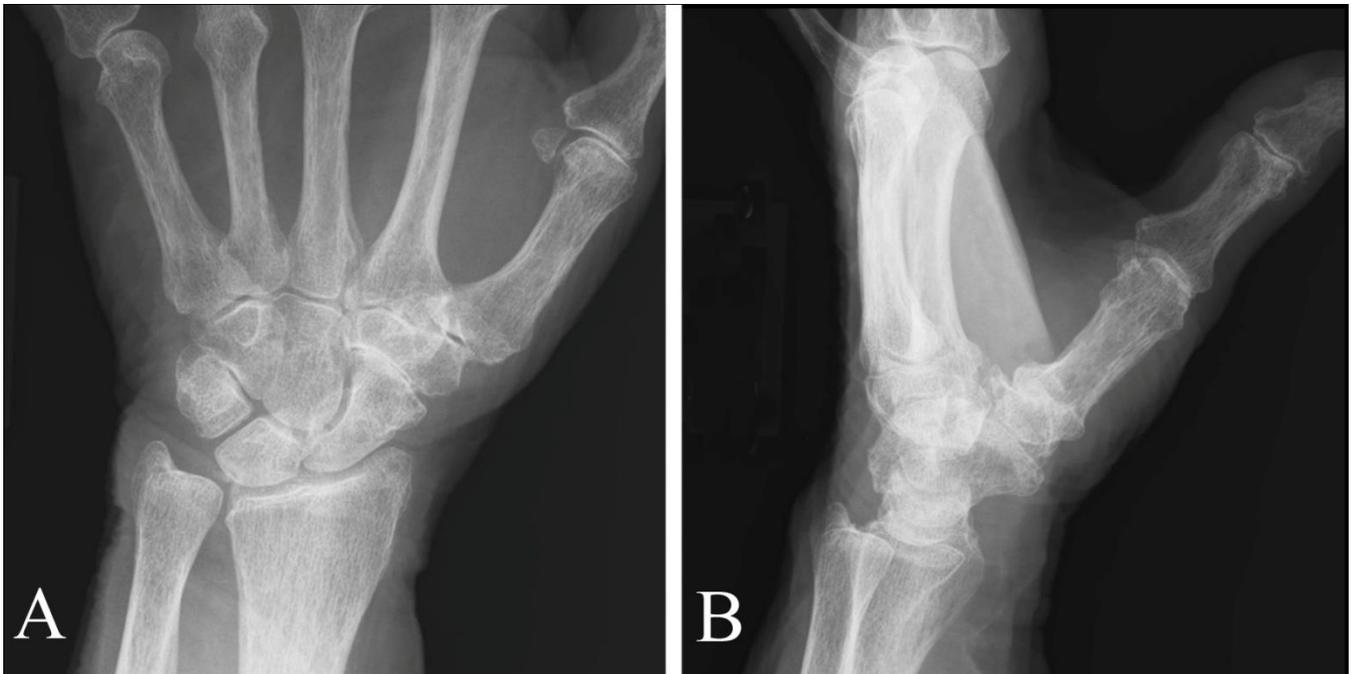


CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

An 87 year old woman in excellent general health presents with severe left wrist pain. She has had the pain for approximately six weeks. She rates the pain as 10 out of 10 and states that it keeps her from sleeping at night. She notes a burning and tingling sensation in the wrist. She has not noticed any discoloration. She has no history of trauma. Her vital signs are normal. She is taking anti-hypertensive medication. On physical exam, she has no swelling or redness of the hand or wrist and has a full range of motion. Her pulses and capillary refill are normal. She has had no pain relief with nonsteroidal anti-inflammatory medications. Plain films were obtained:



Which of the following imaging studies would likely be most helpful in further evaluation of this patient?

- (a) magnetic resonance (MR) imaging of the wrist
- (b) computed tomography (CT) of the wrist
- (c) nuclear medicine whole body bone scan
- (d) ultrasound (US) examination of the wrist

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

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Which of the following imaging studies would likely be most helpful in further evaluation of this patient?

- (a) magnetic resonance (MR) imaging of the wrist
- (b) computed tomography (CT) of the wrist
- (c) nuclear medicine whole body bone scan
- (d) ultrasound (US) examination of the wrist

Plain film examination demonstrated degenerative changes, but no fracture, tumor, or other cause of the patient's severe ongoing pain was identified.

For patients with severe, unremitting wrist pain for whom the plain films demonstrates no obvious source of symptoms, MR imaging is likely to be most helpful in further evaluation, and therefore (a) is correct.

CT may be used as an alternative to MR when MR is contraindicated (for example, if the patient has a pacemaker or aneurysm clip), or for when evaluating a known fracture, but in general CT does not offer as much information as MR, especially regarding the soft tissue structures, and therefore (b) is incorrect. A nuclear medicine bone scan may be helpful in cases of stress fracture, radiographically occult fracture, or complex regional pain syndrome (also known as Sudek's atrophy), but is not nearly as helpful in evaluating soft tissue structures, and therefore (c) is incorrect. Ultrasound of the wrist is helpful for evaluation of blood flow and, in some centers, is used to evaluate displaced acute fractures and tendons, but such use is not at present widely accepted and (d) is incorrect.

IMAGING STUDY AND QUESTIONS

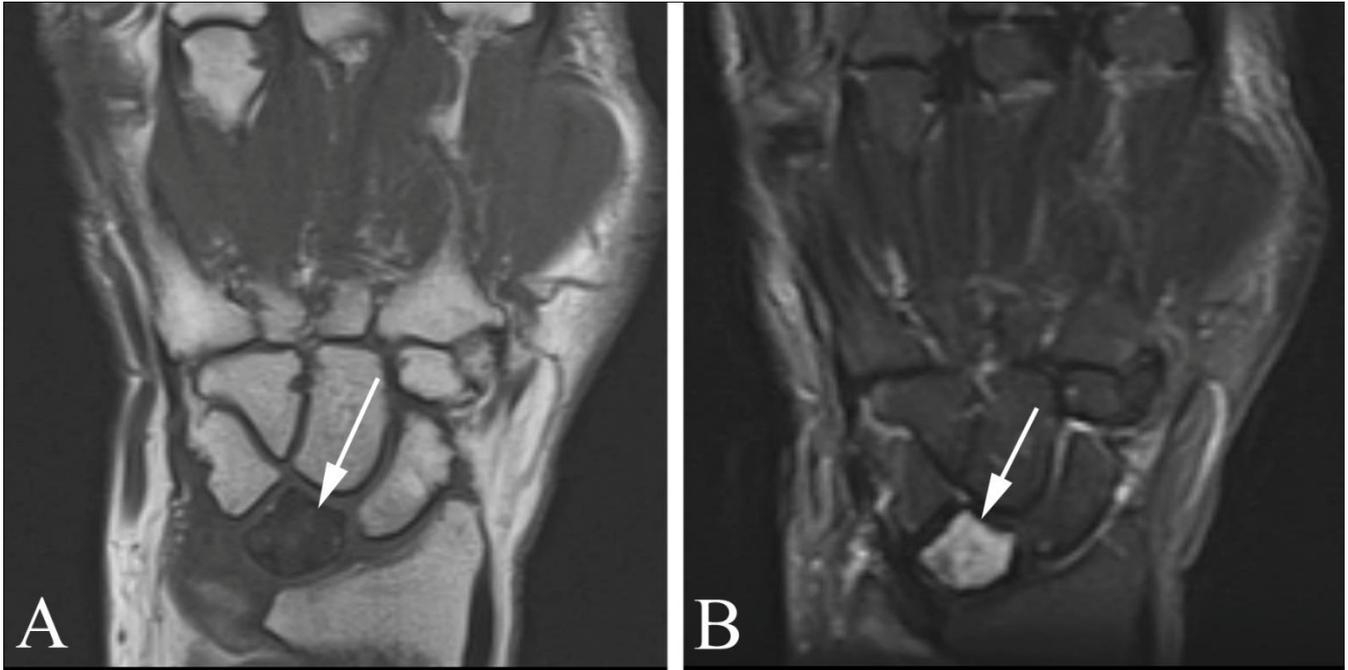
An imaging study was performed:



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? A. is a coronal T1 weighted MR image of the wrist and B. is a coronal fat suppressed T2 weighted MR image of the wrist.
- 2) Are there any abnormalities? Yes. There is abnormal, decreased signal intensity of the lunate on the T1 weighted MR image (arrow in A) and there is abnormal increased signal intensity of the lunate on the fat-suppressed T2-weighted image (arrow in B).
- 3) What is the most likely diagnosis? Osteonecrosis of the lunate, also known as Kienbock's disease.
- 4) What is the next step in management? Conservative measures include splinting or casting the wrist and hand along with oral pain medication. Surgical options include revascularization of the bone, removal of the bone (especially if it is shrunken or fragmented), or fusion of the carpus.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP
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The patient was scheduled to consult with a surgeon regarding surgical options for treatment when her pain started to subside. She delayed the surgical consultation, and within a matter of a few weeks her pain had completely remitted.

SUMMARY

Presenting symptoms: The patient presented with chronic wrist pain. Diagnostic considerations included degenerative, crystal, and rheumatoid arthropathy but the patient did not have a history, pain pattern, or physical examination to support any of these diagnoses. Regional complex pain syndrome (also known as Sudek's atrophy) and myofascial pain syndrome (a variant of fibromyalgia occurring in one joint) were also possible on the basis of the presentation. The pain pattern did not fit carpal tunnel syndrome, since the pain was through the hand rather than being confined to the radial aspect.

Imaging work-up: The initial imaging examination in patients with chronic wrist pain is typically a plain film study including an anteroposterior (AP), lateral, and oblique study. The main purpose of the plain film in chronic arthritis is to evaluate for arthritis. The plain film may also show gross malalignment (and secondary degenerative changes), which is generally the end result of chronic ligamentous rupture (which may or may not be associated with a specific traumatic event).

Establishing the diagnosis: The diagnosis of avascular necrosis of the lunate (also known as lunatomalacia or Kienbock's disease) is generally based on imaging. This patient had the classic MR features of early Kienbock's, with replacement of the entire marrow of the lunate on both T1 and T2 weighted sequences by abnormal signal. Later in the disease process, the lunate becomes smaller, more dense, and breaks into fragments. This patient's pain spontaneously remitted prior to surgical intervention. She has not had a return of symptoms, but if the symptoms recur a plain film of the wrist would be helpful to evaluate whether she has plain film findings (including sclerosis, reduced size, or fragmentation) of the lunate bone.

Take-home message: The initial study of choice for virtually all patients with chronic wrist pain is a plain film examination. When plain film examination fails to reveal an obvious cause of wrist pain, MR can be used for further evaluation and is generally the most helpful second imaging study.

Note the similarity of this case to that presented in RQW091 Chronic Shoulder Pain and RQW093 Chronic Elbow Pain. In most cases, chronic joint pain is first evaluated with a plain film, and MR is done if further imaging is necessary.

FURTHER READING

Anderson BC. Evaluation of the adult patient with wrist pain. UpToDate, accessed 5/1/12.

Renfrew DL. Single joint pain. Chapter 14 in *Symptom Based Radiology*, Symptom Based Radiology Publishing, Sturgeon Bay, WI, 2010, available for no charge at www.symptombasedradiology.com.