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CLINICAL PRESENTATION AND RADIOLOGY QUIZ QUESTION

The patient is a 36 year old avid outdoorsman who works for the Department of Natural Resources. He presents to clinic with six weeks of persistent neck pain radiating into the left shoulder. The pain comes and goes and seems to be made worse with demanding physical activity. The patient has a positive Spurling's test on the left, but his physical examination is otherwise unremarkable. He has no arm or hand symptoms. He has no muscle weakness or abnormality of reflexes. He has no history of prior cervical spine surgery.

What is the most appropriate imaging technique for patients with persistent neck pain, assuming that plain films have already been obtained and provided no useful information?

(a) cervical myelography
(b) cervical myelography followed by CT examination
(c) magnetic resonance imaging of the cervical spine
(d) nuclear medicine bone scan

RADIOLOGY QUIZ QUESTION, ANSWER, AND EXPLANATION

See history on the previous page.

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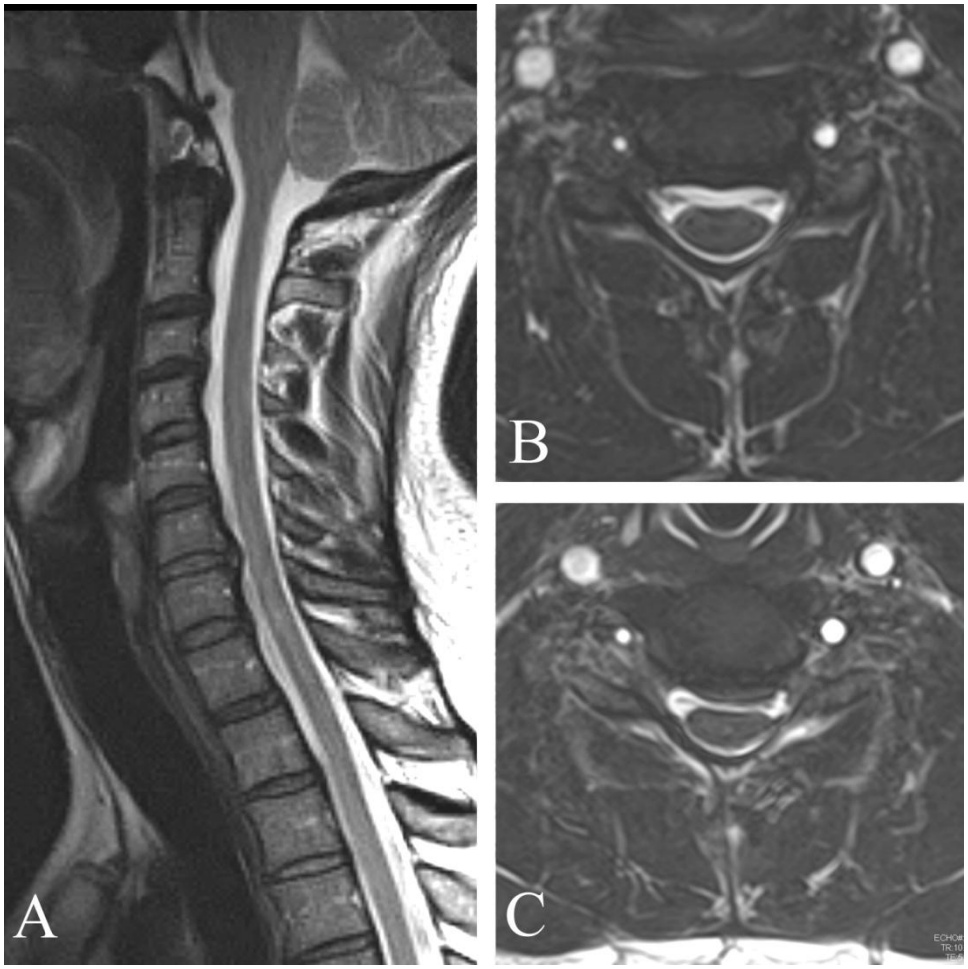
Answer: (c), magnetic resonance imaging of the cervical spine is the most appropriate imaging method for evaluation of persistent neck pain with radicular or somatic referred pain to the shoulder. Many of the recommendations for imaging of lumbar spine and lower extremity symptoms "carry over" to evaluation of the cervical spine and upper extremity symptoms. Magnetic resonance imaging is outstanding for evaluation of both bones and soft tissues and can readily diagnose most important causes of severe ongoing neck pain, with or without associated upper extremity symptoms. Recommendations about when to image varies. As in the lumbar spine, "red flags" should prompt earlier evaluation. These include: young (pediatric) or old (arbitrarily somewhere around 50) age; a personal history of malignancy; significant trauma; or such systemic features as weight loss, fever, or night sweats.

Cervical myelography, once a mainstay of evaluation of neck pain, has largely been supplanted by magnetic resonance imaging and is rarely if ever performed without an accompanying CT study, and (a) is incorrect. Cervical myelography with CT has also largely been supplanted by magnetic resonance imaging, but has a role in the post-operative evaluation of patients who have undergone prior cervical surgery, particularly when patients have undergone fusion with placement of hardware. CT can better evaluate hardware complications (loosening and fractures) and can provide better detail of adjacent soft tissues (when combined with CT) because of significant image degradation caused by the hardware on magnetic resonance images. However, this patient does not have any history of prior cervical surgery, and (b) is incorrect. A nuclear medicine bone scan may be used to evaluate for skeletal metastases in a patient with known malignancy, but the bone scan not the first choice for evaluation of neck pain, and (d) is incorrect.

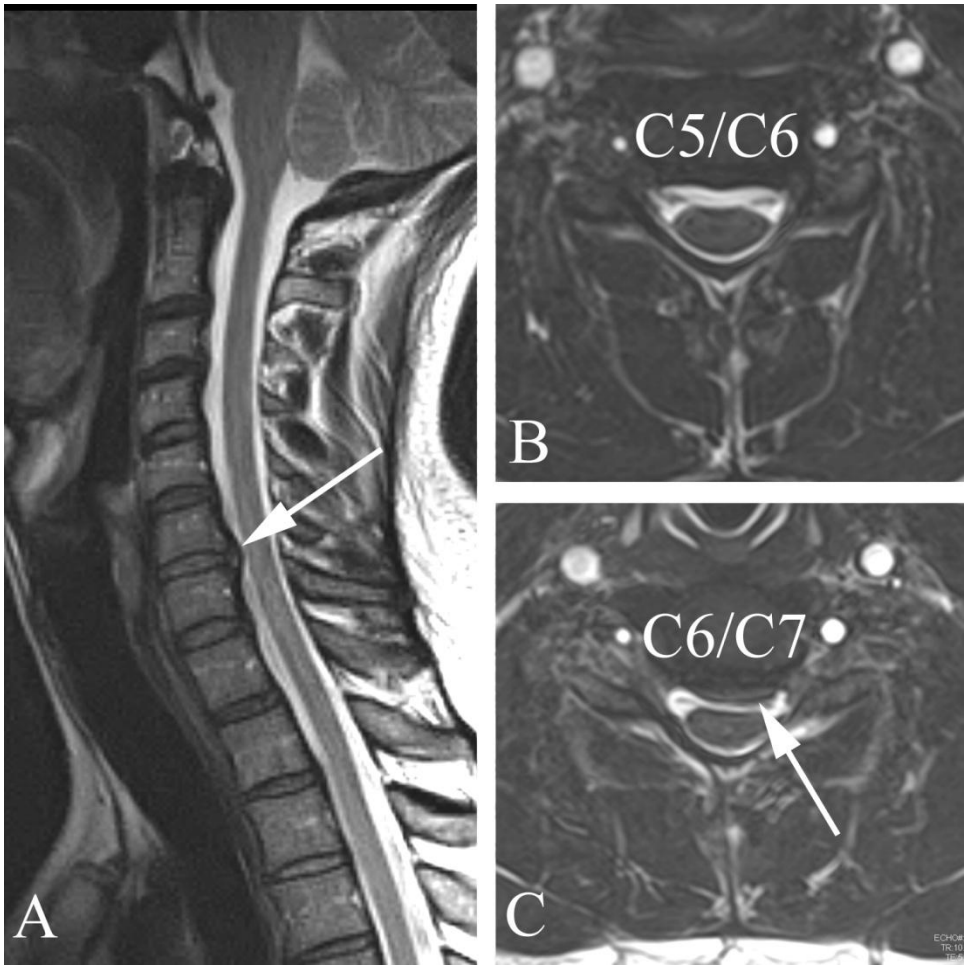
IMAGING STUDY AND QUESTIONS



Imaging questions:

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

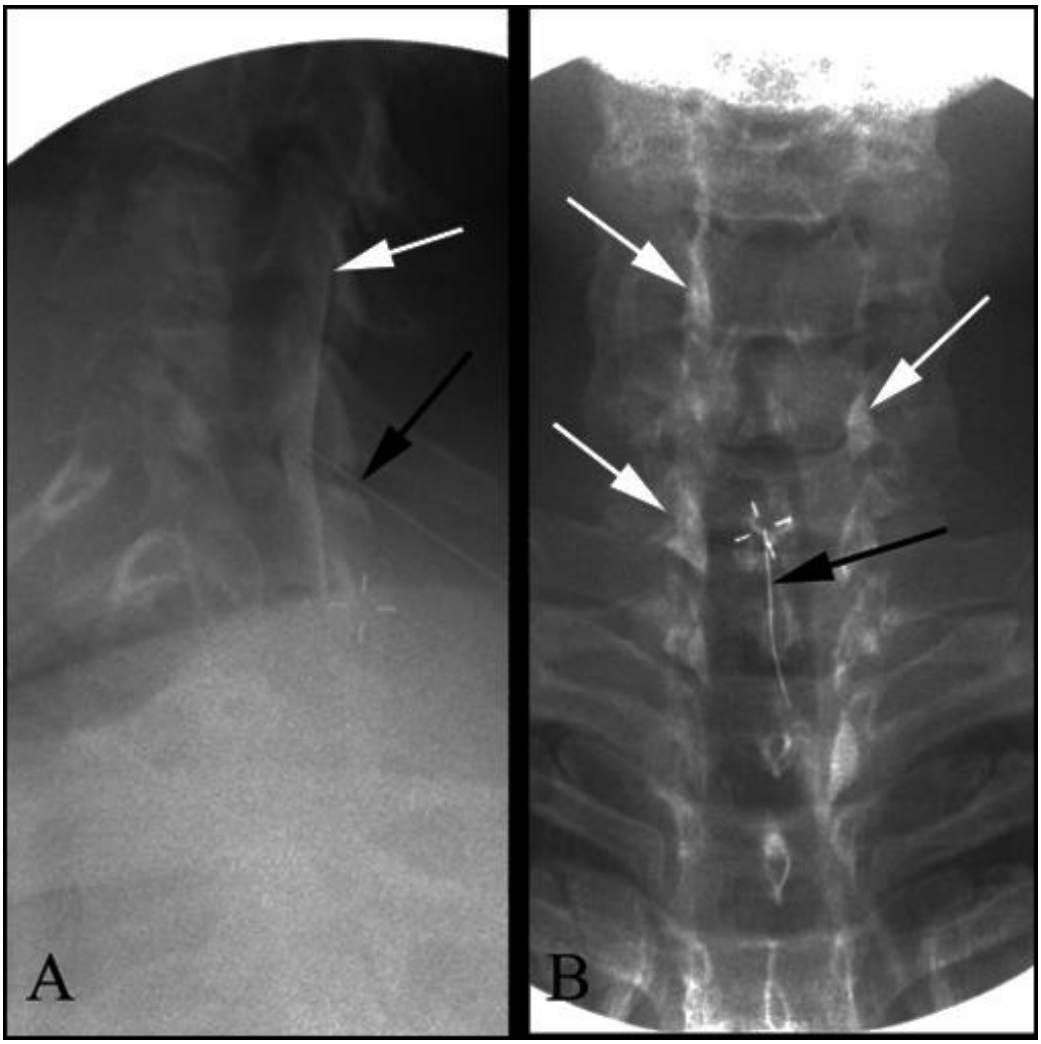
IMAGING STUDY QUESTIONS AND ANSWERS



1) What type of study is shown in the figure? This is a cervical spine magnetic resonance imaging (MRI) examination. A is a sagittal T2 weighted image, B is an axial T2 weighted image at the C5/C6 intervertebral disc level, and C is an axial T2 weighted image at the C6/C7 level.
2) Are there any abnormalities? The sagittal image (A) shows a C6/C7 disc herniation (arrow), confirmed on the axial image at C6/C7 (arrow in C): compare the normal disc margin and (white) CSF signal intensity anterior to the spinal cord at the C5/C6 level (in B).
3) What is the most likely diagnosis? Disc herniation with mild cord flattening causing neck and shoulder pain.
4) What is the next step in management? Controversial. Generally, some sort of conservative therapy (oral medication, physical therapy) versus epidural injections versus discectomy.

PATIENT DISPOSITION, DIAGNOSIS, AND FOLLOW-UP

The patient was started on a burst of steroids even prior to his cervical MR study, and these provided excellent but transient pain relief. He subsequently underwent a series of epidural injections into the cervical spinal canal, which provided approximately four years of pain relief, at which time the patient returned for additional injections which once more were successful in relieving his pain.



36 year old man with neck and shoulder pain who had pain relief following epidural steroid injection. A. Oblique fluoroscopically directed digital cervical spine spot film taken during the procedure shows the needle (black arrow) between the C7 and T1 spinous processes, along with contrast flowing through the epidural space (white arrow). B. Frontal fluoroscopically directed digital cervical spine spot film shows the needle (black arrow) and widely distributed contrast material (white arrows).

SUMMARY

Presenting symptom: As with evaluation of back pain, evaluation of neck pain presents a challenge. Most patients will have benign and self-limited pain and the natural history is for the pain to relent. Persistent severe neck pain, neck pain associated with "red flags" in the clinical history, or neck pain associated with radiculopathy or upper extremity weakness typically merit earlier and more aggressive work-up.

Imaging work-up: Given the nearly universal occurrence of neck pain, imaging all patients with neck pain is unlikely to be cost effective and therefore, as in the case of back pain, multiple attempts have been made to devise lists to limit imaging to situations where it is likely to have the greatest benefit in patient care. Recommendations generally call for expedited imaging of patients with "red flags." Patients with progressive neurologic weakness or numbness should probably undergo urgent imaging. Patients with persistent pain (the usual cutoff is 6 weeks) may benefit from imaging. Most algorithms call for performing plain films first, but whether the plain films are normal or show an abnormality, MR is usually obtained as well.

Establishing the diagnosis: In this case, the MR exam showed a C6/C7 herniated disc. It is hard to say with certainty that this disc herniation is the cause of the patient's symptoms, because such herniations may be seen in asymptomatic subjects. Treatment of the "disease" is no less problematic: there is a lack of evidence-based guidelines for management, but (as in treatment of low back disorders) conservative methods (physical therapy, oral NSAIDs, etc.) are typically tried before surgery. Injections (such as were done in this case) fall somewhere in between.

Take-home message: Not all patients with spine pain require imaging, but if imaging is required, MR is the study of choice. Plain films are often acquired prior to MR imaging, but infrequently are definitive enough to direct treatment.

FURTHER READING

Anderson, BC, Isaac Z, evine, J. Treatment of neck pain. UptoDate, accessed 3/16/2011.

Isaac, Z, Anderson BC. Evaluation of the patient with neck pain and cervical spine disorders. UpToDate, accessed 3/16/2011.

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Robinson, J, Kothari, MJ. Treatment of cervical radiculopathy. UpToDate, accessed 3/18/2011.