

Sample Diagnostic Radiology Oral Exam Cases

The diagnostic radiology Trustees have created a set of sample cases to give an idea of the types of topics and depth that will be evaluated on the DR Oral Exam. The focus is on allowing the candidates to demonstrate their skills in observation, synthesis, and management. The exam is still under development, and these are not actual cases that will be used in 2028. The intention is to provide a general idea of the content and format. Although all these examples have a collage of single images, some cases on the new exam will have cine clips for ultrasound and scrollable stacks for CT and MRI.

ABDOMEN

CASE 1: Diffuse Adenomyosis

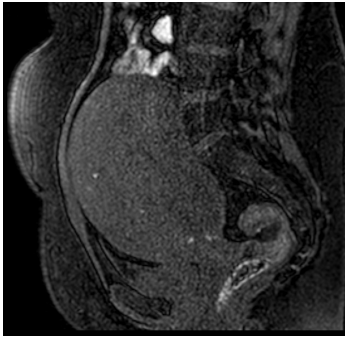
Clinical history: Menorrhagia.

Segment 1: Transvaginal Ultrasound

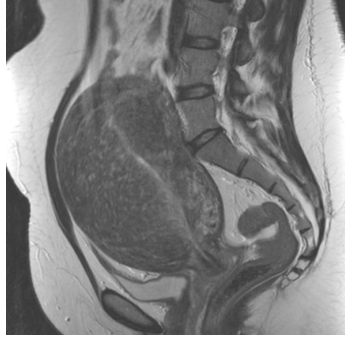


- Successful candidate identifies most or all findings of globular uterine enlargement, myometrial heterogeneity, and linear shadowing obscuring endometrium.
- Candidate identifies pertinent negatives, including absence of obvious endometrial thickening and focal mass, and offers provisional diagnosis and recommends MRI to further evaluate.

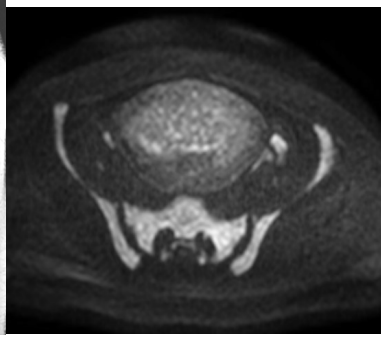
Segment 2: MRI



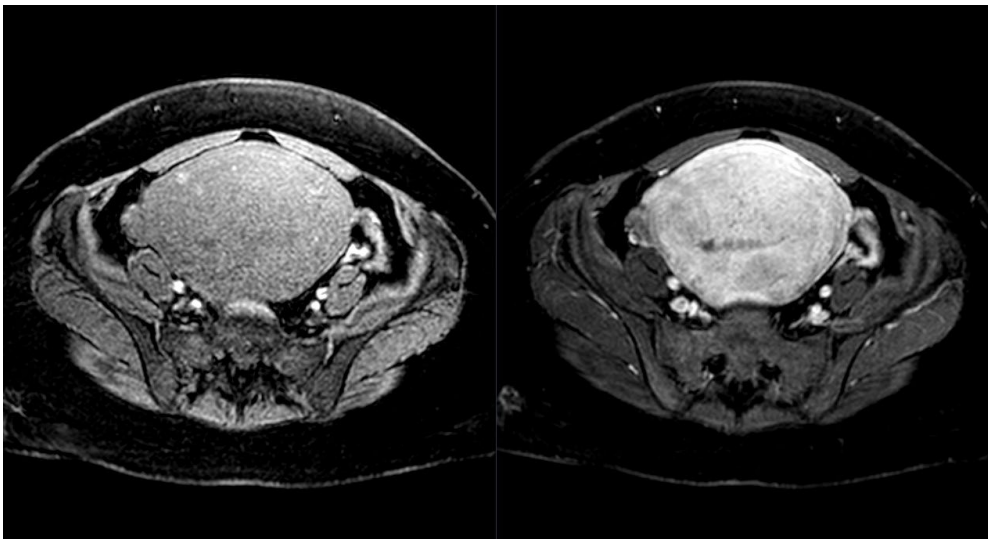
Sag T1WI



Sag T2WI



Ax DWI (b=1200)



Ax T1WI +FS pre and post contrast

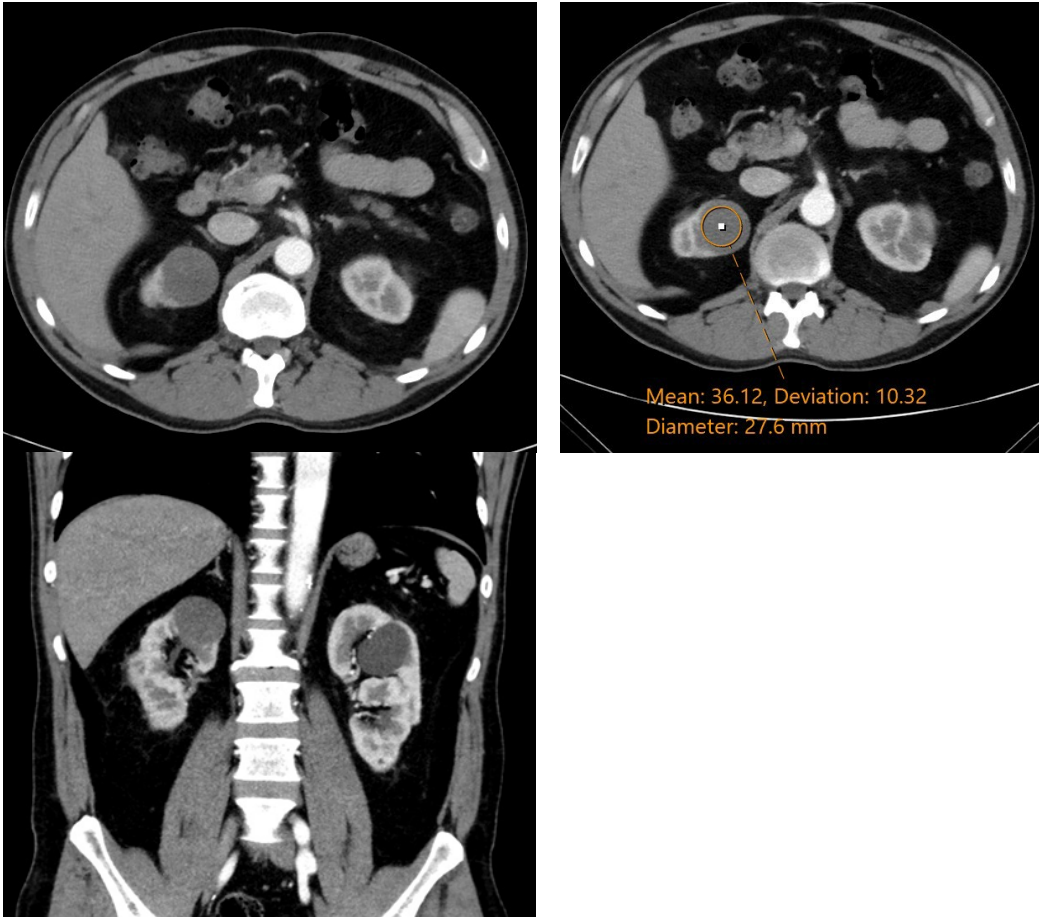
- Candidate describes diffuse thickening of the junctional zone and threshold criteria for diagnosis.
- May identify tiny endometriotic inclusions (with hyperintense signal on pre-contrast T1WI) within the myometrium and note the absence of significant restricted diffusion.
- Correctly excludes malignancy and confirms benign adenomyosis.

Overall: *Candidate makes correct diagnosis and distinguishes it from other uterine pathologies such as leiomyomas, endometrial and cervical masses, and demonstrates awareness of management significance.*

CASE 2: Papillary renal cell carcinoma (RCC)

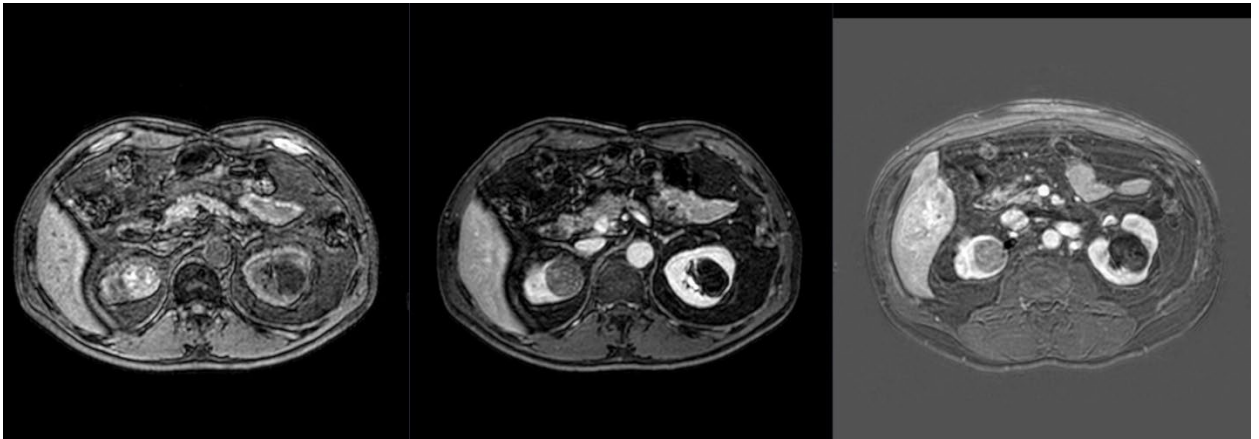
Clinical history: Incidental renal lesion on chest CT.

Segment 1: CT

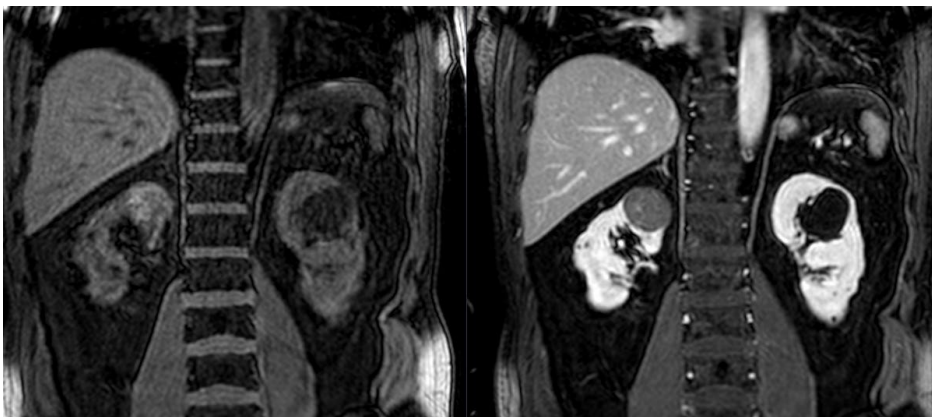


- Candidate describes low density right upper pole renal lesion and requests ROI to assess internal attenuation.
- Recognizes that value of 36 HU is higher than simple fluid and notes limitation due to lack of pre-contrast acquisition to assess enhancement.
- Differential diagnosis includes cyst containing hemorrhagic or proteinaceous fluid vs. hypoenhancing renal mass.
- Suggests surveillance or imaging characterization with MRI.

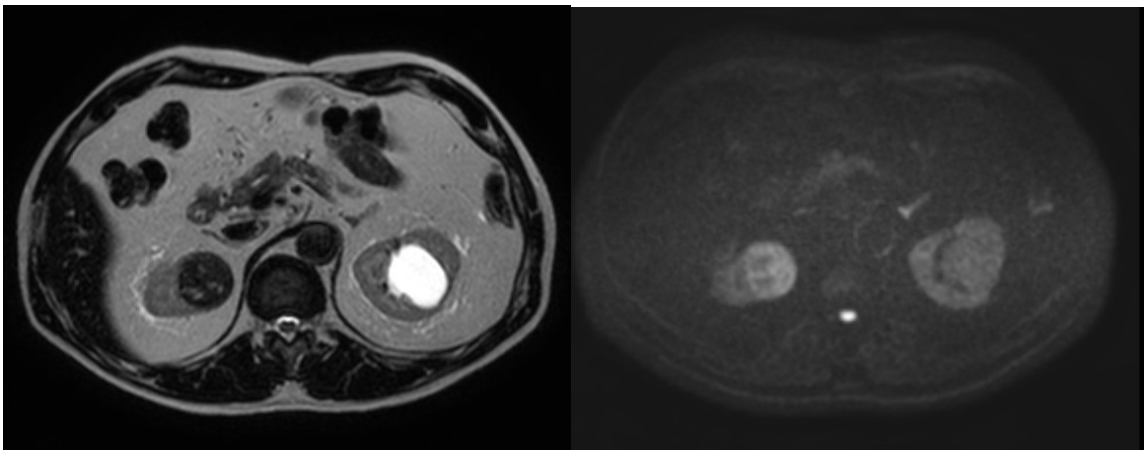
Segment 2: MRI



Ax T1WI + FS (pre and post contrast, then subtraction)



Cor T1WI pre and post



Ax T2WI

Ax DWI b 800

- Candidate correctly describes morphologic and signal intensity characteristics: well marginated; hypointense on T2WI, hyperintense on pre contrast T1WI due

- to blood products; low level enhancement (may compare to cyst in the left kidney). May discuss importance of subtraction series to assess enhancement.
- Evaluates for vascular involvement and lymph node enlargement.

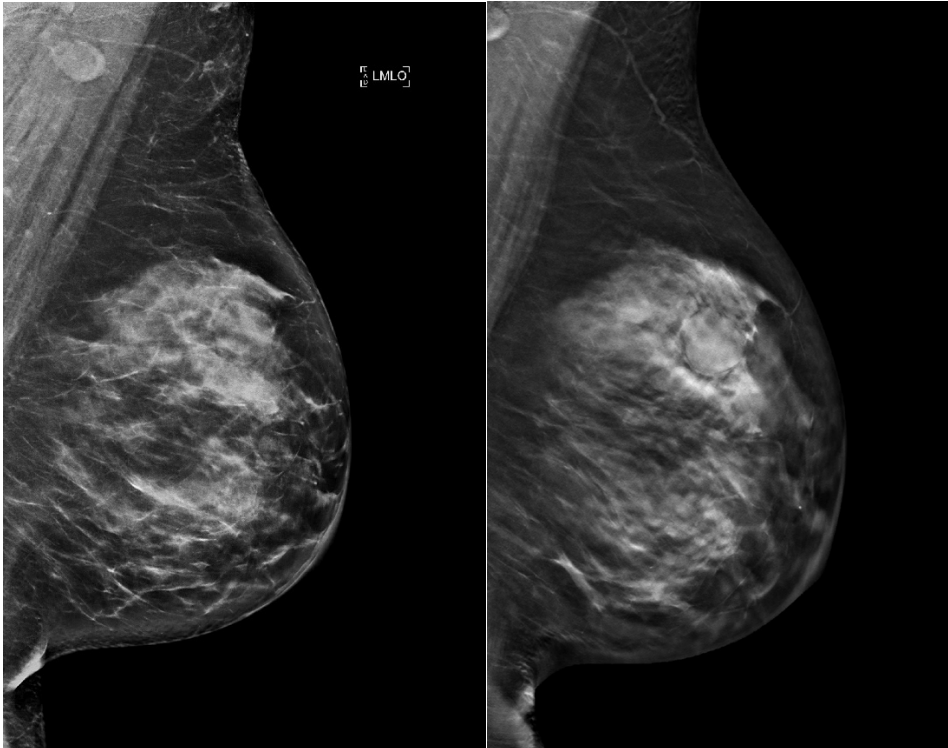
Overall: *Proposes most likely histologic subtype (papillary) and why that distinction might be important. Evaluates for absence of metastasis. Provides an overview of relevant staging features but does not need to know TNM staging with precision.*

BREAST

CASE 1: Breast cyst

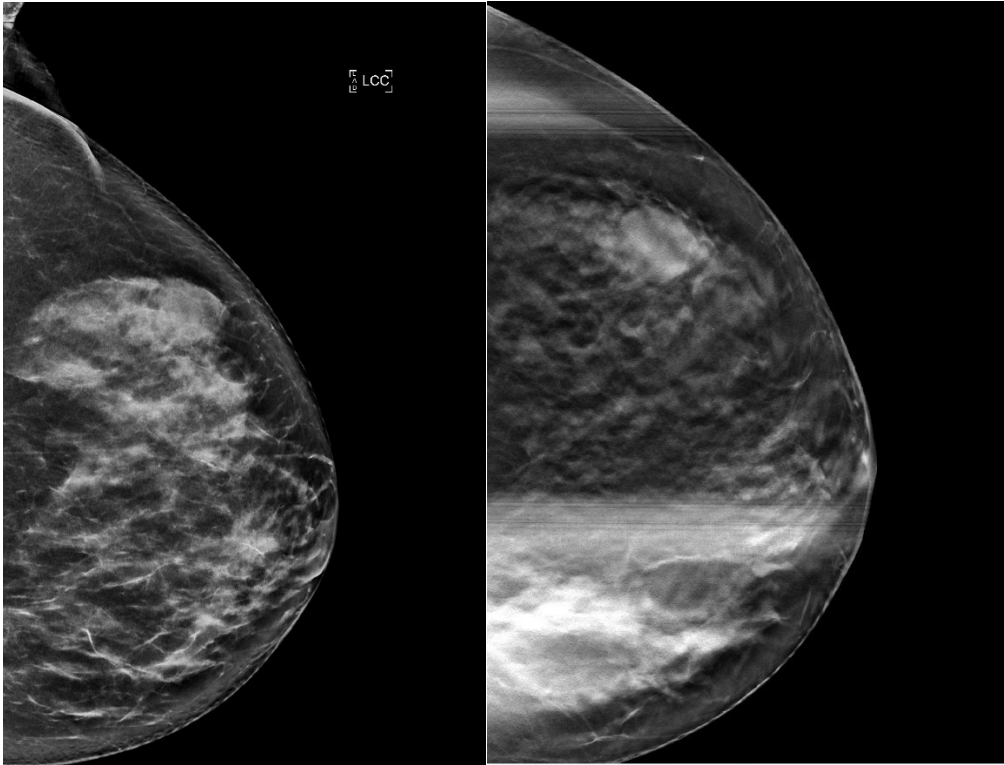
Clinical history: Routine screening

Segment 1: Left mammogram (CC and MLO views)



Left MLO

Left MLO DBT slice



Left CC

Left CC spot

- Candidate identifies and describes the left breast oval circumscribed mass using BI-RADS terminology.
- They offer a differential that includes benign masses including cyst and fibroadenoma but also the potential for a circumscribed carcinoma.
- The candidate also notes pertinent negatives (e.g., no associated calcifications or apparent adenopathy) and recommends US for further characterization.

Segment 2: Ultrasound

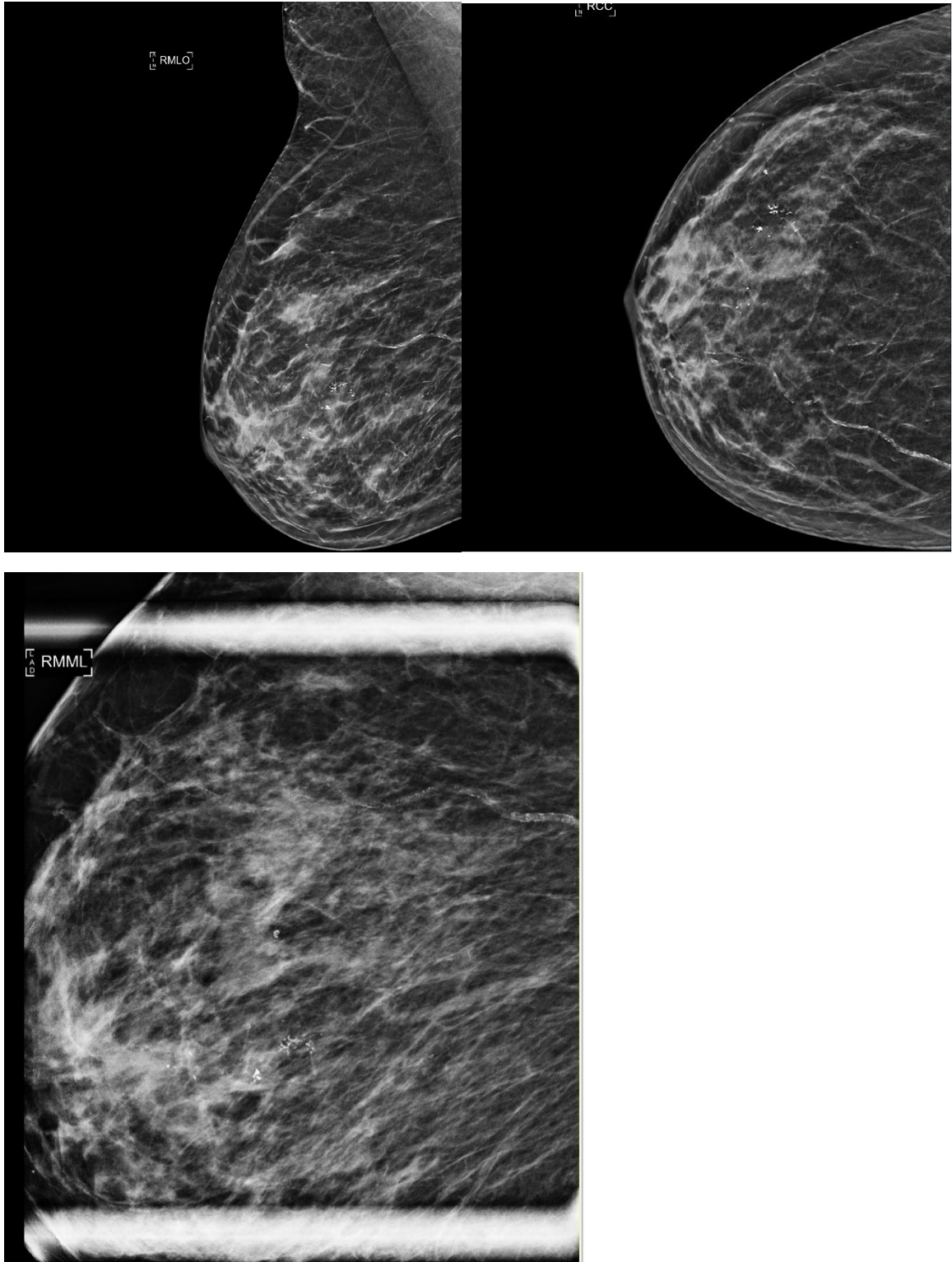


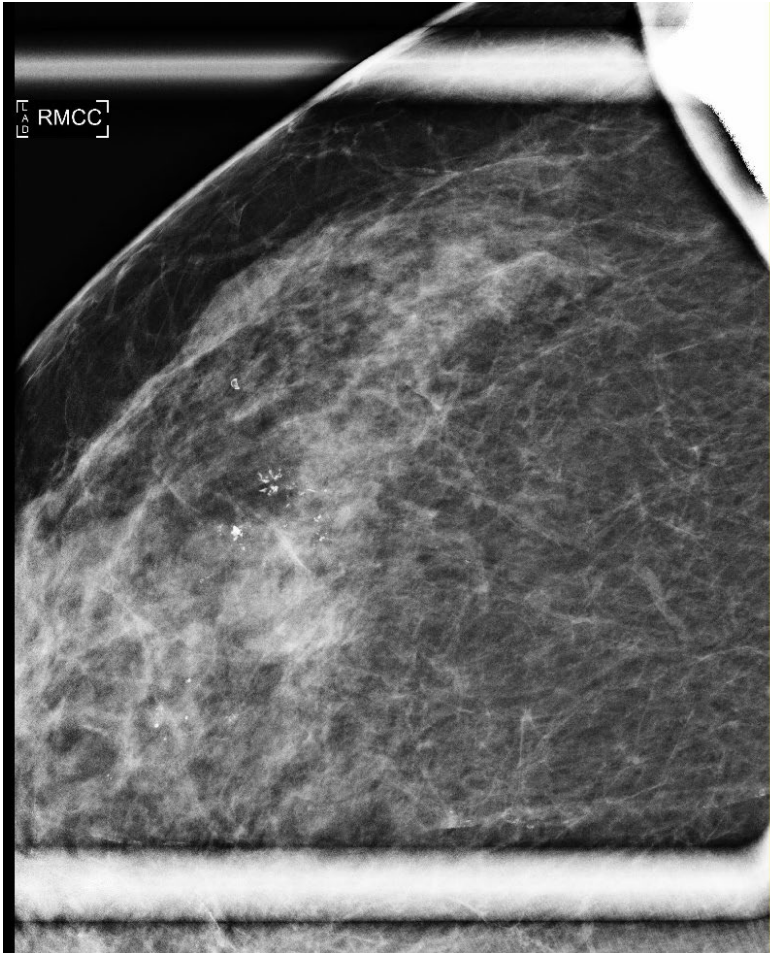
- The candidate identifies that the finding shown on the ultrasound correlates in size and location to the mammogram finding.
- The candidate states that the mass is circumscribed, anechoic, with posterior acoustic enhancement, consistent with a simple cyst.
- They correctly assign a BI-RADS Category 2, benign, assessment, and note proper management (return to screening).

CASE 2: DCIS

Clinical history: Recall from screening

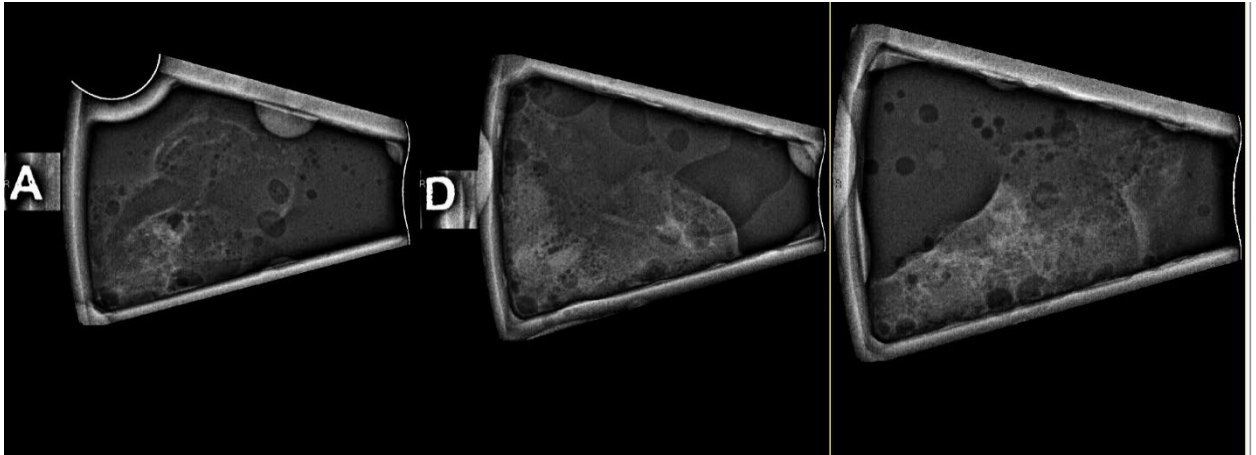
Segment 1: Standard and mag views of the right breast





- The candidate recognizes an area of suspicious calcifications in the right breast and describes location, morphology and distribution using BI-RADS terminology. In this case, the calcifications are grouped fine pleomorphic calcifications in the right breast at 10 o'clock.
- The candidate discusses the differential which includes DCIS, IDC, ADH, or, less likely, fat necrosis, sclerosing adenosis, or other benign causes.
- The candidate conveys the high degree of suspicion based on appearance and probable diagnosis (DCIS). They recognize that there is no associated soft tissue component or adenopathy and recommend mammographic-guided (stereotactic) biopsy.

Segment 2: Specimen radiograph obtained during biopsy



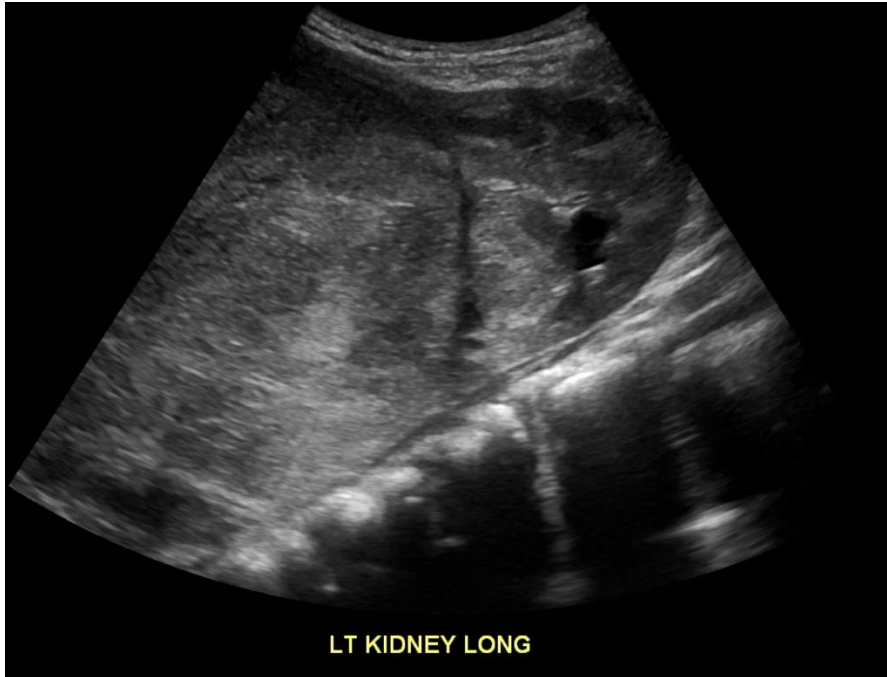
- The candidate recognizes that no calcifications have been retrieved during the biopsy procedure and recommends additional sampling prior to clip placement.
- The candidate is told that the biopsy results after repeat biopsy (with some calcifications retrieved) are returned as “atypical lobular hyperplasia with scant calcifications.” The candidate notes that this is a discordant biopsy result and recommends re-biopsy as the next management option.

PEDIATRICS

CASE 1: Wilms tumor:

Clinical history: 3-year-old with abdominal fullness.

Segment 1: Ultrasound



- Candidate describes the left renal mass and confirms that it is predominantly solid.
- Differential diagnosis Includes renal neoplasm and neuroblastoma among most likely options.
- Recommends CT or MRI to confirm organ of origin and to look for potential metastases.

Segment 2: CT



- Candidate identifies left kidney as organ of origin.
- Offers the most likely diagnosis (Wilms tumor) and knows the most common site of metastasis is the lungs.
- Offers differential diagnosis (clear cell sarcoma, rhabdoid tumor). Explains why the lesion is not mesoblastic nephroma. Demonstrates knowledge of syndromic associations for Wilms tumor.
- Management is consultation with pediatric surgery and oncology. Candidate is aware that staging of Wilms tumor is surgical and that biopsy is relatively contraindicated in low stage Wilms tumor because of the upstaging risk.

CASE 2: Meconium Ileus

Clinical history: Newborn with abdominal distention.

Segment 1: Radiograph



- Candidate recognizes the diffuse bowel dilation in a newborn infant.
- Differential diagnosis of distal bowel obstruction includes ileal atresia, meconium ileus, Hirschsprung disease, and small left colon syndrome.
- Recommends contrast enema as next imaging study.

Segment 2: Contrast enema



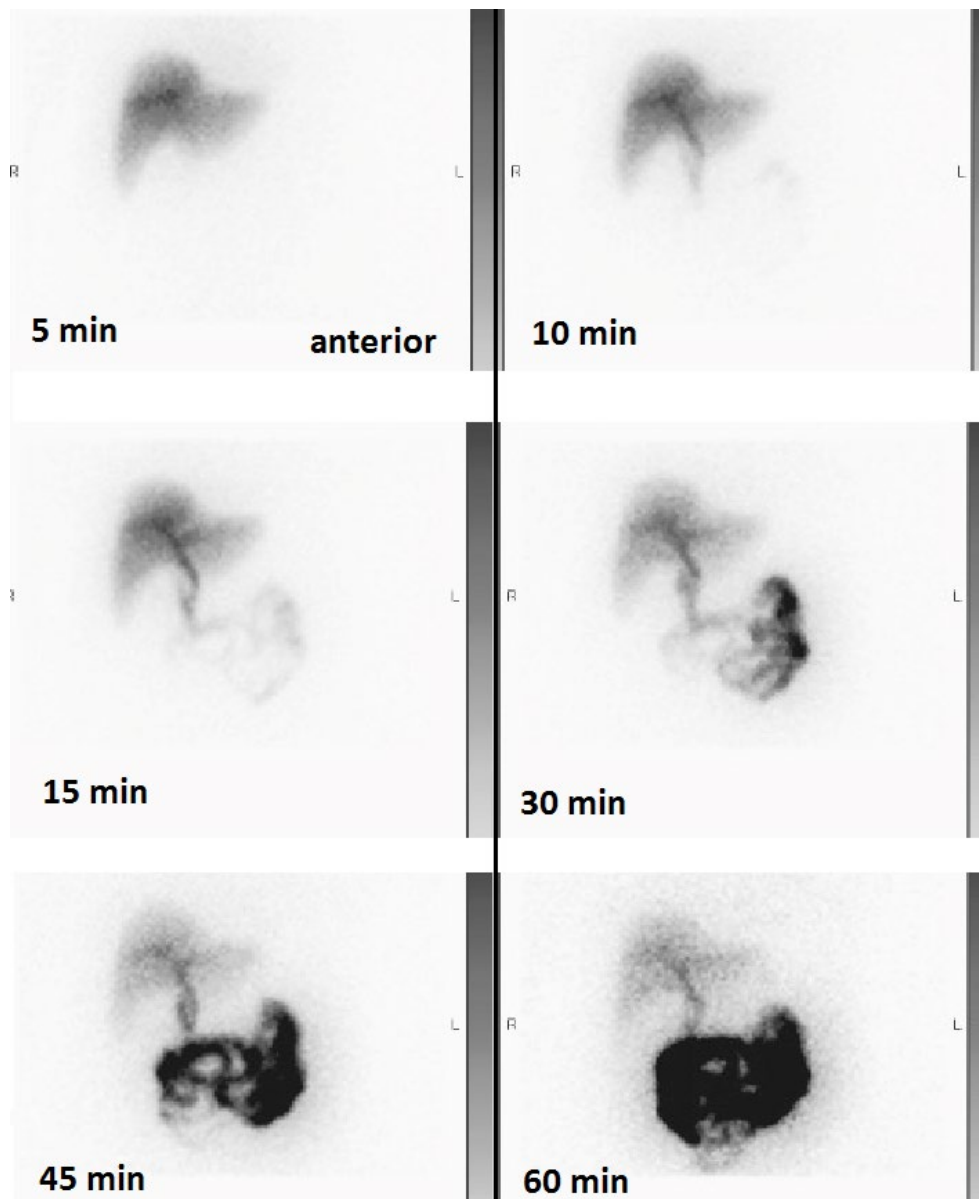
- The candidate recognizes the microcolon and appropriately limits the differential to mainly meconium ileus and ileal atresia. Candidate is aware of the association between meconium ileus and cystic fibrosis. The therapeutic effect of the enema is also discussed.
- Management is surgery consultation.
- Candidate is aware of the possibility of multiple bowel atresia and can also talk about the association.

NUCLEAR RADIOLOGY

CASE 1: Chronic Cholecystitis

Clinical history: Right upper quadrant pain

Segment 1: Hepatobiliary scintigraphy, pre-morphine sulfate intervention

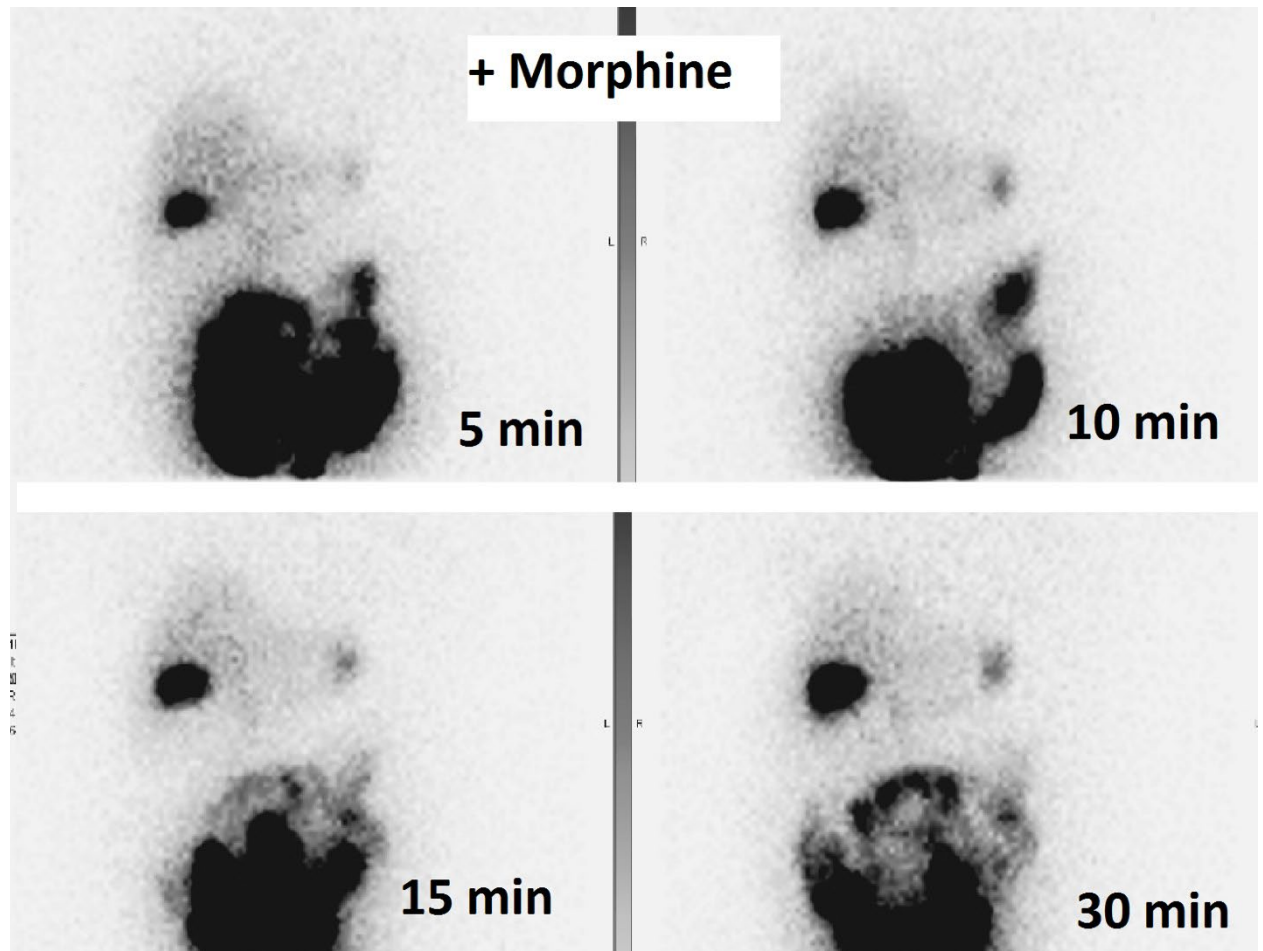


Hepatobiliary scintigraphy

- Candidate describes the findings of normal hepatocellular function and normal visualization of the small intestine, but non-visualization of the gallbladder.
- Differential diagnosis includes acute vs chronic cholecystitis.

- Recommends intervention with IV morphine sulfate, with further imaging up to 30 minutes to look for gallbladder visualization after confirming lack of allergy to morphine. Alternate delayed imaging at 4 hours if allergic.

Segment 2: Hepatobiliary scintigraphy, post-morphine sulfate intervention



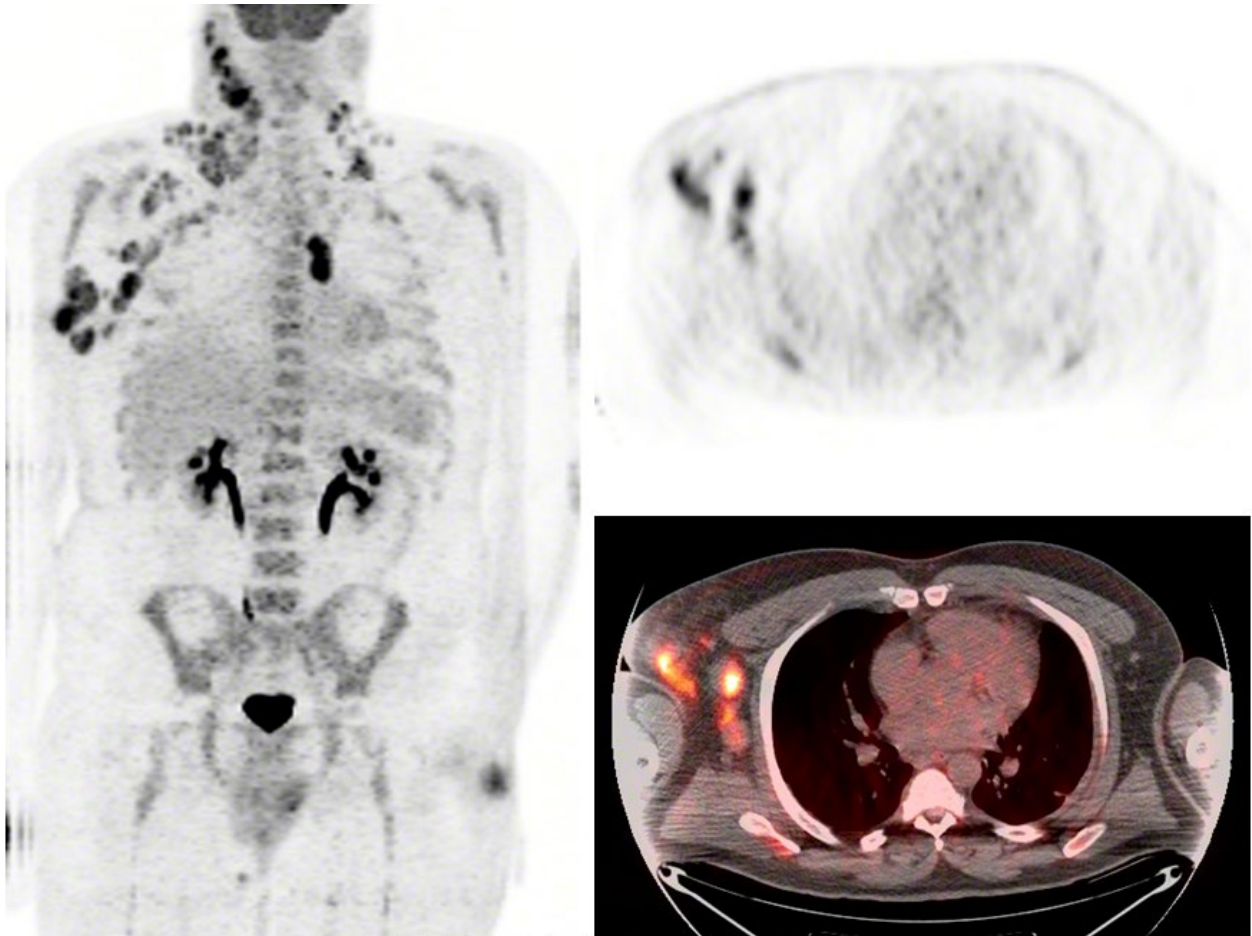
Post-morphine sulfate intervention

- Candidate describes visualization of the gallbladder, indicating patency of the cystic duct, precluding the diagnosis of acute cholecystitis, and supporting the diagnosis of chronic cholecystitis. Incidental finding of enterogastric reflux.
- Explains: patient preparation (fasting for 4-24 hours); the mechanism of action of morphine sulfate in this examination.

CASE 2: Lymphoma

Clinical history: Weight loss

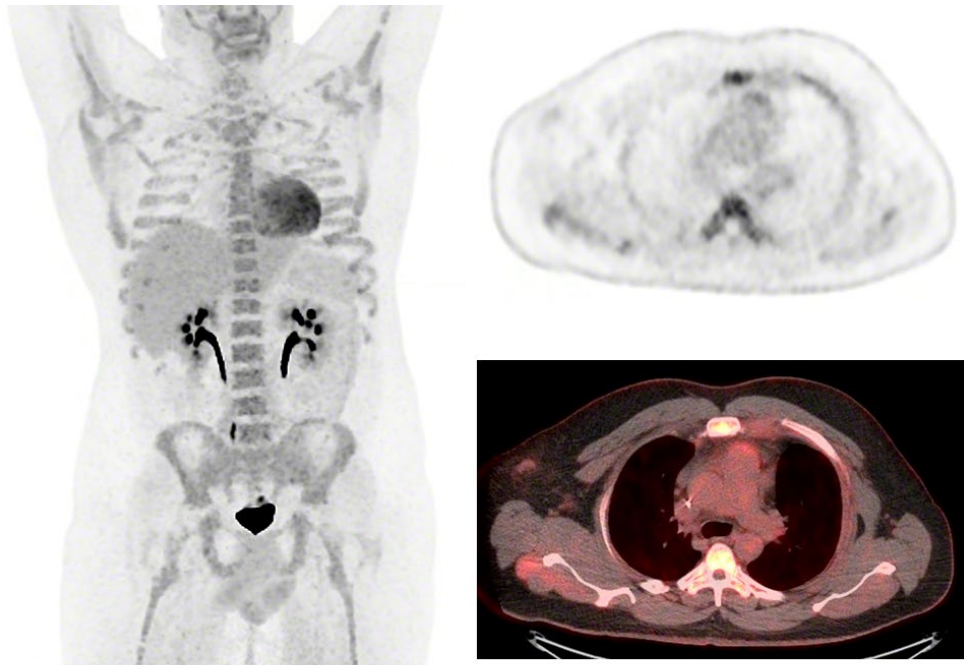
Segment 1: F-18 FDG PET/CT scan, baseline exam



PRE-THERAPY

- Candidate recognizes multifocal localization of FDG in lymph nodes in the cervical and thoracic nodal stations.
- Differential diagnosis includes lymphoma, metastatic cancer, or infectious/inflammatory processes such as fungal/sarcoidosis/TB.

Segment 2: F-18 FDG whole-body PET/CT scan, follow-up



POST-THERAPY PET/CT

- The candidate describes the changes from the baseline scan and concludes that the disease has responded well to chemotherapy.
- Describes key elements of staging and response evaluation systems (Deauville/Lugano).

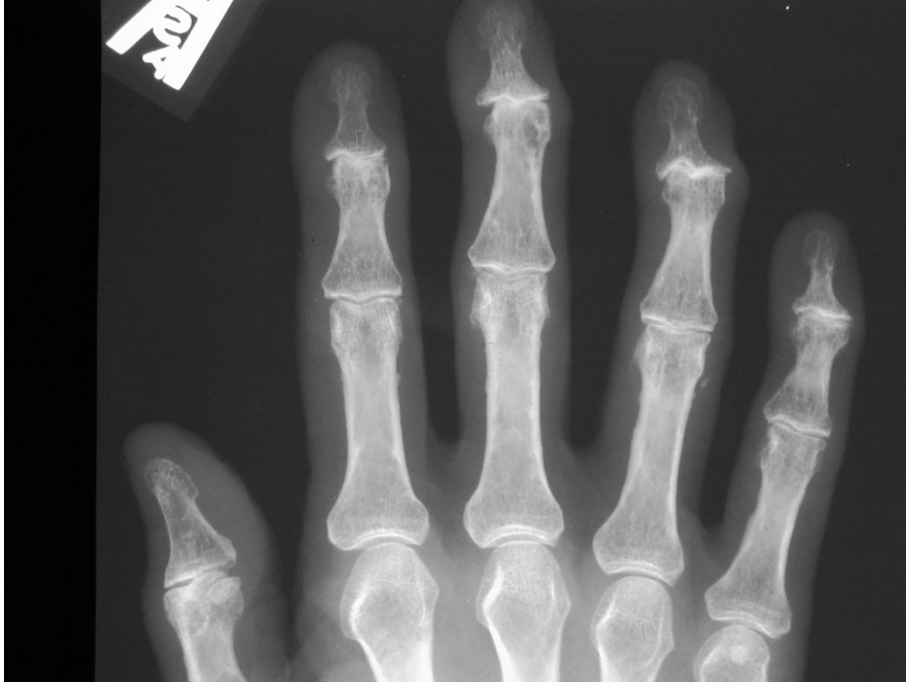
MUSCULOSKELETAL

CASE 1: Erosive Osteoarthritis

Clinical history: Finger pain in an 80-year-old female

Segment 1: Radiographs of bilateral fingers



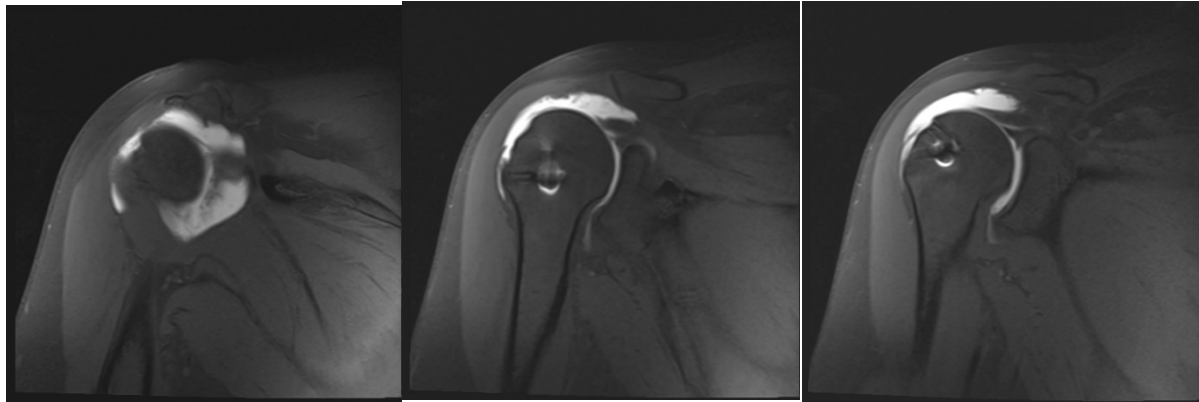


- Candidate describes an arthropathy affecting nearly all of the DIP joints of both hands, and to a lesser degree the PIP joints, with both productive (osteophytes) and erosive features. The erosions are central and without periostitis (aka "seagull" pattern).
- The most likely diagnosis is erosive osteoarthritis. However, the candidate may include a differential of psoriatic arthritis and standard (non-erosive) osteoarthritis, but should realize the demographics and appearance of central erosions with productive changes favors erosive osteoarthritis over the others.
- The examiner may ask about some typical features that differentiate psoriatic arthritis from erosive osteoarthritis (marginal erosions, bone proliferation, asymmetric involvement, demographics, pencil-in-cup deformity, sausage digit).

CASE 2: Full-thickness rotator cuff tear

Clinical history: Shoulder pain in an elderly patient with history of rotator cuff repair

Image series: MR arthrogram of the right shoulder



T1FS Oblique coronal images

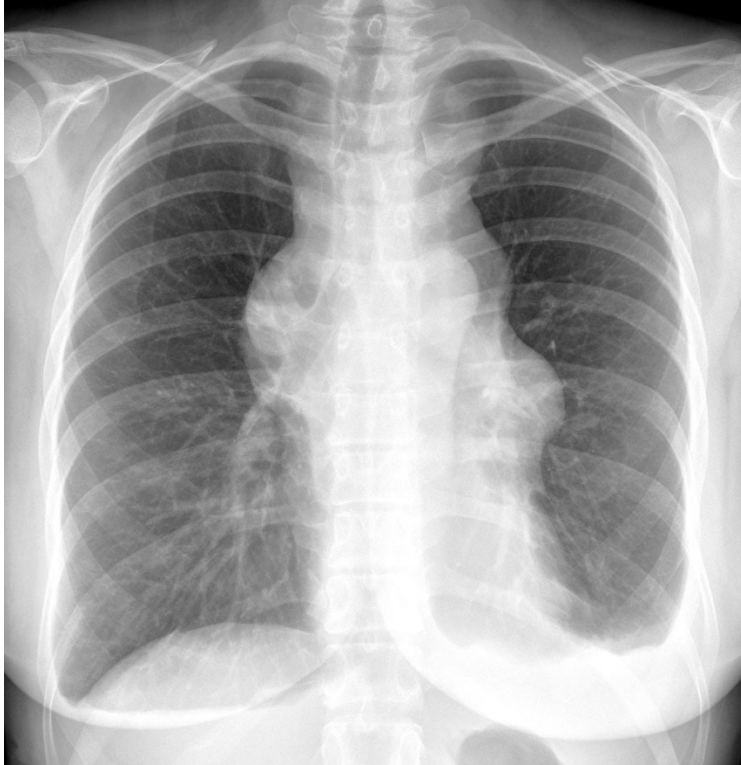
- The candidate should describe that there is intra-articular contrast extending through a large full-thickness defect of the rotator cuff into the sub-acromial/sub-deltoid bursa, with significant tendon retraction.
- This would be consistent with a recurrent full thickness rotator cuff tendon tear, and that orthopedic surgery should be consulted regarding management.
- The examiner may ask which tendon is torn. In this case the defect on these select images is in the supraspinatus, although the other tendons are not well seen or included on these images.
- Additional discussion could focus on technical aspects of MR arthrography. The candidate should be prepared to describe the preparation of the gadolinium concoction, what gauge/length (approximate) needle they would use, the approach, and how much fluid they would typically inject (the examiners realize that there may be several different ways of performing arthrograms, depending upon institutional preference).

CARDIOTHORACIC

CASE 1: Hodgkin Lymphoma

Clinical history: Unexplained weight loss

Segment 1: PA Radiograph



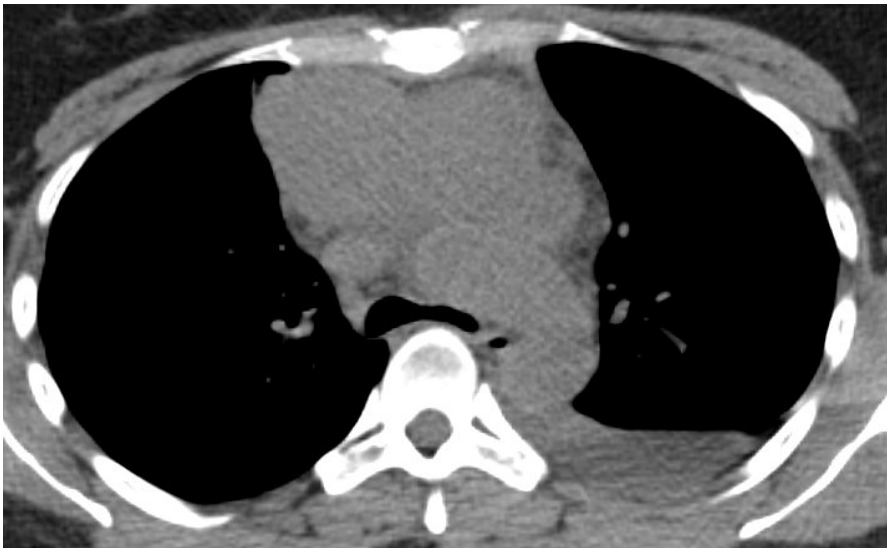
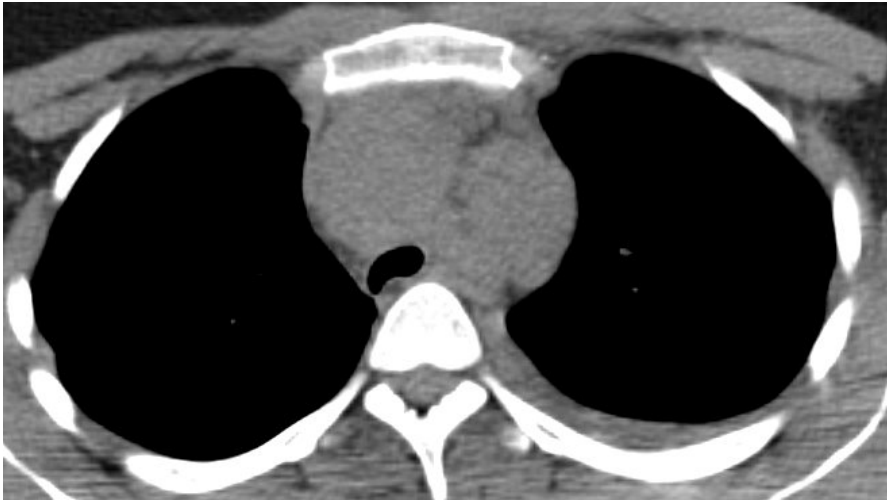
- Candidate describes a large lobulated mediastinal mass which fails to silhouette the hilar structures or the aortic arch indicating either anterior (prevascular) or posterior (paravertebral) compartment location.
- Candidate asks for lateral view to assist in finding localization.

Segment 2: Lateral Radiograph



- Candidate recognizes increased density in the retrosternal space and confirms anterior mediastinal location.
- Candidate provides anterior mediastinal mass differential diagnosis including lymphoma and thymoma.
- Recommends CT chest examination.

Segment 3: Chest CT



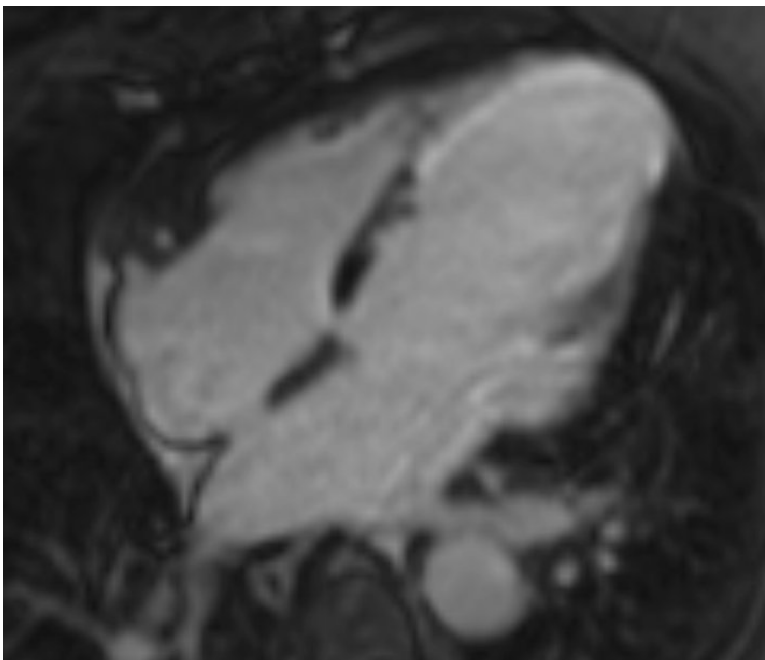
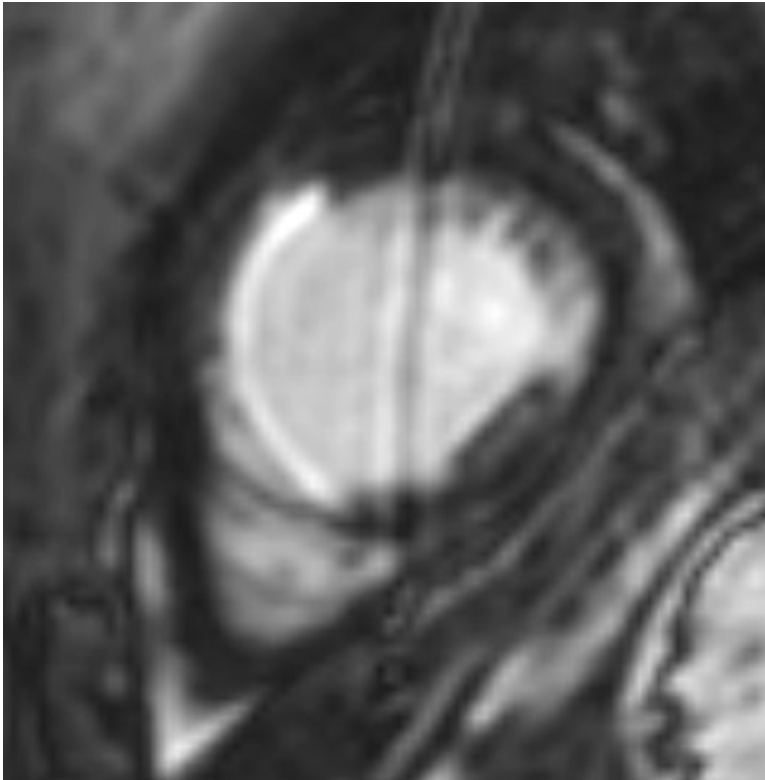


- Candidate describes multiple lobulated masses in the anterior mediastinum and refines differential diagnosis to favor lymphoma.
- Recommends biopsy and describes image guided approach.

CASE 2: Myocardial Infarction

Clinical history: Non-specific chest pain

Segment 1: Short Axis and 4 Chamber long axis late gadolinium enhanced MR images



SAX and 4CH Late gadolinium enhancement

- Candidate describes transmural enhancement of the midventricular to apical septal segments extending to the include the left ventricular apex.
- Candidate correctly identifies the finding to represent a left anterior descending territory myocardial infarction and categorizes the infarct as non-viable indicating conservative management.

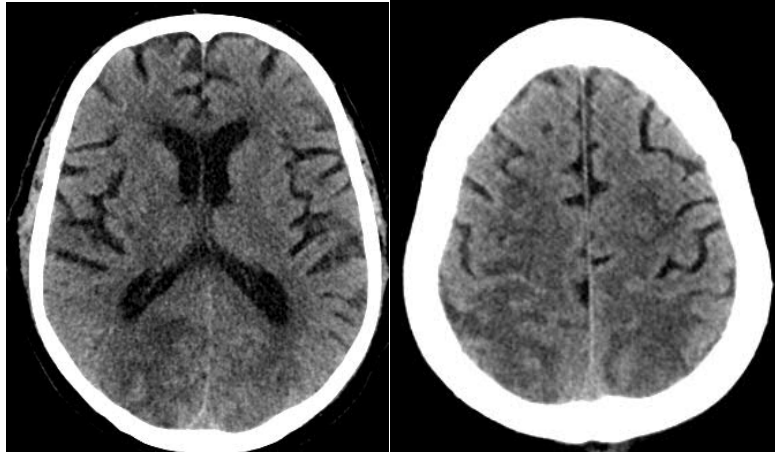
Neuroradiology

CASE 1: Posterior Reversible Encephalopathy (PRES)

Clinical history: Severe headache

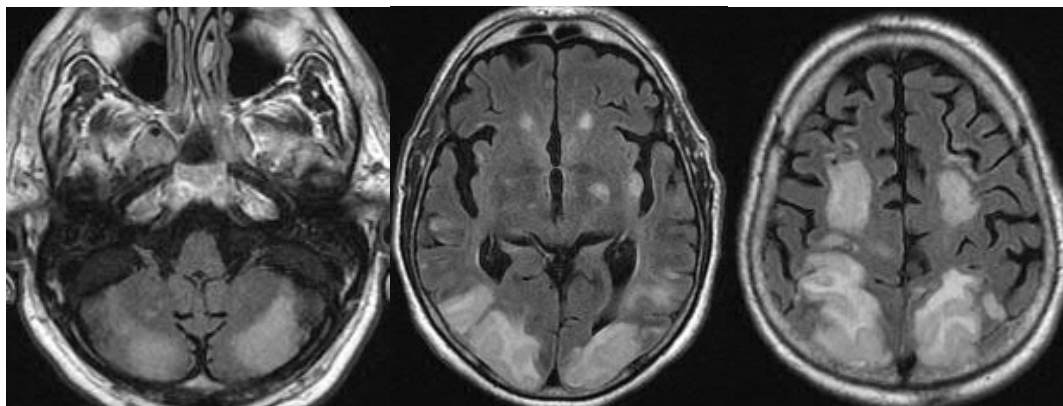
Segment 1: Noncontrast Head CT Exam

Axial CT images

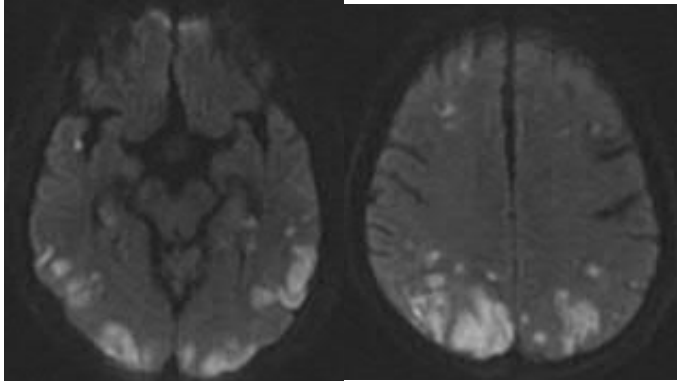


- Candidate notes low density changes in cortex and white matter both cerebral hemispheres with sulcal effacement especially posteriorly without any hemorrhage.
- Discusses differential diagnosis for diffuse low-density changes including multiple infarcts especially from embolic sources, watershed infarcts, reversible vasoconstriction syndrome (RCVS), encephalitis, vasculitis, PRES (posterior reversible encephalopathy syndrome), unusual head trauma, or possibly hypoxia. Due to the imaging pattern candidate indicates that MS or PML are not likely. A superior candidate may note that the pattern is symmetric with a posterior predilection and favor PRES.
- Candidate should ask for an MRI to clarify and narrow their differential diagnosis.

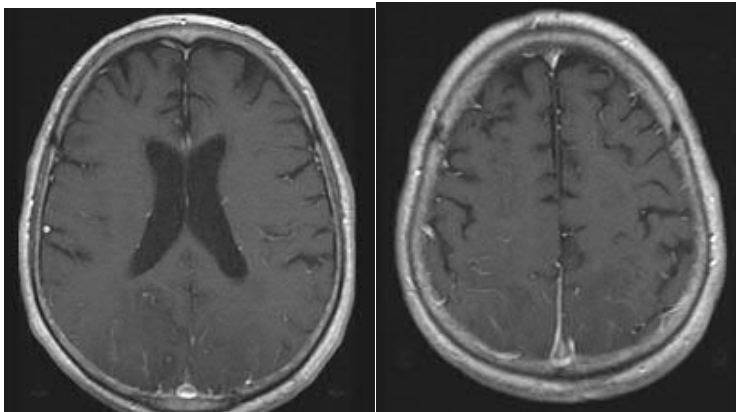
Segment 2: Head MRI Exam



Axial FLAIR images



Axial DWI



Axial T1 post gadolinium

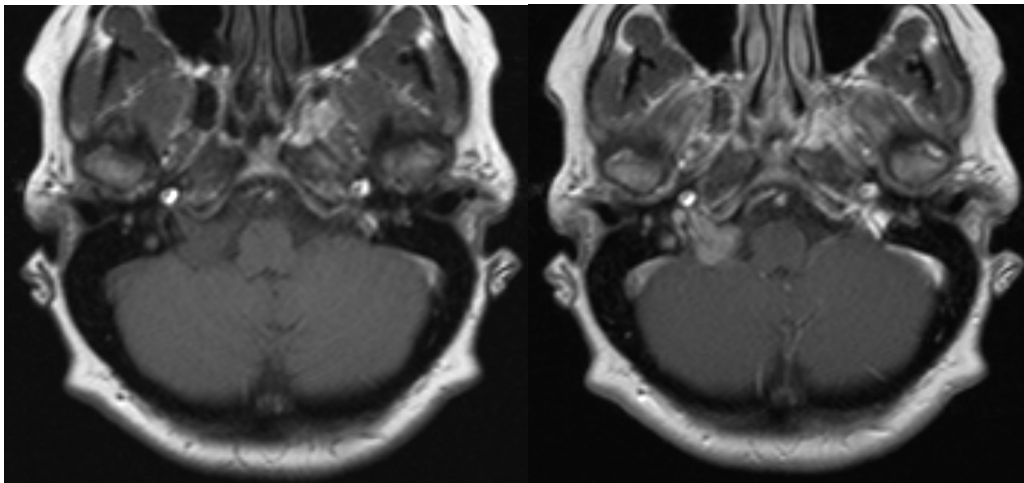
- Candidate recognizes that the pattern is clearly symmetric and involves both cerebellar hemispheres with restricted diffusion and subtle enhancement in the sulci.
- Candidate narrows differential diagnosis and recognizes that severe PRES can have restricted diffusion and subtle enhancement in the sulci. Again, notes that due to the pattern MS or PML are unlikely. The candidate can explain why the other previously noted diagnoses are less likely. Candidate favors PRES and asks for additional history such as hypertensive crisis, eclampsia, renal disease, or various medications such as cyclosporine or tacrolimus to confirm the diagnosis of PRES. They should not mention any type of neoplasm or infection.

- The candidate should not suggest the need for an MRA, CTA, catheter angiogram or brain biopsy.

CASE 2: Jugular foramen schwannoma

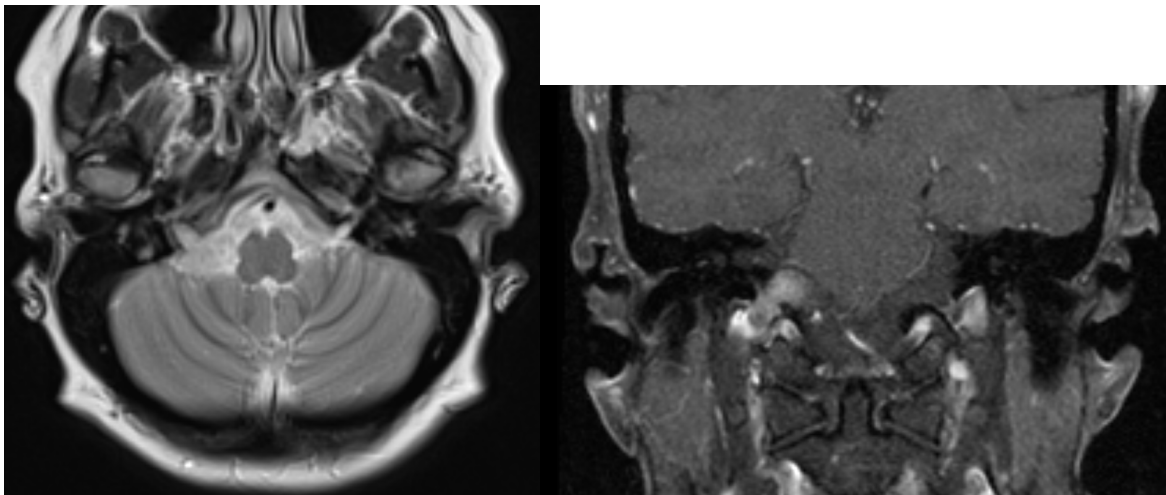
Clinical history: New hearing loss

Segment 1: MRI Brain



Ax T1 Precontrast

Ax T1 Postcontrast



Ax T2

Cor T1 FS Postcontrast

- Candidate recognizes a dumbbell-shaped enhancing mass in the right jugular foramen which is T2 hyperintense.
- Provides a differential diagnosis of schwannoma, meningioma, paraganglioma (glomus jugulare), metastasis, or lymphoma. The lack of salt and pepper appearance signifying internal microhemorrhages makes paraganglioma less likely. The lack of a dural tail makes meningioma less likely. Schwannoma would be most likely with these signal characteristics and dumbbell shape.
- The candidate may offer that CT imaging of the skull base may demonstrate characteristic bone changes which accompany each of the three most common entities.
- Management would be guided by clinical symptoms and may include radiosurgery or neurosurgical resection.