Radiologic Evaluation of painful shoulder

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Suspected instability and labral tear

• Subacute shoulder pain in patients under 35 years of age is often related to sports injuries.

• the most common injuries :
  ➢ posterosuperior labrum
  ➢ supraspinatus / infraspinatus / subscapularis tendon
  ➢ humeral head and glenoid cavity
  ➢ acromioclavicular joint
  ➢ anteroinferior capsulolabral complex
  ➢ biceps tendon
Radiography

- initial imaging test
- humeral and glenoid fractures
- Hill-Sachs
- Bankart lesions
Magnetic resonance arthrography

- method of choice for imaging the labrocapsular structures
- the most accurate imaging modality for sports injuries
- For evaluation of anterior shoulder instability, **MDCT arthrography** has been shown to be more accurate than MR arthrography
- Evaluates the dynamic stabilizers
- Evaluates Static stabilizers
- **MR arthrography** for detection of labral tears: (Sensitivity 88 to 100) and (specificity 88 to 96)
Magnetic resonance arthrography

• The use of abduction and external rotation (ABER) technique increases the sensitivity for labral tears to close to 100 percent.

• **MR arthrography with ABER**: highest sensitivity and specificity for all lesions with the exception of bone sclerosis and enthesophytes.

• **MR arthrography**: indicated in all suspected lesions of the rotator cuff and glenoid labrum in athletes.
Magnetic resonance imaging

- With high field or high resolution and appropriate expertise, MRI is a good alternative to MR arthrography.
- MRI demonstrates bony and soft tissue injuries, including muscle, tendon, and labral tears.
- A meta-analysis of MRI for detection of glenoid labral injury reported sensitivity of 76% and specificity of 87%.
- Evaluation of the capsular structures is limited.
Computed tomography arthrography

• accurate in delineating
  ➢ anatomic derangement
  ➢ glenoid labrum
  ➢ Evaluation of soft tissues is limited
• usually performed only when MR arthrography is contraindicated
• Sensitivity (73 and 76) and specificity (92%) of CT arthrography for labral tears
Adhesive capsulitis

• Diagnosis is based mainly on clinical findings.
• Imaging may be used to exclude intraarticular or rotator cuff abnormalities.
• to guide therapeutic injections.
• Radiography: limited use and is nonspecific.
• Ultrasound: thickening of the coracohumeral ligament and rotator interval synovitis.
• it is not routinely performed.

• Conventional arthrography:
  • is the procedure of choice for the diagnosis and treatment.
• MRI with intravenous contrast
  ➢ signal and thickness abnormalities of the shoulder joint capsule and synovial membrane and thickening of the glenohumeral ligaments.
  ➢ Obliteration of the rotator interval fat pad is characteristic.
osteoarthritis

• **Radiography**:  
  - joint space narrowing  
  - hypertrophic bone formation (osteophytes)  
  - subchondral sclerosis  
  - subarticular cysts
Rheumatoid arthritis

• "high-riding" humeral head.

• pseudogout and chronic rotator cuff tear

• The acromioclavicular joint: erosive change of the distal clavicle

• Ultrasonography:
  • the presence of an effusion in the subacromial or subdeltoid bursa and/or the glenohumeral joint

• Tenosynovitis

• synovial proliferation

• bone erosion
Septic arthritis

- **Radiography**:
  - moderate to large joint effusion in the initial phases (inferior displacement of the humeral head)
  - joint space narrowing and erosive changes
- **Ultrasound arthrocentesis**:
  - Shoulder joint aspiration is the procedure of choice.
- **MRI**:
  - highly sensitive but is not specific for the diagnosis of a septic joint
  - combination of bone erosions and bone marrow edema on MRI is highly suggestive
- **Diffusion-weighted imaging (DWI)**: differentiating effusion due to inflammation versus infectious arthritis
  - distinguishing reactive bone edema from osteomyelitis.
Avascular necrosis of bone

• **Radiography**:
  • is not sensitive in the early stages
  • Sclerosis, crescent sign, or humeral head collapse may be visible later

• **MRI**: the most sensitive and specific modality for earliest changes

• **Radionuclide bone scan**: technetium-99m bone scan of the shoulder is not as sensitive as MRI
  • abnormal uptake appears earlier than radiographic changes
Postoperative shoulder pain

• Radiography:
  - initial imaging modality
  - Radiography can confirm the correct position of metallic fixation devices
  - osseous tunnels
  - detect recurrent humeral head dislocation/subluxation
  - tumor recurrence
Postoperative shoulder pain

MRI:
- symptoms of persistent impingement
- suspected reinjury of the rotator cuff and biceps tendon

MR arthrography:
- evaluation of labral pathology
- optimal delineation of the rotator cuff
- capsulolabral structures
- tendon tears

MR arthrography is more accurate than MRI in the detection of partial rotator cuff retears
Shoulder arthroplasty

- **Radiography**:
  - initial modality for evaluation of arthroplasty
  - demonstrates complications of the prosthesis
  - fracture
  - subluxation or dislocation
  - glenoid or humeral component loosening
  - Periprosthetic bone resorption due to particle disease
  - evaluates the integrity of the bone surrounding the prosthesis.

- **Ultrasound**:
  - Patients with shoulder pain after arthroplasty and negative radiographs
  - very accurate in the evaluation of the rotator cuff in patients who have undergone arthroplasty
Shoulder arthroplasty

• **Computed tomography**: 
  • valuable for evaluation of soft tissue or bony abnormalities
    - abnormal alignment
    - version alteration
    - articular surface or bone stock deficiency

• **MDCT arthrography**: 
  - assessment of the prosthetic and periprosthetic abnormalities
  - rotator cuff and labral-capsular abnormalities
  - Joint fluid can be aspirated during the intraarticular administration of contrast
Shoulder arthroplasty

• MRI:
  • Advances in MAR techniques have led to an increased use of MRI in the evaluation of the painful failed shoulder arthroplasty

➤ integrity of the implant and the supporting soft-tissue envelope
➤ component loosening and implant failure
➤ rotator cuff and deltoid integrity
➤ infection
➤ subtle fracture
➤ nerve pathology.
- **Radionuclide:**
  - technetium-99 bone scan with (SPECT) : choice for suspected joint replacement infection
  - sensitive for identifying the failed joint replacement
  - Combined leukocyte with bone marrow scintigraphy has an accuracy of approximately 90 percent and is the imaging procedure of **choice** for diagnosing **prosthetic joint infection**