

# AMSER Case of the Month

## January 2019

55 yo female presenting with 1 year of shoulder pain without prior trauma

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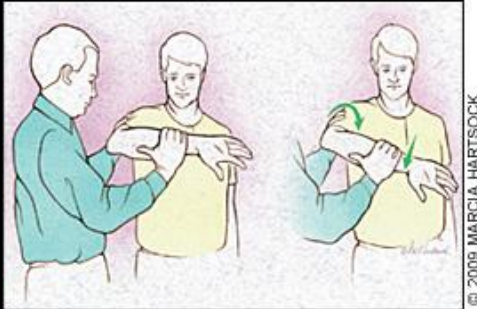


# Patient Presentation

- HPI: 55yo female presents with 1 year of pain in the posterior aspect of her right shoulder and goes down to her posterior arm. She has been very active in the past, but denies trauma
- PMH: None
- PSH: None

# Patient physical exam

- Pertinent physical exam: Positive Hawkins test



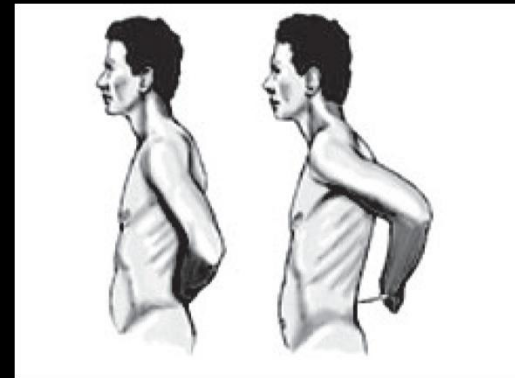
Hawkins



Belly off



Neer



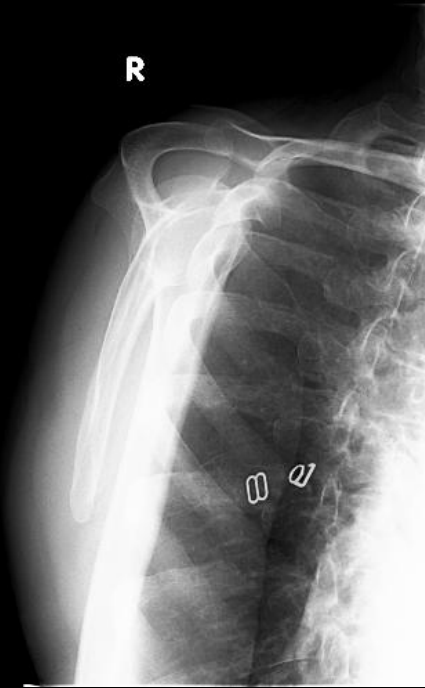
Lift off

What imaging should we order?

# ACR Appropriateness Criteria: Atraumatic shoulder pain—Initial

<b>Variant 1: Atraumatic shoulder pain. Initial imaging.</b>		
<b>Procedure</b>	<b>Appropriateness Category</b>	<b>Relative Radiation Level</b>
Radiography shoulder	Usually Appropriate	☼
CT arthrography shoulder	Usually Not Appropriate	☼☼☼☼
CT shoulder with IV contrast	Usually Not Appropriate	☼☼☼
CT shoulder without and with IV contrast	Usually Not Appropriate	☼☼☼
CT shoulder without IV contrast	Usually Not Appropriate	☼☼☼
MR arthrography shoulder	Usually Not Appropriate	○
MRI shoulder without and with IV contrast	Usually Not Appropriate	○
MRI shoulder without IV contrast	Usually Not Appropriate	○
US shoulder	Usually Not Appropriate	○
X-ray arthrography shoulder	Usually Not Appropriate	☼

# Shoulder x-ray (Unmarked)



# Shoulder x-ray Findings

- Normal shoulder x-ray

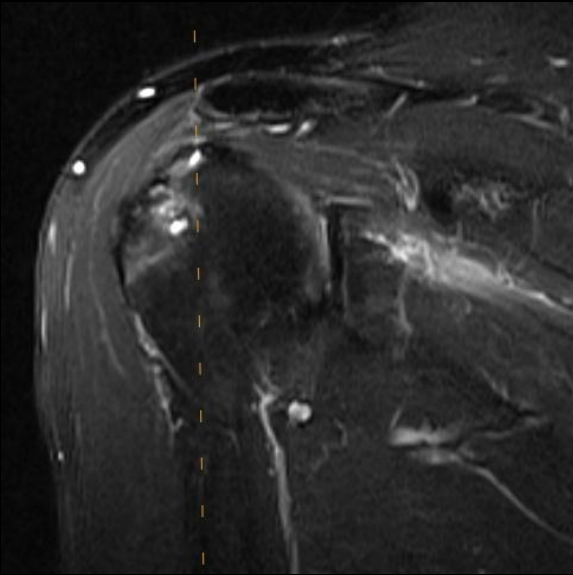
Further imaging?

# ACR Appropriateness Criteria: Atraumatic shoulder pain—Negative XR

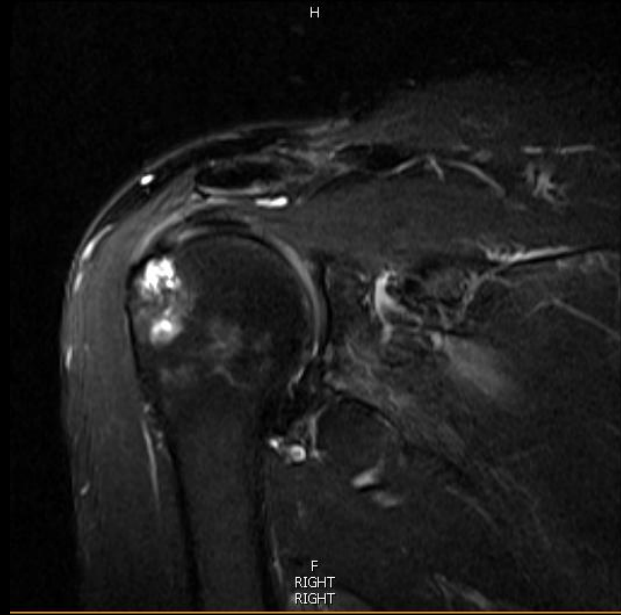
<b>Variant 2:</b> Atraumatic shoulder pain. Suspect rotator cuff disorders (tendinosis, tear, calcific tendinitis). Initial radiographs normal or inconclusive. Next imaging study.		
Procedure	Appropriateness Category	Relative Radiation Level
MRI shoulder without IV contrast	Usually Appropriate	○
US shoulder	Usually Appropriate	○
MR arthrography shoulder	May Be Appropriate	○
CT arthrography shoulder	May Be Appropriate	☼ ☼ ☼ ☼
Radiography shoulder additional views	Usually Not Appropriate	☼
CT shoulder with IV contrast	Usually Not Appropriate	☼ ☼ ☼
CT shoulder without and with IV contrast	Usually Not Appropriate	☼ ☼ ☼
CT shoulder without IV contrast	Usually Not Appropriate	☼ ☼ ☼
MRI shoulder without and with IV contrast	Usually Not Appropriate	○
X-ray arthrography shoulder	Usually Not Appropriate	☼

- Most orthopedic surgeons are more comfortable with MRI
- MR arthrography can be considered in younger patients (<40) whom you suspect labral pathology and would potentially undergo operative repair

# Shoulder MRI (Unmarked)



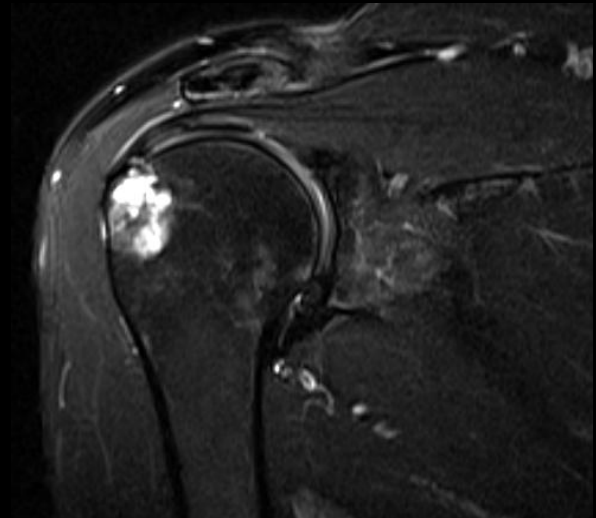
Fat Sat T2 Coronal



Fat Sat T2 Coronal



Fat Sat T2 Sagittal



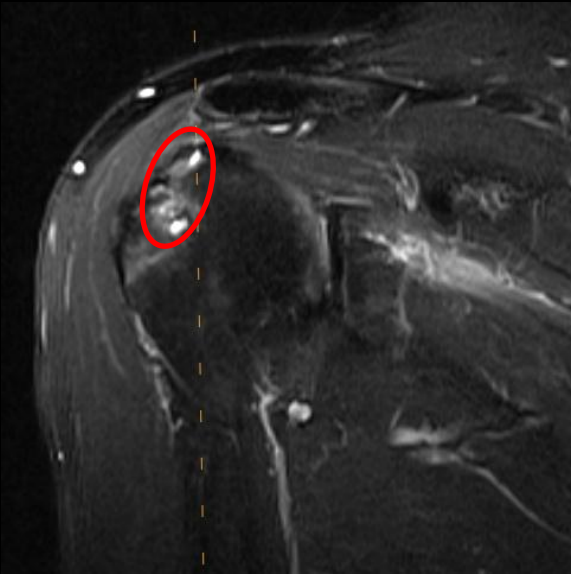
Fat Sat T2 Coronal



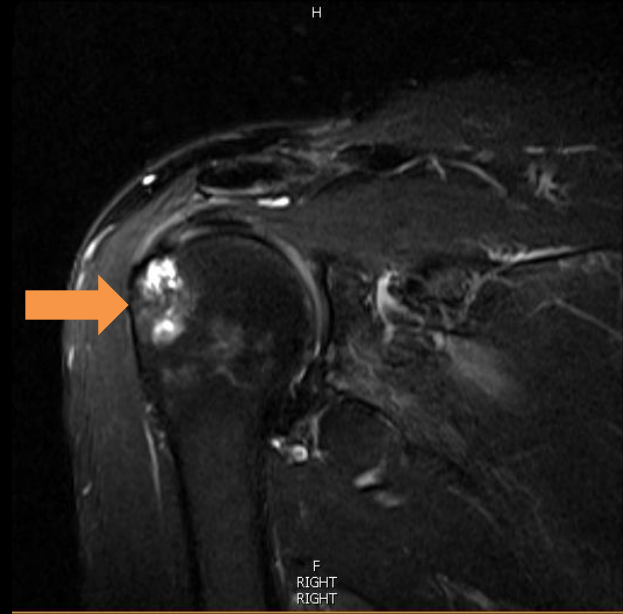
# Shoulder MRI Findings

- Articular sided partial tear of the central rotator cuff tendons (○)
  - Indicated by fluid equivalent signal filling the site of the tear
- Subcortical cysts in the humeral head (➡), secondary to chronic rotator cuff tendinopathy.
- Tendinosis of the supraspinatus tendon (○)

# Shoulder MRI (Marked)



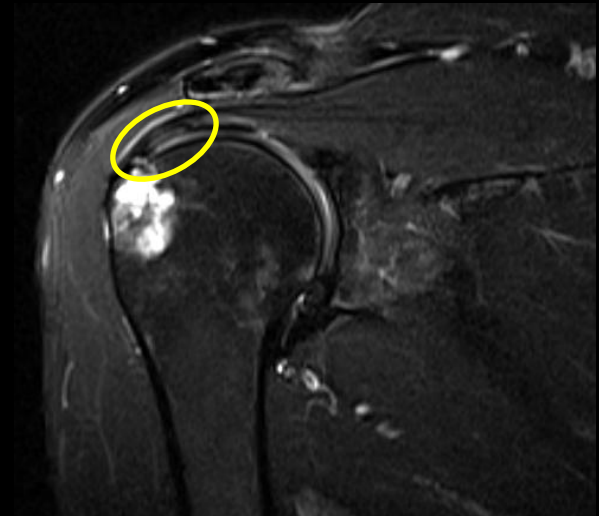
Fat Sat T2 Coronal



Fat Sat T2 Coronal



Fat Sat T2 Sagittal



Fat Sat T2 Coronal

# Final diagnosis

- Intermediate grade articular sided partial thickness tear of the central rotator cuff tendon with fluid tracking along the anterior surface of the infraspinatus muscle.

# Rotator Cuff Tears

- Mechanisms of tear
  - Chronic degeneration (Most common)
  - Chronic impingement
  - Acute avulsions (Often involve subscapularis)
- Risk factors
  - Age
  - Smoking
  - Hypercholesterolemia
- High prevalence in older population
  - >60 yo: 28% with full thickness tear
  - >70yo: 65% with full thickness tear

# Rotator Cuff Tears

- Anatomy
  - Cuff has 5 histologic areas
    - Thinner, less vascularized areas are on the articular side, see more articular sided tears
- Function
  - Provides dynamic stability for the shoulder by balancing opposing forces
    - SIT balance deltoid
    - Subscapularis balances SIT

# Describing a tear on imaging

- Tendon
- Size
- Location
  - Articular side
  - Interstitial
  - Bursal side
- Thickness
  - Partial thickness
    - Low grade → <50%
    - High grade → >50%
    - Intermediate grade → Term not always used, but indicates ~50%
  - Full thickness
- Retraction distance (If a full thickness tear)

# Goutallier Classification

- Purpose
  - Acts as a prognostic tool to anticipate benefits on various interventions
    - More predictive than tear size or number of recurrences
- Classification method
  - 0 → Normal/No fat
  - 1 → Fatty streaks
  - 2 → <50% fat
  - 3 → About 50% fat
  - 4 → >50% fat
- Interpretation
  - Higher grade correlates with less likelihood of successful operation

# Resources

- Jeremy S. Somerson MD, Jason E. Hsu MD, Jacob D. Gorbaty BA, Albert O. Gee MD. Classifications in Brief: Goutallier Classification of Fatty Infiltration of the Rotator Cuff Musculature. *Clin Orthop Relat Res* (2016) 474:1328–1332
- Yoav Morag, MD, Jon A. Jacobson, MD, Bruce Miller, MD, Michel De Maeseneer, MD, PhD, Gandikota Girish, MD, David Jamadar, MD. MR Imaging of Rotator Cuff Injury: What the Clinician Needs to Know. *RadioGraphics* 2006; 26:1045–1065
- ACR Appropriateness Criteria: Shoulder Pain – Atraumatic. <https://acsearch.acr.org/list>
- Rotator Cuff Tears. *OrthoBullets*. <https://www.orthobullets.com/shoulder-and-elbow/3043/rotator-cuff-tears>
- Greene W, Griffin LY, eds. Special tests for the shoulder. In: *Essentials of Musculoskeletal Care*. 3rd ed. Rosemont, Ill.: American Academy of Orthopaedic Surgeons; 2005:154–155.