AMSER Case of the Month July 2024

30 year old male with right upper extremity and right chest pain

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Patient Presentation

HPI: 30-year-old male with no past significant medical history presents with right anterior lateral chest pain. He reports that he was bench pressing when he felt a pop in his pectoral muscle. He subsequently developed swelling, bruising and a feeling of tightness in the same area. The pain comes and go. He endorses weakness. He denies night pain. He reports taking Advil PRN for pain relief.

Patient Presentation (Continued)

- Past Medical History: None
- Past Surgical History: None
- Social history: Denies tobacco, alcohol, or illicit drug use
- Daily Medications: Advil PRN for pain
- Vitals: Stable, unremarkable
- Pertinent Labs: None

Physical Exam

General: Well-developed, well-nourished, no acute distress

Right Upper Extremity and Right Chest:

- Ecchymosis is present to the medial upper arm and chest
- Tender to palpation at the pectoralis major insertion on the humerus
- Tender to palpation along the axillary fold
- Positive Fallen Nipple Sign
- Nipple Asymmetry is present
- Asymmetric pectoral muscles with hands on the hips and flexion
- Weakness and pain with shoulder adduction
- Significant pain with shoulder internal rotation

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1: **Traumatic shoulder pain. Any etiology. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
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	☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
MR arthrography shoulder	Usually Not Appropriate	O
MRI shoulder without and with IV contrast	Usually Not Appropriate	O
MRI shoulder without IV contrast	Usually Not Appropriate	O
Bone scan shoulder	Usually Not Appropriate	☢☢☢
US shoulder	Usually Not Appropriate	O

Ordered by Attending Physician at initial Clinic visit

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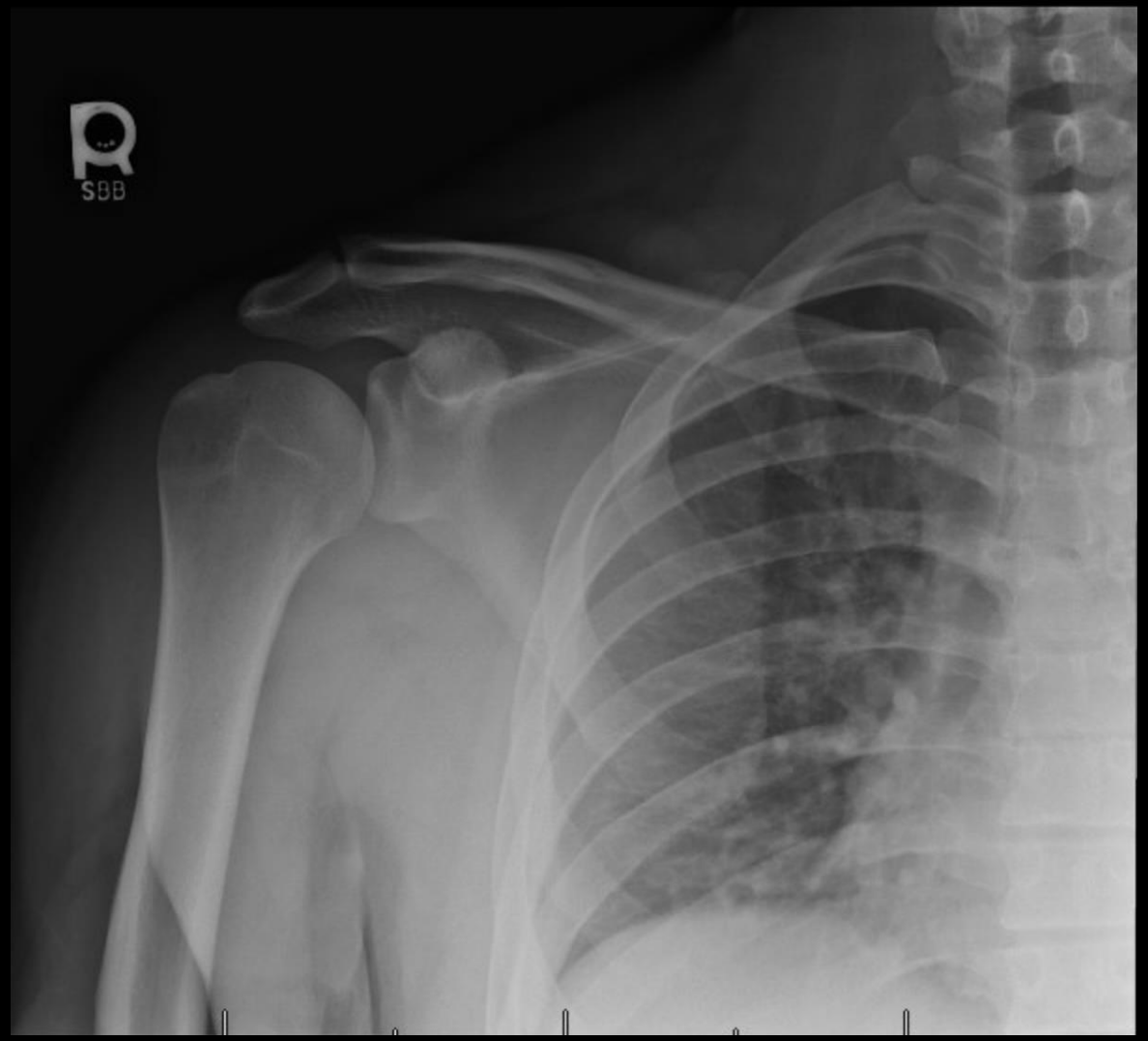
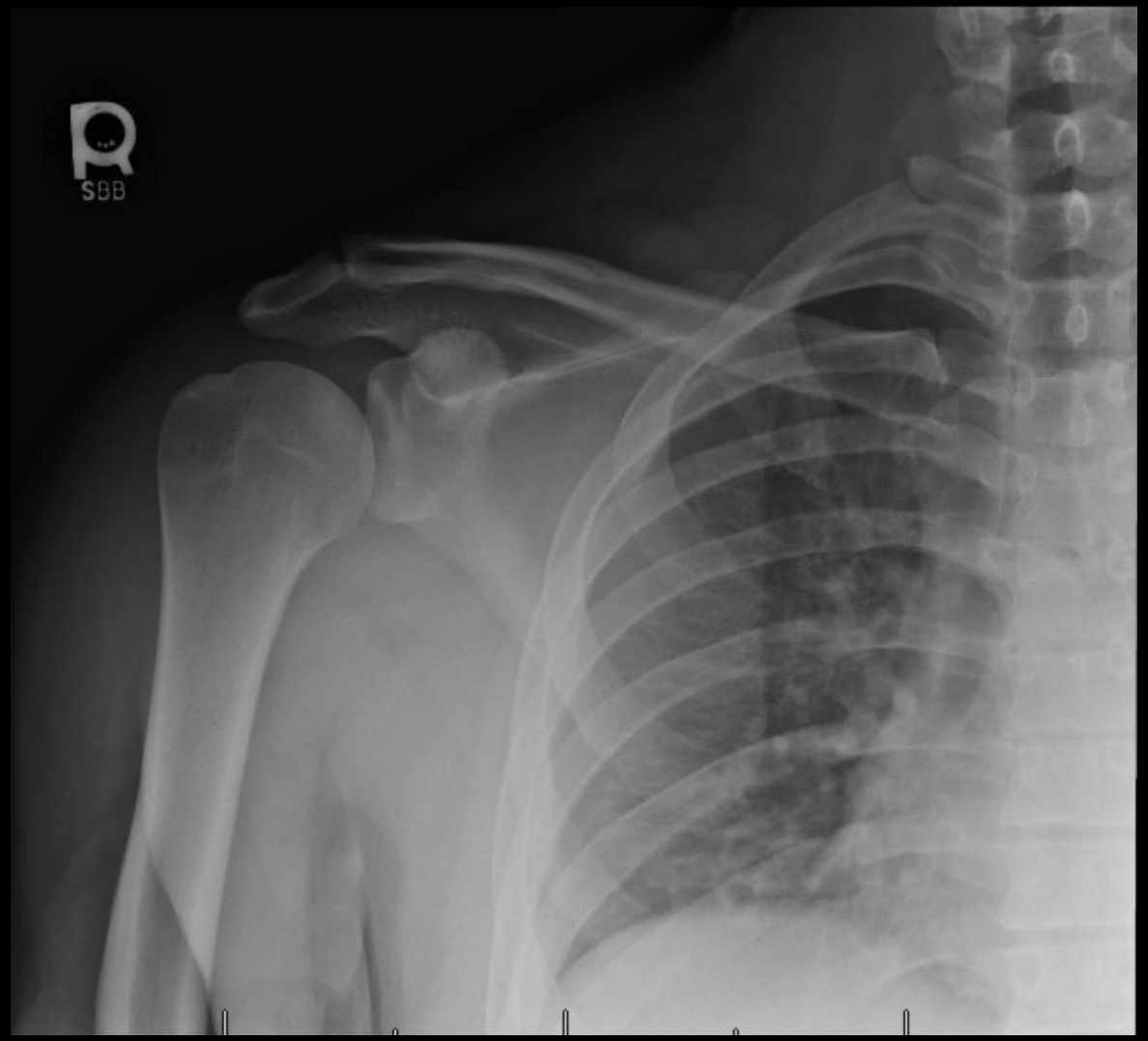
Findings (unlabeled)



AP External rotation
Shoulder

Findings (labeled)



No acute fracture
or dislocation

What Imaging Should We Order Next?

Select the applicable ACR Appropriateness Criteria

Variant 2: **Traumatic shoulder pain. Nonlocalized shoulder pain. Negative radiographs. Next imaging study.**

Procedure	Appropriateness Category	Relative Radiation Level
MRI shoulder without IV contrast	Usually Appropriate	O
CT arthrography shoulder	May Be Appropriate	☢☢☢☢
MR arthrography shoulder	May Be Appropriate	O
US shoulder	May Be Appropriate (Disagreement)	O
CT shoulder without IV contrast	Usually Not Appropriate	☢☢☢
CT shoulder with IV contrast	Usually Not Appropriate	☢☢☢
CT shoulder without and with IV contrast	Usually Not Appropriate	☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
MRI shoulder without and with IV contrast	Usually Not Appropriate	O
Bone scan shoulder	Usually Not Appropriate	☢☢☢

Ordered by Attending Physician

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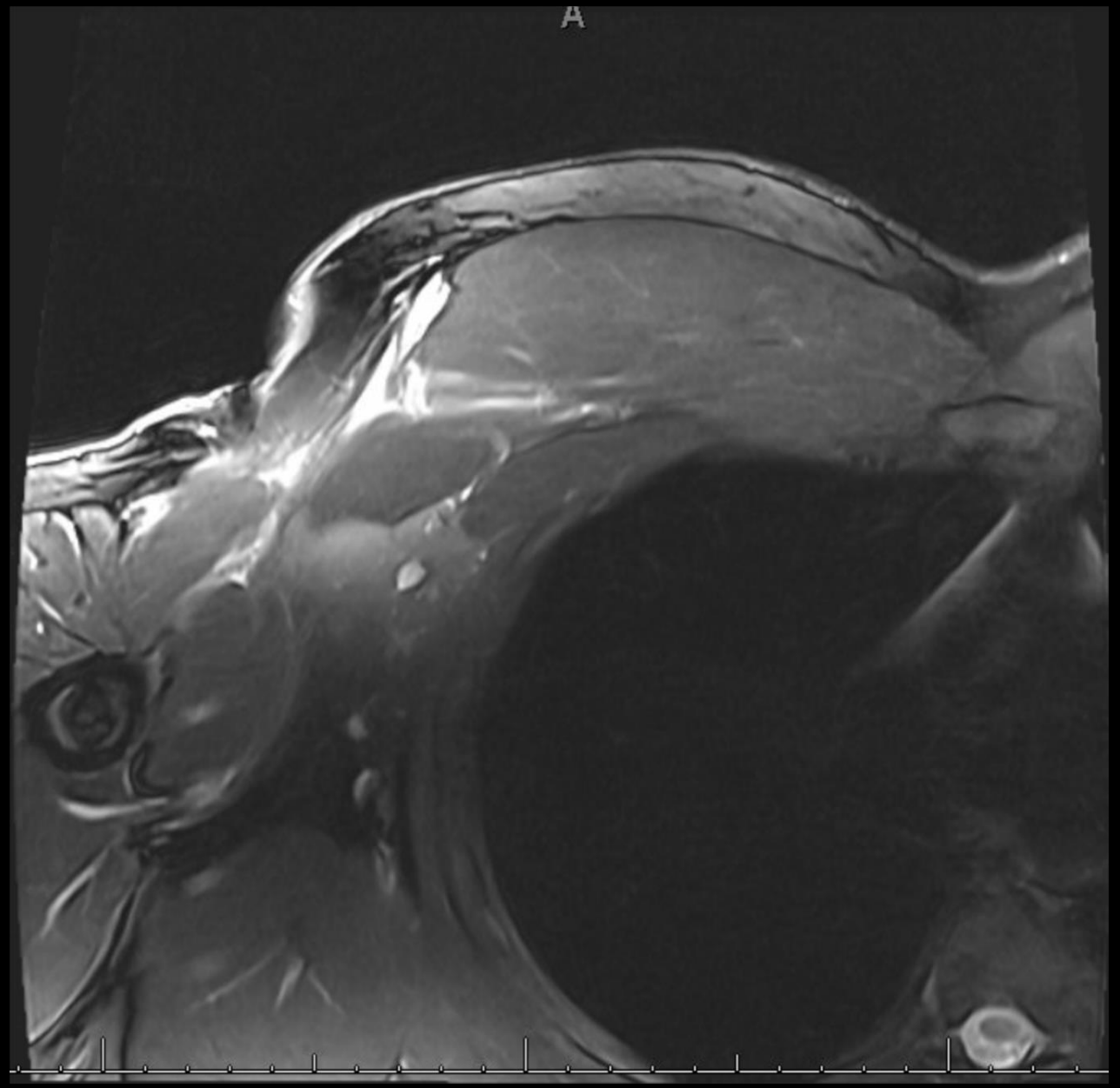
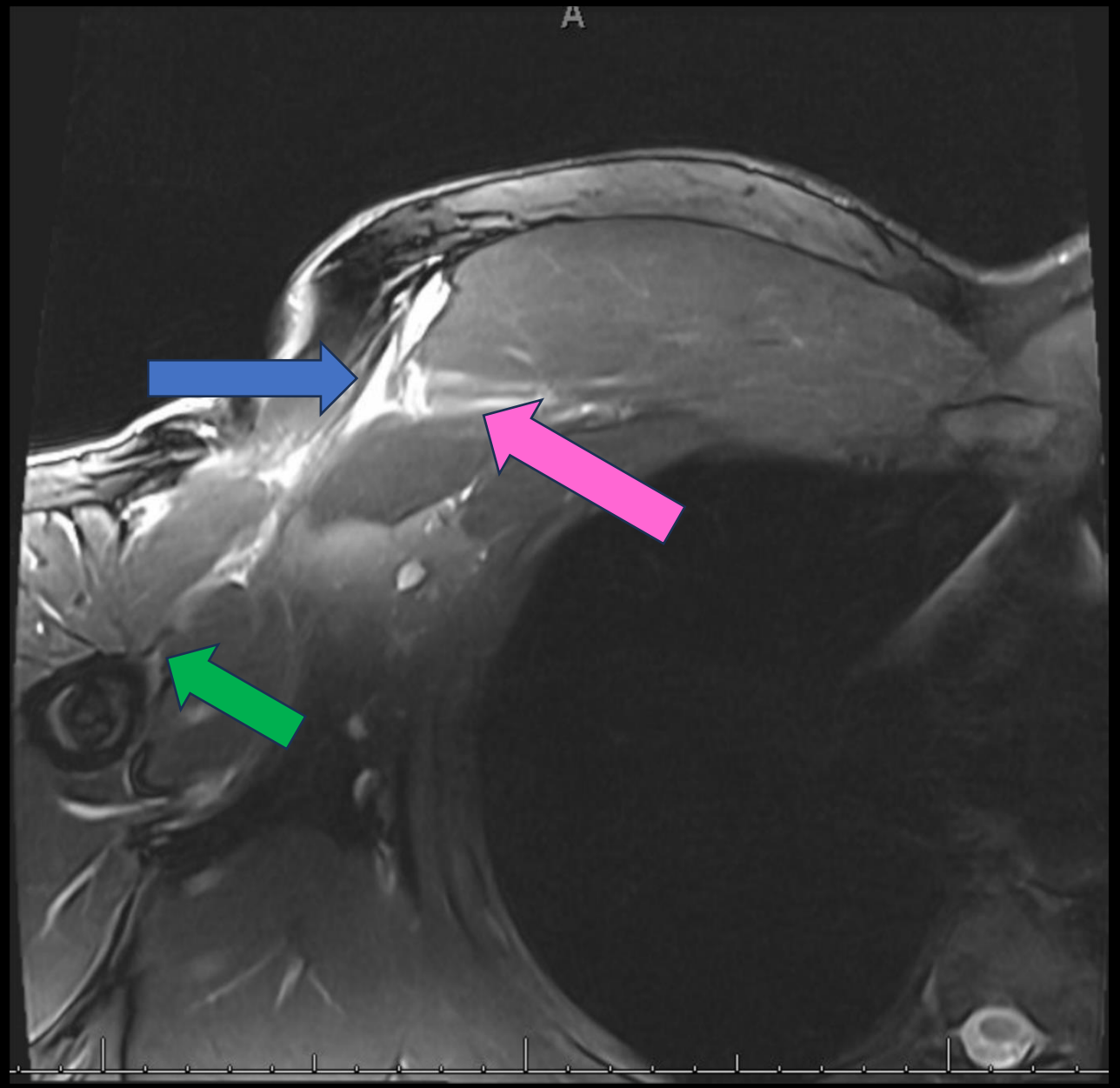
Findings: (unlabeled)



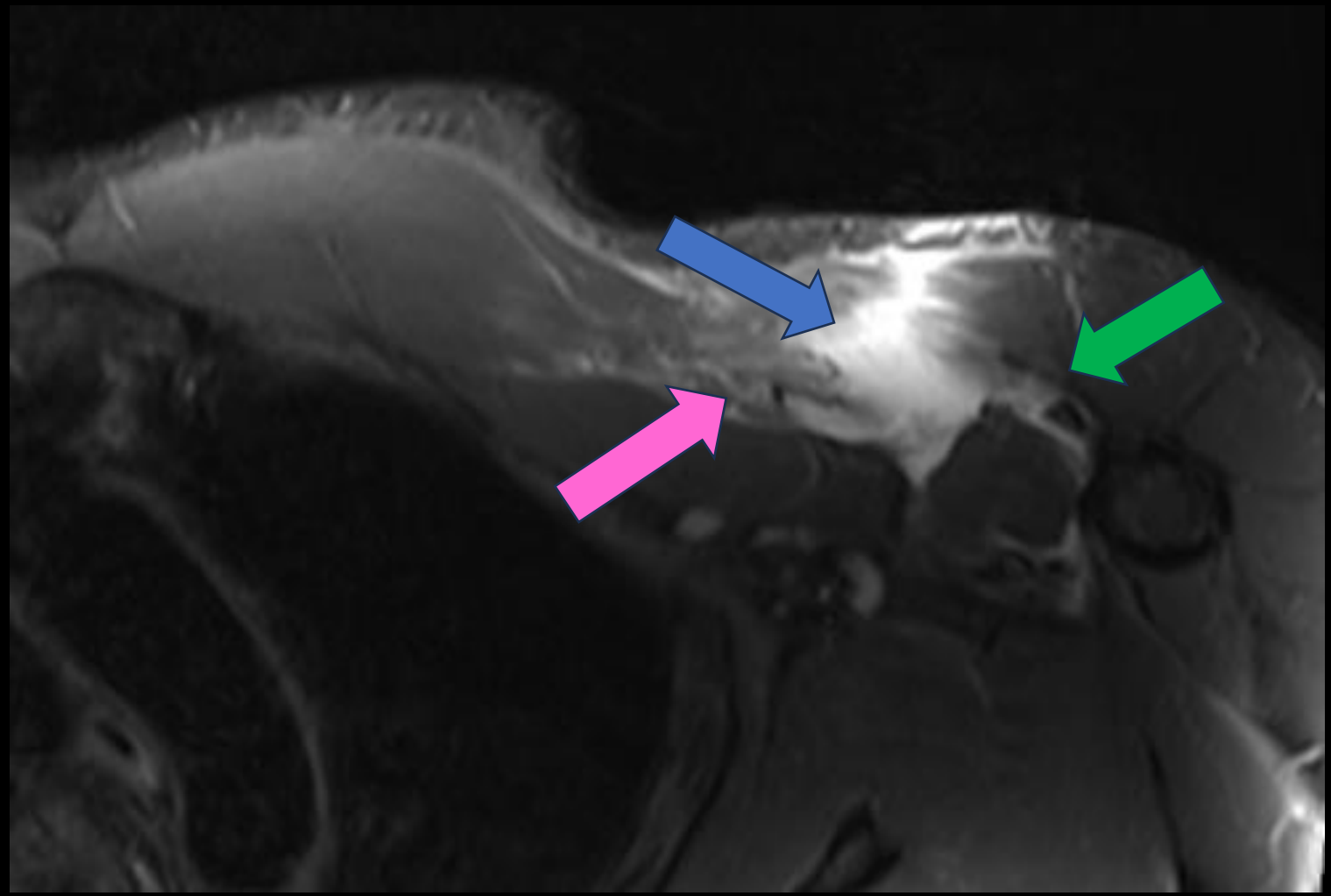
Axial T2 Fat Sat

Findings: (labeled)



- High grade, near-complete myotendinous tear of the pectoralis major (blue).
- Persistent attachment of the pectoralis tendon to the proximal humerus (green).
- Intramuscular edema extending into the muscle fibers (pink).

Findings: (Companion Case - labeled)



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Follow-up/Surgical Findings

- Patient elected to proceed with Right Pectoralis Major Tendon Repair due to factors including his age and desire to return to heavy level activity/weight-lifting.
- Intra-operative findings confirmed a right pectoralis major sternal head rupture with tendon retraction

Final Dx:

Right Pectoralis Major Head Rupture with Retraction of the Right Pectoralis Major Tendon

Case Discussion

- Pectoralis Major tendon ruptures are an increasingly common injury that affects mostly young, active male patients. Often this injury occurs with eccentric contraction, as often performed during a bench press exercise. Less commonly, they occur as a result of direct trauma.
- The use of anabolic steroids is thought to be a risk factor for pectoralis major tears
- Diagnosis: History and Physical Exam
  - Patients often report a “pop” or tearing sensation at the index event. This is then usually followed by pain and weakness.
  - Subsequently, patients will develop ecchymosis of the chest wall/axilla/proximal upper extremity, pectoral asymmetry and localized swelling.
  - A ”dropped nipple sign”, or nipple asymmetry may be present
  - Visual deformities may be visualized and emphasized when patients are positioned with their shoulders abducted at 90 degrees and externally rotated
  - It is paramount to determine the chronicity of the tear, as more chronic tears may be more complex and require more extensive surgical repair.

Case Discussion

- Imaging
  - Plain radiographs of the Shoulder/Humerus can be utilized to identify concomitant fractures, dislocations, or avulsions
  - The use of ultrasound has grown in popularity but is limited in its utility due to its dependence on user proficiency and quality of images obtained
  - MRI remains the gold standard for definitive diagnosis

Case Discussion

- Treatment options consist of both non-operative and operative strategies
- Selection of a specific treatment option revolves around patient age and activity level
- Though operative repair is associated with better function, recovery of strength, corrected deformity, and increased satisfaction, it is not always warranted as the full functioning of the pectoralis major is not required for everyday life. Conservative treatment with range of motion movements that graduate into resistance exercises often restores full range of motion, though the deformity commonly persists.
- Surgical technique depends on the anatomy of the tear, tear chronicity, and surgeon preference
- Frequent complications include re-rupture (incidence reported between 2.9% and 5.4%) and persistent shoulder pain (incidence reported between 2.6% and 7.8%)

References:

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