The Evaluation and Management of Common Shoulder Disorders

Arun J. Ramappa, MD
Chief of Sports Medicine and Shoulder Surgery
Beth Israel Deaconess Medical Center
Team Physician, Boston Red Sox
Harvard Combined Orthopedic Residency Program
Conflict of Interest Disclosure

Arun J. Ramappa, MD

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- Major League Baseball (MLB)
- Arthrex, Naples, FL
- Ceterix Orthopaedics, Menlo Park, CA
- ConMed Linvatec, Largo, FL
- Smith & Nephew, Andover, MA
- Zimmer, Warsaw, IN
Goal: Simplify Evaluation of the Painful Shoulder

- Can be challenging
- Overlapping diagnoses
- Multiple complaints
  - Neck
  - Shoulder
  - Back
  - Arm
Shoulder vs Neck Pathology

- Very common to have neck pain with shoulder problems
- Cervical spine disease: often associated with symptoms below elbow
- PE of shoulder can exclude cervical disease
Shoulder Disorders: Overview

- Anatomy
  - Surface
  - Deep
- History
- Common Shoulder Disorders
  - Evaluation
  - Management
- Injections
Shoulder: Bony Anatomy

- Three major bones
  - Humerus
  - Clavicle
  - Scapula

- Four major joints:
  - Acromio-clavicular
  - Gleno-humeral
  - Scapulo-thoracic
  - Sterno-clavicular
Shoulder: Muscular Anatomy

- Nine major muscles
- Synchronous action results in shoulder motion
- Imbalance results in pain
Shoulder: Muscular Anatomy

- Supraspinatus coursing under acromion
- Infraspinatus
- Subscapularis
- Teres Minor
- Biceps tendon directly under supraspinatus
Shoulder: Rotator Cuff Anatomy

- Subscapularis
- **SUPRASPINATUS**
- Infraspinatus
- Teres Minor
Shoulder: History

- Age
- Hand dominance, occupation
- **Chief complaint:** pain, weakness, stiffness, or instability
- Location
- Onset
- Precipitants
- Prior treatment: meds, PT, injections
- Disability/Progression
- Neurologic complaints
Common Shoulder Disorders

- Rotator cuff impingement
- Rotator cuff tears
- Adhesive capsulitis
- Osteoarthritis
- AC Joint Disorders
- Calcific Tendonitis
Case 1

- 35 yo physician with shoulder pain
- No trauma
- Prompted ER visit
- Radiates down arm
- No complaints of weakness
Physical Examination

- Inspection
- Palpation
- Range of Motion
- Strength Testing
- Provoking Maneuvers
Shoulder: Exam - Inspection

- Atrophy
- Ecchymosis
- Deformity
- Swelling
Shoulder: Exam - Palpation

- Tenderness
  - Cervical Spine
  - AC joint
  - Greater tuberosity
  - Bicipital Groove

HS Gill et al, AJSM 2007
Shoulder: Exam - Range of Motion

- Always compare sides
- **Compare active vs passive motion**
- Forward flexion
- External rotation at side
- Internal rotation vertebral level
Physical Examination

- Inspection
- Palpation
- Range of Motion
- Strength Testing
- Provoking Maneuvers
Shoulder: Exam - Range of Motion

- **Forward flexion**
- **External rotation at side**
- **Internal rotation vertebral level**
Shoulder: Exam - Strength

- Always compare sides
- **Supraspinatus**: arm in plane of scapula, abducted 90 degrees
- External rotation at side
- Internal rotation
Shoulder: Exam - Impingement

- Neer sign:
  - Sensitivity: 85%
  - Specificity: 50%

- Painful arc of motion: forward elevation

- Compression of rotator cuff between underlying humerus and overlying acromion

*Park, et al, JBJS 2005*
Shoulder: Exam - Impingement

- Hawkins sign:
  - Sensitivity: 75%
  - Specificity: 45%

- Painful arc of motion:
  - forward elevation 90° + internal rotation

*Park, et al, JBJS 2005*
Neck: Exam

- Spurling’s maneuver
- Check strength of both extremities
- Assess sensation
- Assess for hyperreflexia
- Compare Sides!!!

Woodward and Best, AFP 2000
Case 1

- Exam: + Spurling’s maneuver
- Exam: - impingement signs
- Exam: Normal strength
- Diagnosis: Neck related NOT Shoulder
Case 2

- 45 yo male injured his shoulder while throwing football
- Feels a click
- Pain with sleeping
- Pain with reaching overhead
- Can’t play with kids
Case 2

- ROM is symmetric but FE above 120 degrees is painful
- Impingement signs are present
- Strength is normal
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Shoulder: Rotator Cuff Disease

- Subscapularis
- **SUPRASPINATUS**
- Infraspinatus
- Teres Minor
Rotator Cuff Disease: Impingement Syndrome

- Tendinosis/Bursitis at the Supraspinatus
- Under the Acromion
- History: Pain overhead, behind back, sleep
- Physical Findings:
  - Impingement Signs
  - No Weakness

Harrison and Flatlow, J Am Acad Orthop Surg 2011
Whittle and Buchbinder, Ann Intern Med 2015
Shoulder: Exam - Impingement

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Park, et al, JBJS 2005
Rotator Cuff Disease: Impingement Syndrome

- Rehabilitation
  - Strengthen Rotator Cuff and Scapular Stabilizers
  - Stretch Posterior Capsule
- Activity Modification
- NSAIDs
- Injections
  - Lidocaine + Cortisone

Harrison and Flatlow, J Am Acad Orthop Surg 2011
Rotator Cuff Disease: Impingement Syndrome

- Surgical Treatment – arthroscopic
- Surgery: RARE
- Bursectomy
- Acromioplasty

*Whittle and Buchbinder, Ann Intern Med 2015*
Case 2: Treatment

- NSAIDs
- PT with emphasis on scapular strength
- Steroid injection?
- Rotator cuff tear VERY UNLIKELY
Case 3

- 42 yo male falls onto his shoulder while snowboarding
- Difficulty raising arm
- XRays: No fracture
- Plan?
Case 3

- Inspection
  - No atrophy
  - No ecchymosis
  - No deformity
- ROM: Passive > active
- RC strength: Weak supraspinatus
Common Shoulder Disorders

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- **Rotator cuff tears**
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Rotator Cuff Tears

- Follow Impingement
- Begin Small
- **Progress**
Rotator Cuff Tears

• Follow Impingement

• Begin Small

• **Progress**

  – 174 Tears:

    • 61% of full thickness tears and 44% of partial thickness tears progress at median of 5 years

*Keener, et al, JBJS 2015*
Rotator Cuff Tears

- Follow Impingement
- Begin Small
- **Progress**
- Physical Findings:
  - Weakness
Normal Rotator Cuff
Supraspinatus Tendinosis
Full-Thickness Rotator Cuff Tear

- Tendon Edge
- Muscle Belly
Rotator Cuff Tears

• Not all tears require surgery (Esp Partial Tears)!
  - MRI study: 54% of asymptomatic cohort > 65 with cuff tear!
  - Assessment of functional goals/comorbid conditions ESSENTIAL
  - Ability to comply / participate in rehabilitation ESSENTIAL

Sher, et al, JBJS 1995
Rotator Cuff Repair Improves Strength

- Functional outcomes are equivalent whether tear heals or not
- Strength significantly greater with healing (75% heal)
  - Scapular elevation strength intact vs torn = 5.0 vs 2.6 kg

Keener, et al, JBJS 2010
Case 3

- Weakness after trauma
- Suggests rotator cuff tear
- MRI!!
- Surgery
Rotator Cuff Repair

- Open Surgical Repair
  - Repair to Bone
  - Full Recovery-Months!

- Results
  - 90% Success at Pain Relief
  - 80% Success at Function

*Zumstein, et al, JBJS 2008*
Rotator Cuff Repair

- Arthroscopic Repairs
  - Technology is Evolving
  - Lower morbidity
  - Success rates similar to open

Aleem and Brophy, Clin Sports Med 2012
Clinical Messaging

- Surgery
  - Very effective
  - Can be painful
  - 4-6 months for recovery
- Should normalize pain and function

Rotator Cuff Tear: Muscle Atrophy with Delay

- Muscle infiltrated with fat over time
- Surgery unsuccessful once significant atrophy occurs
- Do not delay evaluation

*Mall, et al, JBJS 2014*
Common Shoulder Disorders

- Rotator cuff impingement
- Rotator cuff tears
- **Adhesive capsulitis**
- Osteoarthritis
- AC Joint Disorders
- Calcific Tendonitis
Adhesive Capsulitis – Frozen Shoulder

- Painful shoulder
- Restricted ROM (Active=Passive)
- Normal Xrays
- Thickening of shoulder capsule
- Classification
  - Idiopathic – especially Diabetes Mellitus
  - Posttrauma
  - Postsurgical

Neviaser and Hannafin, Am J Sports Med 2010
Adhesive Capsulitis and Diabetes

The Prevalence of a Diabetic Condition and Adhesive Capsulitis of the Shoulder

Connie B. Tighe, MSN, APRN-BC, and Ward S. Oakley, Jr., MD, MBA

Results: The prevalence of diabetes in patients with adhesive capsulitis was 38.6% (34 of 88). The prevalence of prediabetes was 32.95% (29 of 88). The total prevalence of a diabetic condition in patients with adhesive capsulitis was 71.5% (63 of 88). Previous literature fails to reveal the incidence of newly diagnosed diabetes, 2 of 88 (2%), and prediabetes, 25 of 88 (28.4%) in patients presenting with adhesive capsulitis. Early diagnosis and effective management of DM reduces the risk of microvascular complications. DM is believed to play a role in the development of musculoskeletal complications.

Conclusions: Awareness of these findings alerts the practitioner to the risk of diabetes and prediabetes in patients presenting with adhesive capsulitis of the shoulder.
Adhesive Capsulitis – Frozen Shoulder

- Treatment
  - Usually self limited
  - NSAIDS
  - Physical Therapy – Stretching Capsule
  - Intraarticular Injections
  - Arthroscopic Surgery if unresponsive

*Neviaser and Hannafin, Am J Sports Med 2010*
Common Shoulder Disorders

- Rotator cuff impingement
- Rotator cuff tears
- Adhesive capsulitis
- **Osteoarthritis**
- AC Joint Disorders
- Calcific Tendonitis
Shoulder: Osteoarthritis

- Progressive pain
- Limitation of ROM (Active=Passive)
- Treatment
  - NSAIDs
  - PT
  - Injections
  - Surgery: Joint Replacement

Common Shoulder Disorders

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AC Joint Disorders

• AC joint arthritis: common but not often painful

• Distal clavicle osteolysis: weightlifters

• Pain: overhead, crossarm activities

• **Point Tender** at AC joint

• Treatment: activity modification, NSAIDs, **injections**, surgery

Common Shoulder Disorders

- Rotator cuff impingement
- Rotator cuff tears
- Adhesive capsulitis
- Osteoarthritis
- AC Joint Disorders
- **Calcific Tendonitis**
Calcific Tendonitis

- Calcification of supraspinatus tendon
- Painful arc of motion
- Acute onset: VERY PAINFUL

Treatment
- NSAIDs
- PT
- Injections
- Surgery

Shoulder Injection

• Office
  – Rotator Cuff Impingement
  – Calcific Tendinitis

• Ultrasound/Fluoroscopic Guided
  – Adhesive Capsulitis
  – Osteoarthritis
Shoulder Injections

- **SUBACROMIAL**
  - Accuracy: 80-90%
- Glenohumeral
- AC joint

_Marder, et al, JBJS 2012_
Shoulder Injections: Subacromial

- Rotator Cuff Disease/Impingement
- Posterior approach
- Betadine or Chlorhexidine prep
- 5cc lidocaine w/o epi
- 1-2 cc of corticosteroid (40mg/ml)
- Angle Needle Upward Parallel to Acromion
- Diagnostic & Therapeutic

Marder, et al, JBJS 2012
Shoulder Injections

- Subacromial
- **Glenohumeral**
  - Low accuracy for blind injection
  - Anterior: 64%
  - Posterior: 45%
  - Supraclavicular: 45%
- AC joint

*Tobola, et al, JSES 2011*
Shoulder Injections

- Subacromial
- Glenohumeral
- **AC JOINT**
  - Low accuracy
  - 43% intra-articular
  - 23% partially intra-articular
  - 33% extra-articular

Shoulder Injections: AC Joint

- Acromioclavicular disease
- Anterior approach
- Betadine or Chlorhexidine prep
- 1 cc lidocaine w/o epi
- 1 cc of corticosteroid (40 mg/ml)
- Can be difficult

Clinical Messaging

• If injection
  – Will be more sore for a couple of days
  – Typically starts working after 48-72 hours
• Will improve over the next 6-8 weeks
• Self-limited process
• Reassess and consider an MRI
Special Considerations before Injection

- **Pts with Diabetes**
  - Injection may raise blood glucose levels

- **Pts with HIV**
  - Wary if on protease inhibitor
    - Ex. Ritonavir/Norvir
    - Can cause iatrogenic Cushing’s response

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**Changes in Blood Glucose and Cortisol Levels After Epidural or Shoulder Intra-articular Glucocorticoid Injections in Diabetic or Nondiabetic Patients**


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**Injecting epidural and intra-articular triamcinolone in HIV-positive patients on ritonavir: beware of iatrogenic Cushing’s syndrome**

*M. Maviki · P. Cowley · H. Marmery*

*Maviki, et al, Skeletal Radiol 2013*
Shoulder Disorders: Summary

- Refer to PT, but consider a delay in specialist referral
  - Frozen Shoulder
  - Shoulder pain with good ROM and strength
Shoulder Disorders: Summary

• **When to Refer?**
  
  – ALL Fractures
  
  – ALL Dislocations or Instability
  
  – Traumatic event with NEW Weakness
  
  – Whenever in doubt
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References


Evaluation and Management of Common Shoulder Disorders

• Thank you!!

• Questions please

• Referral: 617-667-7678

• Doctor-Doctor Line: 617-667-2020

• bidmc.org/sports

• aramappa@bidmc.harvard.edu
Thank You
aramappaa@bidmc.harvard.edu