



Musculoskeletal Case No. 10, March 2001

Presenting Symptom: Shoulder Pain

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Case prepared by: Joseph P. Laluya, DO, Terry Lee Nicola, MD

Appropriate Audience: Residents and practicing physicians

Learning Objectives: After completing this educational activity, participant will be able to (1) generate an appropriate differential diagnosis for shoulder pain, (2) describe physical examination maneuvers for a shoulder pain patient, and (3) formulate an appropriate treatment plan for the presented shoulder problem.

History

A 38-year-old right-handed woman presents with the complaint of right shoulder pain, which is worsened with overhead activity. She points to the anterolateral aspect of the right shoulder. Two months earlier, she fell down 4 stairs with an outstretched, abducted arm in an attempt to brace her fall.

- Prior to continuing, please develop a differential diagnosis and list each possible diagnosis in order of likelihood.
- Is there any other additional information from the clinical history that may change the priority of your differential list?

Commentary I

The differential diagnosis includes: anterior and posterior glenohumeral instability, multi-directional instability, rotator cuff tendinitis/impingement syndrome, acromioclavicular joint pathology, glenoid labrum tear, rotator cuff tear, biceps tendon pathology, Hill Sachs lesion, fracture of the proximal humerus, trigger points, and referred pain from cervical radiculopathy.

Additional history should assess the specific activity that elicits pain, the nature of the pain (character, location, night pain, sensations of instability, weakness, crepitation, locking or popping, and any radicular symptoms such as neck pain, numbness, or paresthesias).

History, continued

The patient works on a production line in a candy bar manufacturing plant. She describes sharp pain and occasional popping with reaching or lifting. On several occasions, she has noticed slipping of the shoulder as though it may "pop out" with various movements. For the last month she has had pain at night. The use of ibuprofen daily has somewhat alleviated her symptoms.

She describes no neck pain or upper extremity weakness or numbness. She has had no previous cervical spine surgery. Her past medical and family histories are negative for arthritis.

- If necessary, revise your differential diagnosis based on the additional clinical history.



- On which details of the physical examination should you focus at this point?

Commentary II

The sequence of a traumatic event leading to pain with reaching and the sensation of instability strongly suggests shoulder laxity. The absence of neck pain with associated upper extremity weakness, tingling, numbness, or paresthesias argues against a radicular injury. Physical examination of the glenohumeral joint must include assessment for deformity, asymmetry, atrophy, instability, and pain provocation.

Physical Examination

For definition of terms and examination maneuvers see the Definition of Terms

The patient is oriented, alert, overweight, and demonstrates mild pain posturing. Cervical spine range of motion (ROM) is full. Lhermitte's and Spurling maneuvers are negative. The right shoulder upon visual inspection demonstrates no swelling, ecchymosis, deformity, asymmetry, or atrophy. Shoulder ROM is: Flexion 150° right, 160° left; abduction 155° right, 170° left; internal rotation 50° right, 70° left; external rotation 70° right, 90° left; crossed chest adduction 50° bilaterally. Right shoulder forward flexion between 120-150° results in shoulder pain. There is tenderness to palpation in the area of the subacromial bursa. There is no tenderness over the acromioclavicular joint. There is 4+/5 antalgic weakness with right supraspinatus testing and with resisted right shoulder internal and external rotation. The sensory examination is intact to light touch and pinprick and the reflexes are 2+ and symmetric in both upper extremities. A positive anterior apprehension/instability test, relocation test, 1+ anterior drawer/translation test, Neer's and Hawkins impingement tests are noted. Posterior and inferior apprehension tests, Yergason's test, Speed's test, and clunk test are all negative.

- *At this point, review your differential diagnosis and revise as appropriate.*

Commentary III

The physical examination demonstrated limitation and pain with terminal ROM as well as anterior shoulder laxity, consistent with anterior glenohumeral subluxation/instability and secondary rotator cuff tendinitis/impingement syndrome.

The lack of neck pain, cervical root impingement provocative testing, overt weakness, atrophy, loss of reflexes, and intact sensation argue against a cervical root injury.

Negative Speed and Yergason's tests speak against bicipital tendinitis or pathology. No obvious signs of fracture were noted on the examination.

A glenoid labrum tear is still a consideration even though there was a negative clunk test. The most common pathologic entity involves an anterior inferior labral tear (Bankart lesion), which may be seen with anterior instability.

- *Are there additional observations on physical examination that might be helpful in narrowing your differential list?*

Right shoulder plain films including AP, lateral, and axillary views are performed. This examination demonstrates no acute fracture or dislocation, including a Hills Sach lesion. There is minimal spurring at the inferior glenohumeral and acromioclavicular joints. On the



axillary view, there is a suggestion of an os acromiale. There is no soft tissue calcification or greater tuberosity fracture.

An MRI of the right shoulder, including axial and coronal T1, axial fast spin-echo, and coronal fast spin-echo sequences is performed. Incidental note is made of the os acromiale between the pre- and mesacromion. There is increased signal intensity within the supraspinatus tendon compatible with tendinitis. There is no evidence of a frank tear. The glenoid labrum appears normal with no evidence of a tear. There is normal morphology and signal to the humeral head. There is also a slightly curved, type II anterior acromial process.

- *What do you consider the most likely diagnosis?*

Diagnostic Impression

Anterior glenohumeral instability and secondary supraspinatus tendinitis/impingement syndrome.

- *What treatment would you now initiate for the patient?*

Commentary IV

The treatment of recurrent anterior instability begins with a period of rest. After an acute episode, an arm sling is worn for several days. Nonsteroidal anti-inflammatory medication is started along with ice therapy at least 2-3 times daily.

As acute pain resolves, a rehabilitation program emphasizing stretching and strengthening of the scapular stabilizers and then the rotator cuff musculature is begun. Stretching exercises are implemented in an attempt to regain full and coordinated scapulothoracic and glenohumeral joint motions. Strengthening utilizes Theraband or rubber tubing, and then progresses to Nautilus or isokinetic exercises. During the early stage of therapy, especially in patients with concomitant impingement, these activities should be performed with arm at the side or with minimal abduction to protect the inflamed supraspinatus tendon. Later, these exercises may be performed with the arm in 90° of abduction. The scapular stabilizers are conditioned by a combination of shoulder shrugs, horizontal adduction exercises, pull-downs, and rows.

Follow Up

After the imaging studies were completed, treatment consisted of a subacromial injection with anesthetic medication and depomedrol, nonsteroidal anti-inflammatory therapy, ice, and immobilization in a sling for 3 days. A rehabilitation program was then begun, consisting of range of motion exercises and stretching for 2 weeks. Once the pain began to subside with ROM, resistance exercises were initiated using medium resistance Theraband. The initial exercises consisted of rows, pull-downs, and adduction maneuvers. These exercises initially were performed with minimal abduction but progressed to 90° of abduction as the patient became stronger. Once 90° of abduction was achieved, internal and external resistance exercises were initiated. The patient returned to work pain free 6 weeks after initial presentation.

Discussion



Diagnosing recurrent anterior subluxation is often quite difficult. The patient with recurrent subluxation is often unaware that the shoulder has “popped out.” The chief complaint is often subtle, such as a sense of movement, pain, or clicking with various movements. The pain may be located posteriorly secondary to strain on the posterior capsule and tendons attempting to resist anterior translation. Rowe and Zarins described the “dead arm syndrome” in patients with anterior subluxation. In this case, a patient may experience sharp pain when the shoulder is placed in external rotation or when a force is delivered to the shoulder. The patient may then lose any control of the upper extremity and even drop an object held in the hand. After the acute episode of pain the shoulder may remain sore. In throwers, pain is usually experienced during the cocking or acceleration phases of throwing. Swimmers experience pain with the backstroke or during turns. Racquet sports may incite pain with overhead serves. Overhead kills or setting may cause pain with volleyball.

With traumatic events there is typically extreme external rotation of the arm combined with either abduction or hyperextension. Tackling in football or diving to a base in baseball may result in this position. In some patients, there is no particular history of macrotrauma. Instead, microtraumatic changes occur with overuse.

Rotator cuff impingement symptoms frequently occur in association with anterior subluxation, especially in throwers and overhead athletes. Differentiation among pure impingement, pure instability, and mixed pathology may be difficult. Patients who have pure impingement may not experience pain relief with the relocation test. Patients with pure instability should have negative Neer and Hawkins impingement signs.

Recently, Townsend and colleagues have described four specific movements that may be used to specifically strengthen the glenohumeral muscles.

1. Elevation of the arm in the scapular plane with the arm internally rotated and the thumb down.
2. Elevation of the arm in the sagittal plane.
3. Horizontal adduction from the prone position with arm externally rotated.
4. The “press-up” exercise: In a seated position, the hands are placed upon the seat, and the body is lifted from the chair by extending the upper extremities.

A rehabilitation program often succeeds in patients with atraumatic instability. Traumatic dislocations appear to respond less favorably.

Definition of Terms

Lhermitte’s Sign: Cervical flexion (while patient seated with hips flexed and knees extended), with referral of pain down the limbs signifying cervical stenosis or meningeal irritation

Spurling Test: Cervical extension, side bending and axial compression of the head, with referral of pain down the ipsilateral arm signifying cervical nerve root impingement

Supraspinatus strength test: With patient’s arm abducted 90°, forward flexed 30° (scapular plane), and internally rotated with thumb down (empty beer can position), examiner pushes distal humerus down, assessing supraspinatus weakness

Anterior apprehension/instability test: With patient’s shoulder externally rotated, and abducted (wave goodbye position), the examiner pushes the hand further into external



rotation (while the other hand stabilizes the scapula), with increased motion (which may be accompanied by apprehension and/or increased pain) signifying anterior instability of the glenohumeral joint

Anterior drawer/translation test: While patient supine, with the arm abducted 90° (or standing with the arm at a side resting position), examiner applies anterior pressure to the proximal humerus with one hand while the other hand stabilizes the scapula, with increased anterior motion (which may be accompanied by clicking or apprehension) signifying instability

Neer sign: Shoulder internally rotated, examiner forward flexes the patient's arm, jamming the supraspinatus against the anteroinferior acromion, with increased shoulder pain signifying rotator cuff inflammation or tear

Hawkins impingement test: With patient's arm forward flexed to 90°, then shoulder internally rotated, jamming the supraspinatus against the anteroinferior acromion, with increased shoulder pain signifying rotator cuff inflammation or tear

Posterior apprehension tests: While patient supine, elbow flexed and shoulder abducted 90° and forward flexed, the examiner pushes the humerus posteriorly with one hand while the other hand stabilizes the scapula, with increased motion signifying posterior instability

Yergason's test: With patient's arm at side with elbow flexed 90° and forearm pronated, examiner resists supination of the forearm, with anterior shoulder pain (or tendon subluxation out of groove) signifying biceps (long head) tendinitis

Speed's test: With shoulder forward flexed, elbow extended and forearm supinated, the patient resists examiner downward force to the forearm with anterior shoulder pain or apprehension signifying biceps (long head) tendinitis or biceps/anterior glenoid labral tear

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