

Box 3 Statements and recommendations on the role of imaging in intra-articular corticosteroid injections**Role of imaging****Statements**

1. Ultrasound-guided techniques result in more accurate intra-articular needle placement than landmark-based techniques.

Level of certainty: high

2. There are no significant differences in accuracy between ultrasound-guided and fluoroscopy-guided peripheral joint corticosteroid injections.

Level of certainty: low

3. Compared with landmark-based techniques, use of image guidance may be associated with less pain on injection, improved patient satisfaction, and better short-term clinical outcomes.

Level of certainty: low

4. Use of imaging guidance may be associated with fewer adverse events, including damage to periosteum and intravascular injection, after diagnostic or therapeutic arthrocentesis.

Level of certainty: low

Recommendation

1. Image-guided techniques may be preferred for accuracy of intra-articular corticosteroid injections, especially in individuals with morbid obesity.

Grade C

or ankle of 114 patients with chronic inflammatory arthritis including RA, psoriatic arthritis, or other spondyloarthritis.⁴¹ The study showed better short-term outcomes, measured by functional and clinical scores, with the use of US guidance. A separate RCT of 184 patients with similar chronic inflammatory arthritis across shoulder, elbow, wrist, knee, and ankle found that USG injections had higher accuracy but showed similar clinical outcomes.⁴²

A systematic review of 17 studies confirmed greater accuracy of USG IACS, compared with anatomic guidance, into the shoulder, elbow, wrist, hip, knee, or ankle joints and demonstrated better short-term clinical outcomes.⁴³ However, there were no differences in long-term outcome measures with either technique. A recent review noted increased accuracy of USG injections regardless of location, with the exception of the hip (due to a lack of comparative studies).⁴⁴

For SRs on the role of imaging in IACS, see box 3. Discussions supporting the SRs on the role of imaging are noted in the section on specific joints.

Chronic shoulder joint pain: etiologies

The shoulder joint consists of the primary articulations of the acromioclavicular joint, between the clavicle and the acromion of the scapula; the glenohumeral joint, between the glenoid cavity of the scapula and the humerus; and the scapulothoracic articulation. The etiologies of chronic shoulder pain include acromioclavicular glenohumeral and OA, rotator cuff disorders, adhesive capsulitis (AC), and instability.⁴⁵

Acromioclavicular osteoarthritis

The clinical presentation of acromioclavicular joint OA includes superior shoulder pain, joint tenderness, and a painful body cross adduction test. In the body cross test, the affected arm is elevated to 90 degrees; pain is reproduced in the acromioclavicular joint

when the examiner takes the patient's elbow and adducts the arm across the body.⁴⁶ Patients with acromioclavicular OA usually present with gradual pain and loss of motion or a history of dislocation or subluxation.⁴⁵ Imaging studies are indicated when the diagnosis is not clear. MRI shows degenerative changes in the joint, osteophytes and/or hypertrophy of the clavicle and acromion, and joint edema.⁴⁷ As noted previously, IACS is recommended when there is no improvement with the initial conservative management.⁴⁸ Non-surgical management includes suprascapular nerve blocks.⁴⁹ There has been no dose-response study on IACS for the AC joint, although a dose of 40 mg MP has been injected under fluoroscopy.⁴⁶

Adhesive capsulitis and glenohumeral joint disease

Disorders of and around the glenohumeral joint are multifactorial, resulting in frequent shoulder pain, with a lifetime prevalence as high as 67%, and significant functional impairment during and long after the initial painful episode.⁵⁰

AC ('frozen shoulder') is a syndrome thought to involve the capsule of the glenohumeral joint, featuring characteristics of shoulder pain, stiffness with reduced range of active and passive motion, and otherwise negative radiographic findings.⁵¹ ACs have been proposed to be a fibroproliferative disease⁵² and may be either idiopathic or associated with trauma, tear, surgery, immobilization, or medical diseases (such as diabetes, stroke, thyroid disorders, or Parkinson's disease). Treatments include conservative analgesic management, physical therapy (PT), short-wave diathermy, IACS, intracapsular hydrodistension, manipulation under anesthesia, and arthroscopic release.

Glenohumeral instability is caused by trauma, repetitive motion of the shoulder (eg, throwing), high demand shoulder activities (eg, push-ups, bench presses), or loose ligaments leading to chronic shoulder instability. Treatment is conservative^{48,53}; surgery is performed in recalcitrant cases.⁵⁴

Tendinitis of the long head of the biceps

The long head of the biceps tendon is susceptible to trauma, instability, impingement, inflammation of the tendon sheath, instability, and degeneration, resulting in anterior shoulder pain. Patients with biceps tendinitis or tendinosis complain of a deep, throbbing ache in the anterior shoulder.⁵⁵ Repetitive overhead motion of the arm initiates or exacerbates the symptoms. A common isolated finding in biceps tendinitis is tenderness over the bicipital groove with the arm in 10 degrees of internal rotation.⁵⁵ Tests to diagnose tendinitis of the long head of the biceps include the Speed, Yergason, and upper cut tests. These maneuvers are considered positive when pain is elicited in the bicipital groove. A comparison of the tests concluded that the upper cut test should be used as the screening test and the Speed and Yergason tests as confirmatory tests for confirming disorders of the biceps tendon.⁵⁶ MRI can help differentiate between an isolated tear or inflammation of the biceps tendon and other shoulder pathology.

Similar to other causes of shoulder pain, treatment is conservative: rest, medications, and PT. Patients with tendinitis and tenosynovitis who do not respond to conservative treatment may benefit from USG CSIs into the biceps tendon sheath.

Scapulothoracic bursitis

Symptomatic scapulothoracic disorders include scapulothoracic crepitus and scapulothoracic bursitis, collectively called 'snapping scapula syndrome'.⁵⁷ Scapulothoracic