Common injuries of the shoulder

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INTRODUCTION

Shoulder injuries may occur by direct impact, e.g. as the result of high-energy collisions as in a road traffic accident or sport, or indirectly where the force is transmitted via the arm to the shoulder complex, e.g. a fall onto an outstretched hand. Standard assessment begins by taking a history of the injury and fully examining the patient. Imaging should relate to clinical findings.

STERNOCLAVICULAR JOINT INJURIES

Clinical features

Injuries to the sternoclavicular joint (SCJ) are uncommon. Direct injury to the proximal clavicle, or indirect injury via the upper limb shoulder complex, can injure the SCJ. This can range from a minor sprain or subluxation, to dislocation of the joint which may be anterior or posterior. Anterior dislocation produces a painful prominent bump over the SCJ. Posterior dislocation (much less common but more serious) may cause venous congestion, and difficulty in breathing or swallowing as a result of compression of adjacent structures.

Radiographic investigation

Overlapping shadows make plain X-rays difficult to interpret. The serendipity view (40° anteroposterior (AP) cephalic tilt view of both medial clavicles) or tomography may be helpful, but computed tomography (CT) and magnetic resonance imaging are better for imaging the SCJ. Comparison with the contralateral side helps evaluate the injury.

Management

SCJ sprains are managed with ice, analgesia and a sling for pain relief. Anterior dislocation can usually be reduced by exerting direct posterior pressure over the clavicle while traction is applied to the abducted arm. Often reduction is unstable and redislocation may occur. The patient is treated in a sling and early range of motion exercises instituted. The prognosis for full recovery is good, in spite of redislocation. Posterior dislocation should be treated as soon as possible, either by closed or open reduction.

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FRACTURES OF THE CLAVICLE

The clavicle is an S-shaped bone and is weakest in its middle third. The clavicle is closely related to the brachial plexus, subclavian vessels and the pleura and, although rare, it is important to exclude concomitant injury.

Clinical features

Most clavicle fractures occur by direct trauma, but indirect injury may occur by a fall onto an outstretched hand. Fractures of the middle third account for 85% of all injuries. The patient presents with deformity, swelling, bruising and local tenderness at the fracture site. The arm is adducted to the chest and often supported by the other arm.

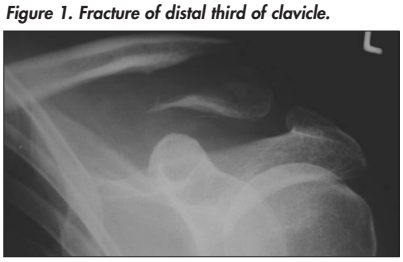
Radiographic investigation

Plain AP X-rays usually define the nature and position of the fracture. Comparison can be made with the contralateral side (*Figure 1*).

Management

Middle and medial third fractures are treated by supporting the arm in a sling for 2–3 weeks, with subsequent gentle mobilization. Outer third fractures may be associated with disruption of the coracoclavicular ligaments. If displacement is significant, there is a higher risk of non-union, so operative treatment of these fractures is indicated. Surgery is also indicated for open injuries, fractures associated with neurovascular complications, compromise of the overlying skin or in the multiply injured patient.

Figure 1. Fracture of distal third of clavicle.



ACROMIOCLAVICULAR JOINT INJURIES

Clinical features

Injuries range from a simple sprain of the acromioclavicular joint (ACJ) and surrounding ligaments to complete disruption of the joint and coracoclavicular ligaments. A simple sprain presents with a painful, mildly swollen ACJ but no major deformity. With increasing severity of injury the ACJ structures and then coracoclavicular ligaments are disrupted. The patient presents with a painful shoulder with the distal end of the clavicle displaced superiorly giving a prominent bump (*Figure 2*). Rarely the clavicle is displaced inferiorly or posteriorly. It may not be clearly displaced on inspection but palpation indicates the change in position. Neurovascular examination should be documented.

Radiographic investigation

Simple AP X-ray of both ACJs will be normal for a simple sprain, but show a step between the acromion and clavicle as the ACJ ligaments are disrupted, which may be more evident on weight-bearing views. A larger gap between the acromion and the outer end of the clavicle shows more severe soft tissue injury.

Figure 2. Grade III acromioclavicular joint injury – obvious deformity.

Management

Treatment of minor sprains involves simple rest in a sling, ice and analgesia. Return to activity can be with gentle range of motion exercise at 7–10 days depending on discomfort.

Most disruptions of the ACJ and coracoclavicular ligaments are managed non-operatively as the outcome is very good. Initially treatment is as for the minor sprain and then gradual return of active motion is encouraged with return to function after 4–6 weeks. Dislocation of the ACJ with complete disruption of coracoclavicular ligaments may require surgery. The ACJ is indirectly reduced by holding the clavicle in place with a Bosworth screw (from the clavicle to the coracoid) and repairing the coracoclavicular ligaments. For more severe disruptions with the clavicle displaced grossly surgical repair is preferred. The screw is removed at 6–8 weeks.

Complications following injury are mainly cosmetic with a pronounced step over the ACJ. Late arthritic change is rare but can cause ACJ pain and may require joint excision.

SHOULDER (GLENOHUMERAL) DISLOCATION

The shoulder joint has low intrinsic stability from its osseous structure. It relies on soft tissue for stability, specifically the glenoid labrum, capsular ligaments and the rotator cuff. Dislocation usually involves significant trauma or congenital laxity (or both). Of dislocations 95% are anterior, and only 5% are posterior. Inferior dislocation may occur (luxatio erecta) but this is very rare.

Clinical features

The shoulder classically dislocates anteriorly in the position of apprehension: abduction and external rotation. Posterior dislocations occur after direct trauma or muscle spasm and are associated with epilepsy, alcohol and electrocution.

A patient with an anterior dislocation characteristically presents with the arm slightly abducted and in internal rotation. The shoulder will lose its normal deltoid contour, appearing 'squared'. The humeral head may be palpated anteriorly. In posterior dislocation the arm is held adducted and internally rotated. The shoulder may appear flat anteriorly and will not externally rotate. In luxatio erecta the arm is held abducted ('statue of liberty'). The neurovascular status of the arm must be assessed and recorded before and after any attempt at reduction.

Radiographic investigation

Standard radiographs should be taken to confirm the direction of dislocation and the presence of any concomitant fracture (glenoid, greater or lesser tuberosity). An AP view in the plane of the scapula will show most anterior dislocations with the humeral head displaced medially and the joint surface no longer aligned with the glenoid. A Stryker notch view may show an impaction fracture (Hill–Sachs lesion) of the posterolateral aspect of the humeral head (*Figures 3* and *4*).

Posterior dislocations are less common and may be missed on AP radiograph as the humeral head appears aligned with the glenoid; the key to diagnosis is the shape of the humeral head – the 'light-bulb' or 'drumstick' sign. Posterior dislocation of the shoulder is more easily diagnosed on axillary or lateral scapular views.

Management

Any dislocation should be reduced as soon as possible. Delay may make reduction harder and may increase damage to other structures. Before reduction neurovascular examination should be carried out to define any existing deficit. The axillary nerve, which supplies the deltoid and is sensory to the skin in the 'shoulder patch' region, is at risk in dislocation as it is closely related to the glenohumeral joint. Sensation and active abduction should be tested and recorded before reduction. Vascular injuries occur very rarely but are more common in elderly patients and are probably related to the relatively stiff vessel walls.

Most dislocations can be reduced by closed means. Ideally reduction should be with full relaxation under a general anaesthetic but this is not normally possible. Reduction is therefore carried out in an appropriately equipped setting with adequate sedation and analgesia. A number of recognized, well-described techniques can be used to reduce the shoulder (see *Further reading*).

Posterior dislocations are reduced by traction of the arm in adduction (forceful external rotation may cause fracture). Inferior dislocations can usually be reduced by traction alone – occasionally the humeral head button holes the capsule and requires open reduction.

Surgical exploration and open reduction is indicated if there is an associated vascular injury, an open dislocation, failed closed reduction, a displaced fracture of glenoid or greater tuberosity, and in persistent instability after reduction.

Post-reduction management requires re-evaluation of neurovascular status and repeat X-ray. Most surgeons immobilize the shoulder for 3–6 weeks, but there is no evidence that prolonged immobilization reduces the incidence of recurrent dislocation. Early mobilization is encouraged in patients over 40 years to prevent stiffness. Posterior dislocations may be unstable after reduction and may require special brac-

Figure 3. Anterior dislocation – anteroposterior view.

Figure 4. Hill–Sachs lesion of humeral head.

ing or immobilization of the shoulder in a plaster of Paris spica.

The main complications of dislocation include recurrent dislocation, neurological injury, fracture and associated rotator cuff tear or vascular injury. The risk of recurrent dislocation is inversely related to the age at first dislocation. In patients under 20 years up to 80% have a recurrent dislocation in the next 2 years. After the age of 40 years there is a 10–15% redislocation rate. Rotator cuff tears are more common in older patients with dislocation (up to 60% in patients over 50 years of age). This will delay healing and rehabilitation. If function is impaired then early repair is indicated.

SHOULDER (GLENOHUMERAL) FRACTURE-DISLOCATION

Fractures of the tuberosities are seen in older people. Anterior dislocation is associated with a fracture of the greater tuberosity and posterior dislocation with a lesser tuberosity fracture. After reduction of the dislocated joint the fracture is often reduced but a post-reduction X-ray is important to ascertain this. Open reduction and internal fixation may be required if the fragment remains significantly displaced (*Figure 5*).

FRACTURES OF THE SCAPULA

Fractures of the scapula are rare, constituting 3–5% of all shoulder injuries. There is a high likelihood of other serious injury. Initial assessment should treat any life-threatening condition first following the Advanced Trauma Life Support protocols. Once medically stabilized the shoulder can be assessed.

Clinical features

Trauma may be direct or indirect through the outstretched arm. The patient presents with pain, especially on active and passive shoulder movement and on deep inspiration. There may be local tenderness to palpation, swelling, ecchymosis and deformity. Full neurovascular examination is required.

Figure 5. Anterior dislocation with greater tuberosity fracture.

Radiographic investigation

Scapula fractures are diagnosed on plain X-rays. Subsequent information can be gained from specific scapular views. CT scans with three-dimensional reconstruction are helpful in evaluating the need for surgical intervention.

Management

Most scapula fractures are treated non-operatively. Glenoid fossa fractures are rare, comprising 10% of scapula fractures. These can result in glenoid incongruity and instability and may have a poor outcome if treated non-operatively.

Glenoid neck fractures do not involve the joint surface and tend to heal in their position of displacement. Open surgical reduction may be required if the position is likely to interfere with rotator cuff function (angulation > 40°, displacement > 1 cm). Fractures of the clavicle in association with glenoid fractures may constitute a 'floating shoulder', so both fractures should be fixed as they will tend to displace with time.

Coracoid fractures commonly occur at the base and are typically minimally displaced. These can be managed conservatively in most instances.

Fractures of the scapula body will usually not require any intervention but there is a high incidence of other major injury in these patients.

FRACTURE OF PROXIMAL HUMERUS

Fracture of the proximal humerus in the young patient is a high-energy injury, while in the elderly with osteoporosis the fracture is more commonly a result of a low-energy fall.

Clinical features

The patient will present with a history of injury to the shoulder. There will be pain and a decreased range of motion. The shoulder may have an abnormal alignment if the shaft is displaced or angulated. Initial assessment must include neurovascular assessment. Distal pulses may be present even in the presence of vascular injury.

Radiographic investigation

Radiographs of the shoulder are essential to plan treatment. These should include AP, scapular lateral and axillary views. Occasionally these may need to be supplemented with rotated views to see the tuberosities (*Figure 6*).

Management

Proximal humeral fractures are classified and management is planned according whether the head, greater tuberosity or lesser tuberosity are involved and their degree of displacement (Neer, 1975). Most fractures are minimally displaced and can be managed conservatively with immobilization followed by early range of motion exercise. Displaced fractures may require either closed reduction or open reduction and internal fixation. Severely displaced four-part fractures, involving both tuberosities and the surgical neck, require primary hemiarthroplasty.

Neurovascular complications may occur. The brachial plexus and axillary artery are at risk from injury by the humeral shaft, which is nearby. HM

Neer CS II (1975) Four segment classification of displaced proximal humerus fractures. *American Academy of Orthopaedic Surgeons Instructional Course Lectures* **24:** 160–8

Further reading

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Dee R, Hurst LC, Gruber MA, Kottmeier SA (1997) *Principles of Orthopaedic Practice.* 2nd edn. Blackwell Science, Oxford

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Wheeless' Textbook of Orthopaedics (2002) http://www.ortho-u.net/orthoo/43.htm

Figure 6. Three part fracture of neck of humerus.