The shoulder is the most commonly dislocated joint, with an overall incidence of 24 per 100,000 person years, of which less than 3% are posterior\(^1,2\). The incidence is bimodal, with peaks in young men aged 20-29 and women over 60\(^2,4\). Most dislocations are uncomplicated but a small proportion will have additional injuries which may be missed – these are commoner in older patients, with up to 75% of them reporting persistent symptoms\(^5\). A recent analysis of NHS litigation cases showed failure to diagnose glenohumeral dislocations as the largest group within orthopaedic upper limb cases\(^6\).

**Missed diagnosis**

Posterior dislocations pose a special threat. Diagnosis is tricky as manifest by case series of chronically undiagnosed posteriorly dislocated shoulders\(^7,8\). Delay to diagnosis leads to an increase in the size of the humeral head defect and the necessity of open procedures\(^1\). A modified axillary radiograph helps diagnosis, as anteroposterior views are difficult to interpret\(^9,10\). 65% have associated lesions such as fracture and cuff tears, and in the absence of fracture the risk of cuff tear increases 4.6 times\(^1\).

**Associated fractures**

These are common and easily missed, with an overall fracture rate of 29% if including Hill Sachs lesions, with up to 59% of fractures not diagnosed initially\(^11,14\). Despite this, propagation of an unnoticed neck fracture or Hill Sachs lesion by manipulation has only rarely been reported – all of these cases also had a tuberosity fracture. We suspect this scenario is commoner than reported. The use of general anaesthetic, muscle relaxation and image intensification didn't prevent displacement with manipulation, but in one report prophylactically stabilising the humeral head prior to manipulation helped\(^15\).

The anterior rim of the glenoid may be fractured during the dislocation creating a bony Bankart lesion. Most commonly this is a small flake of bone that may or may not be visible on plain x-ray. The larger the lesion, the more likely that the shoulder may develop instability. As with all fractures, early surgical intervention has shown better results than late reconstruction\(^20\). If a glenoid fragment is seen on plain radiograph, a CT to quantify it is helpful in decision-making.

Independent risk factors for fracture have been shown to be first dislocation, age over 40 and mechanism of injury\(^18\).

**Rotator Cuff**

With anterior dislocation the posterior and superior rotator cuff are stretched. With advancing age the cuff becomes less pliable and cuff tear rates of 54% - 61% are reported in the over 40s and rising in severity and frequency with age - even though it is not possible to know if these tears were present before the dislocation\(^20-24\). The supraspinatus is always involved, and a significant correlation was found between full thickness tears, night pain and the inability to raise the arm to 90 degrees in the scapular plane at two weeks following dislocation\(^20\). This inability to abduct the arm also mimics an axillary nerve lesion. Almost half of these patients report symptoms persisting for years\(^20\).

In the early post reduction phase it is not possible to interrogate adequately the rotator cuff by clinical examination, and therefore it is the responsibility of the clinician in the fracture clinic to ensure follow up until an injury can be excluded, especially as there is evidence that the outcome of repair of acute rotator cuff tears is better if performed earlier\(^20\).
Neurological Injuries

Owing to its route and position, the axillary nerve is the most commonly injured. This is followed by the suprascapular nerve, which tends to recover spontaneously27, 28.

In one series, 48% of all patients had documented nerve injuries when using EMG to aid diagnosis. Prognosis was too variable to help predict outcome. Although axillary nerve injury accounted for almost half of the injuries, combinations were also seen with an average of 1.8 nerves involved. Risk of nerve injury increased with age, fracture and the presence of haematoma. Examination of sensation in the distribution of the axillary nerve did not reliably indicate the presence of a lesion, whereas abnormal forearm sensation did indicate a more severe injury. Even with good EMG recovery, shoulder function often did not return to normal, but physiotherapy did improve outcomes. The recommendation was EMGs at three weeks if function had not resolved28.

A few patients are reported as having a terrible triad of dislocation, cuff tear and nerve injury, which leads to a poor prognosis25, 29.

Vascular Injuries

These are quite rare and may be missed due to an extensive collateral circulation around the shoulder. Case reports of axillary artery transection, circumflex artery avulsion and delayed presentation of pseudoaneurysm and upper limb deep vein thrombosis have all been published. Older patients with less compliant and atheromatous arteries are at greater risk, and there is an association with neurological injury, which along with bruising and axillary swelling should alert the physician to this emergency and prompt further investigation20–33.

Conclusions

We make a number of recommendations based on the published evidence:

1. Beware the older patients, especially first time dislocators, as they are a high risk group
2. Formal assessment of the nerves should be performed both before and after manipulation
3. Radiographs should be undertaken both before and after manipulation, including a modified axillary view if in doubt
4. Immediate referral to orthopaedics if the shoulder hasn’t reduced first time
5. If a glenoid or complex humeral fracture is identified a CT scan is helpful
6. All patients are reviewed in outpatients within three weeks to reassess the nerves, cuff and arrange physiotherapy as required.

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References can be found online at www.boa.ac.uk/publications/JTO or by scanning the QR Code

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