Introduction

Shoulder instability and related problems are common injuries in orthopaedic sports medicine. Emergency physicians often manage acute dislocations in trauma scenario while primary care physicians may encounter patients presenting with symptoms of the relevant functional impairment. With the recent advances in injury biomechanics, arthroscopic surgery and MRI imaging, clinicians should be aware of the fact that shoulder instability composed of a wide spectrum of conditions with variable presentations which warrant specific attention to details in pathoanatomy and their outcome implications. The potential diagnostic pitfalls are discussed as follows.

Misdiagnosis

Types of Instability

A misdiagnosis of the type of instability leads to incorrect surgical procedures and results in treatment failure. Clinicians should conduct a thorough history and full shoulder examination for patients presenting with instability symptoms with or without previous dislocation. Accurate physical examination can help to differentiate anterior instability, posterior instability and multi-directional instability (MDI). Arm position, at the time of the initial injury and during onset of symptoms, can help differentiate the direction of the instability. The commonly performed anterior apprehension test, if positive, will indicate deficiency of the anterior anatomical restraint involving the anteroinferior capsulolabral complex (e.g. Bankart lesion or variants). Posterior jerk test is useful for evaluation of posterior instability. Another useful finding is the sulcus sign in symptomatic shoulder which demonstrates evidence of inferior instability and the diagnosis of MDI should be considered.

Paradoxical Presentation

Shoulder instability at times may occur without any preceding significant traumatic event or any recalled injury by patients. A missed shoulder dislocation is not rare and will give rise to treatment delay and irreversible complications.

Neglected shoulder dislocations usually present as loss of active motion. Anteriorly dislocated shoulders are not able to be internally rotated, and posteriorly dislocated shoulders are locked in internal rotation.

Posterior shoulder dislocations are much less common, accounting for only 2% to 3.8% of all shoulder dislocations but are missed in up to 50% of cases on initial evaluation. The loss of range of motion, particularly passive external rotation and forward flexion, is a typical sign on initial presentation. This paradoxical presentation of shoulder stiffness might lead to a misdiagnosis of “frozen shoulder” and therefore delay the patient’s referral to an orthopaedic specialist for definitive treatment.

Idiopathic frozen shoulder should be a diagnosis by exclusion. Differential diagnoses including neglected posterior shoulder dislocation, glenohumeral joint osteoarthritis and post-surgical shoulder stiffness ought to be considered prior to making the diagnosis of frozen shoulder.

A posterior shoulder dislocation can be confirmed by plain radiography but it can still be missed if the film is not properly interpreted. Although helpful, the anteroposterior radiograph can often be misleading. (fig 1) There is often an overlap of the humerus with the glenoid fossa seen typically on malpositioned anteroposterior radiographs. Such a view will not demonstrate the posterior dislocation.

Typical findings on an anteroposterior radiograph include distortion of the normal elliptical radiodense region created by overlapping of the humeral head and glenoid fossa, a vacant glenoid cavity, internal rotation of humerus (light bulb sign), impaction fracture (trough sign) and loss of parallelism between the articular surface of the glenoid cavity and the humeral head.
The traditional lateral or Y-view of the scapula if not positioned accurately will also result in misinterpretation. Axillary view is the method of recommendation. CT scan of course is even more diagnostic and informative if available (fig 2).

Dead Man Syndrome

Painful shoulder conditions in young athletes, particularly in sports involving overhead throwing or spiking, are most often caused by subtle shoulder instability. The classical features of "dead arm syndrome" were described by Rowe and Zarins. A functional summary of the observation stated that throwers with a "dead arm" had pain or popping with the arm in the abducted and externally rotated position.

The current concept of the "dead arm syndrome" is known to be related to labral lesion of the shoulder, particularly for Type II posterior SLAP lesion (Superior labrum Anterior Posterior), which contributes to posterosuperior shoulder instability and articular side cuff tear. Arthroscopic repair of the labral lesion to correct the instability is the definitive treatment of choice.

Neglecting the instability as a root cause in athletes with painful shoulders will prolong the disabling symptoms and prevent early return to original sports.

Failure to Recognise and Address Concomitant Pathologies

Nowadays, a successfully reduced dislocated shoulder is definitely not the end of the story but the beginning of a fascinating journey of in-depth evaluation of the magnitude of the injury and long term outcome.

Understanding the concomitant pathologies and their outcome implication is crucial for clinicians to conduct accurate patient communication, maintenance of good patient rapport and initiate timely referral to orthopaedic specialists.

Associated pathologies commonly include various types of labral tears from anterior (Bankart lesion) to superior (SLAP lesion) and posterior (Kim’s lesion). Capsular lesions include plastic deformation of the joint capsule, rotator interval deficiency and specific lesions like humeral avulsion of the anterior glenohumeral ligament (HAGL lesion).

Labral Lesions

Making a diagnosis of labral lesion before surgery is important for specific and more exact communication with the patient, specific patient consent and better pre-operative preparation for both the surgical instruments and surgeons themselves.

The three clinical tests most predictive of labral pathology are the apprehension test, the Jobe relocation test, and O'Brien test. The apprehension test is conducted with the examiner applying only passive abduction and external rotation to the supine patient that results in either apprehension or pain on the patient's shoulder. The Jobe's relocation test requires the patient be supine with the affected arm abducted and externally rotated to 90° followed by the examiner applying posteriorly directed thrust at the proximal humerus. When the pressure is released, if the patient experiences pain it is a positive indication of labral pathology. The O'Brien test is a two-phase clinical examination that involves an upright patient with the arm adducted at least 10° with 90° forward elevation. The first phase is resisted forward elevation with the thumb down (pronation of extremity), and the second phase is done likewise with the thumb up (supination of extremity). Pain with the first phase and not the second is a positive test consistent with labral pathology. False positive of this test may be due to acromioclavicular joint symptoms since it recreates an arm crossover chest test. The sensitivity and specificity of these clinical tests are not great when used individually, but when the test results are combined the specificity ranges in the 90 percentile but the sensitivity remains low at around 34%.

A recent systematic review also concluded that there are no good physical examination tests that exist for effectively diagnosing a labral lesion.

A clinical examination alone is not good enough to decide for surgery. Although the sensitivity and specificity for using MRI arthrography is better than physical tests, arthroscopic examination remains the best diagnostic tool for labral tears.

In order to avoid encountering a surprise in arthroscopic findings during surgery, combination of positive signs with MR arthrography can yield a more accurate pre-operative diagnosis.
Bony Defects

Most cases of instability of the shoulder usually do not involve a significant osseous lesion. When a contributory bony lesion is involved, however, it can easily be missed and result in failure of attempted surgical repairs.7 Bony defects, occurred after acute traumatic dislocations or chronic instability, are found in either the proximal humerus which is known as the Hill-Sachs lesion or the inferior glenoid rim defect also known as the bony Bankart lesion.

The Hill-Sachs lesion is the chondral impaction injury in the posterosuperior humeral head secondary to traumatic contact with the glenoid rim. It occurs in 80% of cases of traumatic dislocation. The lesion is best visualised with a Stryker notch view or an AP view in internal rotation. Bony Bankart lesions can be visualised with a West Point view.

For the concern of surgical decision, smaller bony lesions may be amenable toarthroscopic treatment, but larger lesions often require open surgery and bone grafting to prevent recurrent instability. Standardised quantification of the size of the bone defects becomes critical for surgical management.

Traditionally, the West Point and Stryker notch views can provide some details about the bony deformity. In many cases, however, plain radiographs will not lead to an accurate diagnosis. A recent study identified that almost 60% of operative bony lesions were missed by plain radiographs alone.8

A CT scan, preferably with 3-Dimensional reconstruction, is a useful method for quantifying the size of bone defects. Glenoid index calculated from 3D CT scan was reported to be predictive of the need for a bone grafting procedure.9

Failure to Recognise the Associated Complications

Associated injuries are usually accompanied by acute traumatic shoulder dislocations. Careful evaluation and documentation is essential for the planning of subsequent management and medico-legal concerns. However, a detailed physical examination is obviously difficult during the painful episode of acute injury. To avoid the pitfall of missing the associated injuries, the attending clinician should maintain a high degree of awareness on these common but easily neglected associated injuries.

Associated Fractures

Associated proximal humeral fractures can occur for shoulder dislocations causing by high energy trauma. Ferkel10 reported on two cases of proximal humerus fracture missed by emergency department personnel and subsequently wide displacement of the fracture with reduction manoeuvres.

Frontline clinicians or team physicians on the field should actively avoid performing joint reduction for an acutely dislocated shoulder without good quality radiographs available.

Acute shoulder dislocations with fractures should be better managed by orthopaedic surgeons after full acknowledgment of the associated risks and obtaining a proper informed consent from the patient on the plan of management. The well planned reduction should be performed under adequate analgesics and sedation or even under general anaesthesia.

Axillary Nerve Injury

The axillary nerve is a common associated injury in shoulder dislocations. The incidence can be as high as 35%.11 Skin sensation in the distribution of the axillary nerve and lateral antebrachial cutaneous nerve should be assessed and documented before and after reduction attempts.

The nerve palsy more commonly occurs in patients of advancing age.

Most of the axillary nerve injuries are due to neurapraxia and will recover in 4 to 6 months. Performing electromyography in the acute phase is not vital to confirm the diagnosis of acute nerve injury. However, an electromyography performed 3 to 4 weeks post-injury may help differentiate whether any persistent abduction weakness is due to axillary nerve palsy or rotator cuff tear.

Rotator Cuff Tear

Due to advancing age, the rotator cuff and greater tuberosity complex are getting weaker and being more prone to be disrupted during anterior shoulder dislocations.12

The reported incidence of associated rotator cuff tears is variable which depends on the age distribution of the studied population. There is a consensus that the overall incidence of associated rotator cuff tears is increased in patients that are older than 40 years old.13

Physical examination for assessing the integrity of the rotator cuff in the acute injury episode is difficult because of the acute pain or associated axillary nerve traction neurapraxia.

Excellent results are achieved for prompt rotator cuff repairs after shoulder dislocations.14 Therefore a more aggressive approach for early diagnosis and surgical repair of any associated rotator cuff is recommended.

A rotator cuff injury should be considered as the diagnosis until excluded if symptoms of weakness in the shoulder remain at 2-4 weeks. It is wrong to assume that all these symptoms are caused solely by an axillary nerve palsy.15

As mentioned earlier, electromyography at 2-3 weeks post-injury may help to study the status of the axillary nerve function but it cannot rule out the possibility of concomitant rotator cuff injuries. Early ultrasonography cuff imaging and MR arthrography in symptomatic patients are useful tools to achieve early diagnosis of associated cuff tears. (fig 4)
Conclusion

The swiftly evolving knowledge in basic sciences and evidence-based clinical studies on shoulder instability poses a great challenge to orthopaedic surgeons on patient evaluation and problem solving. Inevitably, lots of diagnostic pitfalls accompany it.

Currently, the less invasive arthroscopic stabilisation surgery is the preferred method of choice as opposed to traditional open surgery. However, the success of this arthroscopic approach depends on appropriate case selection. Cutting edge technology will only work on the right client with the right decision and under the hands of the right expertise.

References

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