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REVIEW

Scapulothoracic dissociation: evaluation and management

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Review

Summary Scapulothoracic dissociation is an infrequent injury with potentially devastating outcomes. Knowledge of this injury is based on small patient series and case reports. The aim of this article is to review the evaluation, management and functional outcomes following scapulothoracic dissociation. Often caused by high traction forces applied to the shoulder girdle, there is a complete loss of the scapulothoracic articulation with lateral scapular displacement and intact skin. This is frequently associated with muscular, ligamentous and osseous injuries to the shoulder girdle, vascular injuries to the subclavian, or axillary, vessels and brachial plexus lesions.

In the acute setting, the timely diagnosis of the associated neurovascular injuries is crucial. Severe neurovascular and soft tissue compromise often requires an early above-elbow amputation. Further, complete brachial plexus avulsions are associated with a limited potential for functional recovery.

Contents

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Introduction

Scapulothoracic dissociation is an infrequent, but severe, injury of the shoulder girdle with a high mortality rate and a poor functional outcome. The injury was originally described in 1984 by Oreck et al.,[35] and is characterised by a complete disruption of the scapulothoracic articulation with lateral scapular displacement and intact skin (effectively a closed forequarter amputation if the neurovascular injury is severe). The injury may be associated with a spectrum of musculoskeletal and neurovascular injuries[10] including:

- osseous injuries to the shoulder girdle (acromioclavicular dislocation, displaced fracture of the clavicle, sternoclavicular dislocation);
- vascular injuries to the subclavian, or axillary, vessels;
- neurological deficit caused by complete, or partial, avulsion of the brachial plexus;
- complete, or partial, muscular tear of the deltoid, pectoralis minor, rhomboids, levator scapulae, trapezius and latissimus dorsi;
- massive soft tissue swelling in the shoulder region.

The literature on scapulothoracic dissociation is dominated by case reports and small case series,[1,7,9,10,12,16,19,21–23,27,29,31,34,35,42,43,8–50,52,54] which may be a result of this injury's high mortality rate. Over the last decades, however, improved trauma care has markedly decreased the mortality rates of polytrauma patients.[36] The purpose of this article is to review the current concepts of evaluation, management and functional outcomes following scapulothoracic dissociation.

Injury mechanism and pattern

Injury mechanism

Scapulothoracic dissociation usually results from high-energy trauma. The injury mechanism is characterised by high traction forces that are applied to the shoulder girdle. In many cases, the exact injury mechanism cannot be elucidated from the medical history, as coexisting severe head injuries are common in these patients. A frequent mechanism occurs when a motorcyclist attempts to hold the handlebars, while the body is forcibly thrown away from the machine.[10,31,50] A careful review of the literature reveals that approximately 50% of the reported cases are as the result of motorcycle accidents. Other reported injury mechanisms include motor vehicle crashes, rollover accidents, pedestrian accidents and falls from heights.[1,7,9,10,12,16,19,21–23,27,29,31,34,35,42,43,48–50,52,54]

Injury pattern

A scapulothoracic dissociation is characterised by a complete loss of scapulothoracic articulation and lateral displacement of the scapula, while the skin is usually intact. It is considered analogous to a closed forequarter amputation and includes a wide spectrum of associated injuries. Osseous and ligamentous injuries to the shoulder girdle, such as acromioclavicular joint separation, clavicle fractures and sternoclavicular joint separation, may accompany vascular injuries to the subclavian, or axillary, vessels. Complete, or partial, avulsion of the brachial plexus, massive muscular injury to the deltoid, pectoralis minor, rhomboids, levator scapulae, trapezius and latissimus dorsi may all be found in this injury. As scapulothoracic dissociation results from high-energy trauma, concomitant injuries of other body regions, as well as ipsilateral upper extremity trauma are frequently seen.

The relative frequency of isolated blunt arterial injuries of the upper extremity, compared to that of isolated neurological injuries,[43] may be the result of the vascular structures' giving way before the nerves.[37] In children, increased elasticity may protect against neurovascular disruption in scapulothoracic dissociation.[1]