Case Report

Trapezoid dislocation

I Zondagh MMed(Orth)(Pret), FC(Orth)(SA)
Consultant and Orthopaedic Surgeon, University of Pretoria, Department of Orthopaedics, Pretoria Academic Hospital and Unitas Hospital
GN du Plessis MMed(Orth)(Pret), FC(Orth)(SA)
Orthopaedic Surgeon, Unitas Hospital

Reprint requests:
Dr Ian Zondagh
PO Box 14353
0140 Lyttelton
Email: ianzondagh@openweb.co.za
Cell: 082 8248 972

Introduction

Dislocation of the trapezoid (lesser multangular) is a very uncommon injury. Koenig *et al*[1] reported on only 33 such cases found in the literature. One-third of these injuries were palmar dislocations and the rest were dorsally dislocated. High impact injuries are generally required to cause the trapezoid to dislocate.[2] Associated injuries must be diligently looked for. These injuries can be treated successfully with an open reduction, repair of the ligamentous structures and temporary fixation with Kirschner wires. Some require limited arthrodesis.

Case report

A 48-year-old male truck driver was involved in a motor vehicle accident when another truck collided with him. He subsequently lost control and rolled his truck. He sustained no serious injury and was discharged from the emergency unit the same day. He presented to us two weeks later complaining of a painful left wrist that was not improving despite adequate analgesia.

On examination his left wrist was swollen and tender on the dorso-radial side of the carpus, proximal to the index metacarpal. A bony prominence was noted. The overlying skin was intact. His active range of motion was limited due to pain.

Initial radiographs of the injured wrist revealed a dorsal dislocation of the trapezoid with proximal migration of the index metacarpal. CT scan confirmed the diagnosis and noted cortical fragmentation in relation to the dorsal aspect of the capitate *(Figure 1)*.

There was no attempt made at a closed reduction as the injury was more than two weeks old. We proceeded with an open reduction through a longitudinal dorsal incision, dissecting between the tendons of extensor carpi radialis longus (ECRL) and brevis (ECRB). The trapezoid was found to be extruded dorsally between the scaphoid and the index metacarpal. After clearing the bed of fibrous tissue, the trapezoid was manipulated (with difficulty) into place and held with three K-wires. The dorsal capsule and ligamentous structures were repaired. A forearm circular cast was applied and the patient was admitted to the ward for elevation and observation *(Figure 2)*.

At six weeks all the K-wires were removed. Maintenance of anatomical reduction and stability was confirmed with the imaging intensifier in theatre. Hand therapy and rehabilitation was then initiated *(Figure 3)*.

Complete dislocation of the trapezoid is an exceedingly rare injury

Figure 1: Trapezoid dislocation. Radiographs and CT scan

Figure 2: Fixation with Kirschner wires

At three months the patient was pain-free and satisfied with the outcome. His active range of motion was limited to 20° of palmar flexion and 30° of dorsi flexion; 20° of radial and ulnar deviation and normal pro and supination. Grip strength was not measured. Radiographs revealed anatomical reduction of the trapezoid, no signs of osteonecrosis, but some residual disuse osteopaenia of the whole carpus *(Figure 4)*.

Discussion

Complete dislocation of the trapezoid is an exceedingly rare injury. Gay reported the first case in 1869.[3] Koenig *et al*[1] found only 33 reported cases in the literature, and since then only isolated case reports have been described.

The trapezoid is wedge-shaped and is normally firmly anchored in the distal carpal row between the trapezium, scaphoid, capitate and the base of the index metacarpal. Its volar surface area is about one-half of its dorsal area, which gives this bone a 'keystone' shape similar to a stone in an arch.[4] The trapezoid is attached to its neighbouring carpal bones by firm intercarpal and interosseous ligaments; the volar ligaments are the strongest of these ligaments. This anatomy predisposes the trapezoid to dorsal dislocations.

Dorsal dislocations are postulated to occur from a force applied to the distal dorsal end of the index metacarpal with the wrist in slight flexion.[5] This force levers and extrudes the trapezoid 'wedge' dorsally.

Figure 3: Stable reduction after removal of fixation

Figure 4: Three-month follow-up

The exact mechanism of palmar dislocations is unknown. A direct blow or hyperextension injuries have been postulated as mechanisms. Review of the few reported palmar dislocations reveals that most are caused by direct crushing injuries by heavy objects or are machinery-related incidents.[1]

Associated injuries are not uncommon. This includes dorsal and proximal migration of the index metacarpal, which indicates disruption (partial or complete) of the intermetacarpal ligaments. Fractures or subluxations of the remaining finger metacarpals, capitate fractures, trapezium subluxations and even Galeazzi fractures have been described. It is for this reason we suggest CT scanning of these injuries after the diagnosis has been made on routine radiographs.

The significant forces necessary to generate these carpal dislocations understandably can cause extensive soft-tissue damage, and optimal restoration of hand function demands aggressive soft-tissue and skeletal correction. For closed injuries, early closed reduction can be attempted (mainly dorsal dislocations), proceeding if necessary to open reduction. The trapezoid may be predisposed to avascular necrosis if its precarious blood supply is compromised at the initial trauma; therefore rapid reduction and careful handling of the soft tissues at surgery is required.[6] Additional K-wire fixation is mostly used to maintain an anatomical reduction. Immediate limited carpal fusion has been proposed by some, claiming that under normal circumstances mobility in this region is limited and that sacrificing this mobility would outweigh any future risk of redisplacement, avascular necrosis, or degenerative disease. We opted to reserve fusion as a salvage procedure should it be clinically necessary.

This article was submitted to an ethical committee for approval. The content of this article is the sole work of the authors.

No benefits of any form have been derived from any commercial party related directly or indirectly to the subject of this article.

References

1. Koenig TR, West OC. Palmar dislocation of the trapezoid. *Skeletal Radiol* 2003;**32**:95-8.
2. Cuenod P, Della Santa DR. Open dislocations of the trapezoid. *J Hand Surg* 1995;**20**:185-8.
3. Gay W. Dislocation of the trapezoid. *Boston Med Surg J* 1869;**81**:188.
4. Meyn MA, Roth AM. Isolated dislocation of the trapezoid bone. *J Hand Surg* 1980;**5**:874-8.
5. Stein AH. Dorsal dislocation of the lesser multangular. *J Bone Joint Surg AM* 1971;**19**:576-83.
6. Gelberman RH, Panagis JS, Taleisnik J, Baumgaertner M. The arterial anatomy of the carpus: part II – the intraosseous vascularity. *J Hand Surg* 1983;**8**:375-82.