Trans-Radial Styloid, Trans-Scaphoid, Trans-Triquetral Perilunate Dislocation

Sqn Ldr P J Schranz
FRCS(Ed), RAF

Wg Cdr P S Fagg
FRCS, RAF
The Princess of Wales Royal Air Force Hospital, Ely, Cambridgeshire CB6 1DN

SUMMARY: A rare case of trans-radial styloid, trans-scaphoid, trans-triquetral perilunate dislocation is described. The injury was treated by reduction and internal fixation using a Herbert screw and Kirschner wire. A good functional result was achieved. A review of the literature illustrates that early surgery is recommended. Alternative surgical approaches are discussed.

Case Report

A twenty-one year old factory worker fell from his motorcycle, landing on his outstretched left hand. On arrival in the casualty department the left wrist was tender and deformed, with paraesthesiae in the median nerve distribution. Radiographic examination revealed a dorsal perilunate dislocation with associated fractures of the scaphoid, radial styloid and triquetrum (Fig 1). That day, under a general anaesthetic, the perilunate dislocation was reduced by gentle distraction and palmar flexion of the wrist while maintaining thumb pressure on the lunate from the volar surface. The scaphoid fracture was then reduced and internally fixed with a Herbert screw (1) through a Russe approach (2) and the radial styloid reduced and fixed with a percutaneous K-wire (Fig 2).

Screening under image intensification suggested that the wrist was stable in slight flexion so it was immobilised in that position in a forearm cast for six weeks. The K-wire and cast were removed after six weeks and the wrist mobilised.

One year post injury the fractures of the scaphoid and radial styloid had united. The proximal fragment of the scaphoid appeared relatively dense. The avulsion fragment of the triquetrum remained un-united (Fig 3). There was no evidence of carpal instability on stress views of the wrist although the Herbert screw appeared rather vertical to the lunate suggesting some palmar flexion of the scaphoid. The median nerve paraesthesiae had recovered. The patient had no wrist discomfort and had returned to work. There was slight restriction of ulnar deviation, with 50 degrees of dorsiflexion and 65 degrees of palmar flexion. Grip strength was measured at 200mmHg compared with 260mmHg on the right. Using Green and O’Brien’s method of evaluation (3,4), our patient had good wrist function with a wrist score of 85 (good = 75-90).

Discussion

Mayfield and Johnson (5) described the mechanism of injury in perilunate fracture-dislocation as forcible wrist extension, ulnar deviation and intercarpal supination. They defined four stages of progressive perilunar instability with increasing levels of instability as the injury progressed through the greater arc, from the radial styloid, through the scaphoid, capitate and triquetrum with either rupture of the radial and ulnar triquetral ligaments or avulsion fractures off the triquetrum. The presence of an avulsion fracture of the triquetrum in association with a trans-scaphoid perilunate fracture-dislocation is indicative of a high degree of perilunar instability (Mayfield stage 3 and 4).

Morawa et al (6) reported poor results after the conservative treatment of trans-scaphoid perilunate fracture-dislocations. Adkison and Chapman (7) reported that the maintenance of an anatomical position of the carpal bones after closed reduction was only successful in thirty-two per cent of cases. They further reported that if the scaphoid fracture could not be maintained in an anatomical position there was a seventy-five per cent incidence of scaphoid non-union.

In contrast, Moneim et al (8) reported union in 15 out of 17 wrists after open reduction and K-wire fixation. In Morawa’s series (6) good results were reported in 8 out of 10 patients treated by primary open reduction.

Viegas et al (9) described union in 7 of 8 scaphoid fractures following early internal fixation using a Herbert screw.

There is a consensus of opinion that an early active surgical approach to treatment of these highly unstable injuries is more likely to result in stable carpus and good function. There is some controversy, however, as to the most appropriate surgical approach to use when internally fixing these fracture-dislocations.

The case described above was fixed through a volar...
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Figs 1 a + b Anteroposterior and lateral X-rays before reduction.

Figs 2 a + b X-ray appearance after reduction and internal fixation.

Figs 3 a + b X-ray appearance one year after injury.
Russe approach, using a Herbert screw inserted using the jig. Viegas et al (9) used the volar approach for scaphoid fixation in their series. Green and O’Brien also advocate the use of a Russe approach when using K-wire fixation.

However, they stress that midcarpal stability must be assessed radiographically after fixation of the scaphoid as the relationship of the capitate to the lunate is not well visualised through the Russe approach. This approach however does allow for immediate bone grafting and correction of flexion deformity in the more comminuted scaphoid fractures.

Early in their series, Adkison and Chapman (7) used a volar Russe approach but abandoned this in favour of a dorsal approach which they claim proved superior for the purposes of anatomic reduction and fixation. A dorsal approach does allow observation of the relationship between the scaphoid, lunate and capitate, facilitating accurate reduction. This approach also allows access to the triquetrum, if the dorsal incision is extended.

A combined dorsal and volar approach has been recommended by Cooney et al (10) to allow reduction and alignment of the scaphoid, capitate, lunate and triquetrum dorsally and repair of the palmar ligaments together with release of the median nerve through a volar approach.

Another uncertainty is the incidence of avascular necrosis with the reported incidence varying between ten per cent (6) and ninety per cent (11). Moneim (8) observed increased density in the proximal fragment of the scaphoid and considered it to be of no significance as long as the fracture was healing. Moneim reported that the increased density of the proximal scaphoid usually occurred between the fourth and sixth month after injury and was transient, taking several years to fully resolve.

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