Surgical Treatment of Trans-Scaphoid, Transcapitate, Transtriquetral, Perilunate Fracture–Dislocation with Open Reduction, Internal Fixation and Lunotriquetral Ligament Repair

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What is This?
SURGICAL TREATMENT OF TRANS-SCAPHOID, TRANSCAPITATE, TRANSTRIQUETRAL, PERILUNATE FRACTURE–DISLOCATION WITH OPEN REDUCTION, INTERNAL FIXATION AND LUNOTRIQUETRAL LIGAMENT REPAIR

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This paper presents a rare case of trans-scaphoid, transcapitate, transtriquetral, perilunate fracture–dislocation of the right wrist as a result of a motorcycle accident. Open reduction and internal fixation of the scaphoid and capitate with one screw was performed and the lunotriquetral ligament was repaired using a suture anchor.

Keywords: perilunate dislocation, trans-scaphoid, transcapitate, transtriquetral

Johnson classified the greater arc injuries to the wrist into three stages (Johnson, 1980). The Stage I lesion consists of a trans-scaphoid fracture, the Stage II lesion is a trans-scaphoid, transcapitate fracture and the Stage III lesion is a trans-scaphoid, transcapitate, transtriquetral, perilunate fracture–dislocation.

To our knowledge, there are only three previous reports in the English literature of Stage III lesions (Leung et al., 2006; Marsh and Lampros, 1959; Weseley and Barenfeld, 1972). We report a fourth case of Johnson’s Stage III lesion of the carpus treated by open reduction and internal fixation.

CASE REPORT

A 39 year-old right-handed man sustained a motorcycle accident. The exact mechanism of injury could not be established. Plain X-rays showed a right trans-scaphoid, transcapitate, transtriquetral, dorsal perilunate fracture–dislocation (Fig 1). Under general anaesthesia and arm tourniquet, open reduction was carried through a dorsal approach. The capitate had a proximal pole fracture and the scaphoid had a severely comminuted waist fracture (Fig 2A). The scapholunate ligament was intact. Both fractures were internally fixed with a single AO 3.0 mm cannulated screw (Synthes, Oberdorf, Switzerland) under fluoroscopy. Cancellous bone from the distal radius was used to graft the scaphoid fracture. The triquetrum had a proximal pole avulsion associated with a comminuted sagittal fracture of the body (Fig 2B). The lunotriquetral ligament was partially torn. A TWINFOX Ti 2.8 suture anchor (Smith and Nephew Endoscopy, Andover, MN, USA) was used to reattach the ligament. A splint was applied for 6 weeks.

At 1-year follow-up, the patient complained of no pain in his right wrist. Motion was 5° of flexion, 20° of extension, 70° of pronation and 60° of supination. The fractures healed uneventfully but X-rays showed a certain degree of intracarpal collapse (Fig 3). He achieved a DASH questionnaire score of 50 points (Rosales et al., 2002).

DISCUSSION

According to Johnson (1980), a trans-scaphoid, transcapitate, transtriquetral, perilunate fracture–dislocation represents a Stage III injury of the greater arc of the wrist. Mayfield et al. (1980) also described four stages of progressive perilunar instability. With respect to this classification, a force applied to the radial side of the wrist produces scapholunate instability (Stage I). As the loading force progresses, the instability increases to involve the capitate (Stage II) and the triquetrum (Stage III). Stage IV occurs when the lunate dislocates.

In respect of traumatic injuries to the carpus, Knoll et al. (2005) stressed the importance of repairing the lunotriquetral ligament. In respect of capitate fracture–dislocations, Fenton (1956) and Stein and Siegel (1969) advocated excision of the proximal pole, but other authors have recommended reserving this technique for use only in late cases with pain or limitation of motion (Adler and Shaftan, 1962; Cooney et al., 1987; Kaulesar Sukul and Johannes, 1992). Even when successful reduction and fixation of these lesions is carried out,
early degenerative changes of the midcarpal joint can be expected (Leung et al., 2006).

To our knowledge, there are no reports of treatment of the serious and rare Johnson Stage III injury by internal fixation with screws and ligament repair (Leung et al., 2006; Marsh and Lampros, 1959; Weseley and Barenfeld, 1972). In our opinion, open reduction and internal fixation provides adequate stability of the scaphoid and capitate fractures. Lunotriquetral ligament repair and triquetral fixation remain challenging technically. We recommend assessing the ligament anatomy and function during the surgery and stabilising the lunotriquetral joint when possible.
Fig 3 Wrist X-rays 1 year after surgery showing healing of the fractures but with a degree of intracarpal collapse.

References


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