PERCUTANEOUS HERBERT SCREW OSTEOSYNTHESIS IN TRANS-SCAPHOID PERILUNATE FRACTURE-DISLOCATIONS

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PERCUTANEOUS HERBERT SCREW OSTEOSYNTHESIS IN TRANS-SCAPHOID PERILUNATE FRACTURE-DISLOCATIONS (Abstract): Trans-scaphoid perilunate fracture-dislocation is the most common variety of fracture-dislocations of the wrist. Because of the carpal scaphoid fracture association, post-reduction stability is poor, often requiring surgery. Of the several surgical techniques used over time, percutaneous screw fixation for scaphoid fracture is currently preferred. **Material and methods**: Six cases of trans-scaphoid perilunate fracture-dislocation were surgically treated by percutaneous reduction of the scaphoid fracture and percutaneous insertion of Herbert screw in a proximal to distal manner. Postoperative immobilization was followed by rapid resumption of wrist mobility. Results: Four of the six patients have resumed normal, painless mobility of the wrist within 3 to 6 weeks post immobilization; in the remaining two cases there were a slight wrist stiffness attributed to persistent slight rotational deficiency between the fractured scaphoid fragments. **Conclusions**: The percutaneous Herbert screw fixation provides a firm fixation with good compaction of scaphoid fracture, enough stability to allow minimal soft tissue and local damage, early mobilization following minimal immobilization, and thus rapid healing. **Keywords**: TRANS-SCAPHOID PERILUNATE FRACTURE-DISLOCATIONS, PERCUTANEOUS OSTEOSYNTHESIS, HERBERT SCREW.

Trans-scaphoid perilunate fracture-dislocations are the most common pattern of carpal fracture-dislocation (1, 2). These injuries can lead to poor functional results (3, 4) as a result of wrist arthritis; therefore, overtime, treatment was focused on anatomical fracture reduction, stable fixation and rapid mobilization.

Closed reduction and cast immobilization often result in loss of reduction (44% - 68%) and/or scaphoid nonunion (23% - 27%) (5). Therefore, open reduction and internal fixation seem to be a reasonable alternative to the previous technique, but these methods are accompanied by soft tissue damage by extensive dissection and implicitly interruption of vascular supply.

Other techniques used in these fracture-dislocations were closed reduction with percutaneous fixation of the fracture, the advantages being minimal dissection, stable fixation and early mobilization. Initially, these techniques used Kirschner pins, but as these did not provide adequate inter-fragmentary compression cannulated screws that were successfully used in isolated fractures of the scaphoid were preferred (6).
MATERIAL AND METHODS

In the interval August-December 2012 6 patients presented to our unit with trans-scaphoid perilunate fracture-dislocations, the fracture line separating the scaphoid proximal pole from scaphoid body. Patients were aged 19 to 34 years; the incriminated mechanism was fall exerting an axial load with hyperextension and ulnar deviation of wrist. For diagnosis we used the Mayfield classification, five cases being stage 2 (fig. 1) and one stage 4.

Fig. 1. Wrist radiography (A - anterior-posterior and B – lateral views): trans-scaphoid perilunate fracture-dislocation Mayfield stage 2

In all cases the course of treatment consisted in emergency closed reduction of the carpal dislocation and plaster splint immobilization.

Post-reduction, radiological control showed in most cases a persistent misalignment between forearm bones and the first row of carpal bones and between the first and the second row of carpal bones observable by Gilula line interruption (fig.2). This was attributed to the imperfect reduction of the scaphoid fracture, causing dislocation instability and requiring surgery. To avoid extensive dissection, given its local vascular implications, we preferred a minimally invasive technique that consisted in percutaneous reduction of the scaphoid fracture and its fixation with a Herbert screw.

There was generally a waiting period of 4-7 days, while the hand was immobilized in brachiopalmar, proclive plaster splint; inflammatory and analgesic treatment was instituted. During this period edema had resolved facilitating our attempts at closed reduction of the scaphoid fracture.

Surgery was performed under loco-regional anesthesia (infra-clavicular plexus). Orthopedic fracture reduction was achieved and maintained with a temporary percutaneous olecranon forceps. A guide pin was introduced through the scaphoid tuberosity, then advanced to the proximal pole and exteriorized on the dorsal wrist, later serving to the introduction of the Herbert screw in proximal to distal direction (fig. 3).
Percutaneous herbert screw osteosynthesis in trans-scaphoid perilunate fracture-dislocations

Fig. 2. Post-reduction wrist radiography: A - anterior-posterior view - reduction of the scaphoid fracture with interfragmentary diastasis and maintaining a persistent interruption of Gilula lines, B – lateral view – reduction of the trans-scaphoid perilunate fracture-dislocation.

Fig. 3. Post-surgery wrist radiography: A - anterior-posterior view, B – lateral view, C – scaphoid view): good reduction of scaphoid fracture with compactness and good alignment between the carpal bones
Dislocation stability was then examined, only one of the six cases requiring additional stabilization with Kirschner pins. Post-reduction, in two of the six patients there was a slight rotator deficiency between the fractured scaphoid fragments.

Postoperative immobilization consisted of brachiopalmar plaster splint kept for 3 weeks and antebrachioalmar plaster splint for another 3 weeks, followed by physiotherapy.

Four of the six patients have resumed normal, painless mobility of the wrist within 3 to 6 weeks post immobilization; in the remaining two cases there was a slight wrist stiffness attributed to persistent slight rotator deficiency between the fractured scaphoid fragments.

**DISCUSSION**

Currently, most authors believe that for best results, all dislocations or perilunate fracture-dislocations of the wrist must be reduced and rigidly fixed as soon as possible. It is sometimes necessary to delay definitive treatment because of the general condition of the patient, excessive swelling of the hand and wrist, or the need for adequate surgical care.

Hee et al. (8), in 1999, in a study on 16 cases with trans-scaphoid perilunate fracture-dislocations obtained good results by open reduction and fixation with Herbert screw or Kirschner pins alone or with screw. Inoue et al. (9) in a study of 29 patients treated by open reduction and internal fixation with Herbert screw observed good functional results in patients immobilized for 4 weeks postoperatively compared to those immobilized for more than 5 weeks.

Lam et al. (10) introduced in 2002 the cannulated percutaneous screw fixation of the scaphoid fracture, a difficult technique that can be an alternative to open reduction technique of recent trans-scaphoid perilunate fracture-dislocations.

Wong (11), in 2008, in a retrospective study of 21 patients treated by closed reduction of the carpus dislocation associated with closed reduction and percutaneous screw fixation of scaphoid fracture followed by closed reduction and stabilization with Kirschner pins of the carpal dislocation obtained an average Mayo score of the wrist of 80, with three excellent and two poor results, concluding that minimally invasive techniques can be considered a good reverse shuttle to open techniques.

Excellent results with minimally invasive techniques were reported by Chou et al. (12). They used in a series of 24 patients a technique involving percutaneous screw fixation of the scaphoid fracture and axial fixation with Kirschner pins of the carpal dislocation performed 7 days after injury. Clinical results were evaluated based on the range of motion, pain, functional status, and Mayo scores, the authors concluding that this technique is an appropriate treatment for acute trans-scaphoid perilunate fracture-dislocations of the carpus.

**CONCLUSIONS**

The percutaneous technique with Herbert screw offers a good protection of soft tissue with minimal local implications and firm fixation, good compaction of scaphoid fracture providing a rapid healing with good stability post-reduction, with minimum immobilization and possibility of early mobilization.
REFERENCES


OLFACTORY DYSFUNCTION AND NEURODEGENERATIVE DISORDERS

Olfactory dysfunction is common, about 5% of the general population having anosmia and becomes more common with advancing age. Since many patients with neurodegenerative diseases - including Parkinson's or Alzheimer's - have early olfactory loss, testing for disturbances of the sense of smell is becoming important in neurology. Olfactory dysfunction is considered an early sign of neurodegenerative disorder that may facilitate diagnosis years before the onset of motor or cognitive disturbances. The use of anti-inflammatory drugs, surgery and olfactory training can help as the treatment for olfactory loss. (Hüttenbrink KB, Hummel T, Berg D, Gassner T, Hähner A. Olfactory dysfunction: common in later life and early warning of neurodegenerative disease. Dtsch Arztebl Int. 2013; 110(1-2): 1-7. doi: 10.3238/arztebl.2013.0001).

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