International Journal of Surgery 24 (2015) 57–63

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original research

Surgical treatment of dorsal perilunate fracture-dislocations and prognostic factors

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HIGHLIGHTS

- Perilunate fracture-dislocations are rare injuries which result from high energy traumas.
- Anatomic reduction and stable fixation are obligatory.
- The mechanism of injury is an important determiner to decide the type of treatment.

ARTICLE INFO

Article history:
Received 8 July 2015
Received in revised form 23 September 2015
Accepted 24 October 2015
Available online 2 November 2015

Keywords:
Perilunate fracture-dislocation
Dorsal perilunate fracture-dislocation
Surgical treatment
Prognostic factors

ABSTRACT

Introduction: Perilunate injuries are rare entities which can be difficult to diagnose. Most common type is dorsal perilunate fracture dislocation (97%). The purpose of treatment is anatomic reduction and stable fixation. We aimed to present the radiologic and functional results of surgically treated dorsal perilunate fracture-dislocations and discuss the factors influencing the prognosis.

Methods: Between 2007 and 2013, 17 patients were operated for perilunate fracture-dislocations. The mechanism of injuries, soft tissue traumas, etiologic factors and stages according to Herzberg classification were determined. The MAYO wrist score was used for functional evaluation. Scapholunate distance and scapholunate angle were measured and, degenerative changes were investigated by comparing with contralateral side on plain x-ray images in terms of radiologic evaluation.

Results: Mean follow-up was 37,8 (range, 16–84) months. The average age at surgery was 35.1 (range, 18–51) years. Fifteen patients were male and two were female. Functional results were excellent in four (23.5%), good in two (11.8%), satisfactory in five (29.4%) and poor in six (35.3%) patients. Degenerative changes were determined in radiocarpal and mid-carpal joints of 14 wrists (82.4%). Scapholunate dissociation more than 2 mm was detected in three wrists. In four wrists osteochondral fragments were determined on the head of the capitate. Stage 2 lesions, delayed presentations, open fractures, scapholunate dissociations more than 2 mm had worse functional results.

Conclusion: Despite anatomic reduction, ligamentous and chondral injuries that occured at the time of trauma may cause persistant wrist pain in patients who suffer perilunate fracture dislocation. Mechanism of injury, presence of soft tissue defects and the time between injury and treatment can affect clinical and radiologic results.

1. Introduction

Perilunate fracture-dislocations are rare injuries which require surgical treatment mostly [1]. They constitute 10% of the carpal injuries [2]. This high energy injuries generally occur after fall on an

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http://dx.doi.org/10.1016/j.ijsu.2015.10.037
1743-9191/

outstretchced hand. The main mechanism is distruption of relation between lunate and capitate bones followed by displacement in anteroposterior direction that cause ligamentous injury and/or carpal fractures. The most common type is dorsal perilunate fracture-dislocation (97%) [3]. The 25% of perilunate fractures and fracture-dislocations are missed in diagnosis and delayed treatment may cause poor outcomes [3].

The treatment of perilunate fracture-dislocations may vary according to the mechanism of injury and there is no concensus in literature. In this retrospective study, we aimed to present the radiologic and functional results of surgically treated dorsal perilunate fracture-dislocations and discuss the factors influencing the prognosis.

2. Methods

Between 2007 and 2013, 24 patients were operated for perilunate fracture-dislocation. Twenty one patients had dorsal (87.5%) and three patients (12.5%) had volar dislocations (Fig. 1). Patients who do not have enough follow-up or data were excluded from the study. Seventeen patients (2 females, 15 males; mean age 35.2 (range, 18–51) years) with dorsal dislocation were included (Table 1).

The average period between injury and procedure was 1.4 days (range, 12 hours-3 days). Closed reduction was achieved in six wrists and open reduction was needed in 11 patients. The K-wires were placed under fluoroscopy for stabilisation. Open reduction was performed through dorsal approach. In two patients, median nerve decompression was needed via additional volar incision. Concomitant scaphoid fractures were fixed with headless compression screw in six patients (Fig. 2). In two patients, scapholunate ligament was repaired with suture anchor. Unilateral external fixator was applied in three patients for additional stability. A short arm cast was applied in the remainders. The casts and K-wires were removed with a mean of 8.06 (6–10) weeks after surgery and range of motion exercises were started. In patients with external fixator, the K-wires were removed at sixth week and external fixator at eight week after surgery (Table 2).

The etiology, mechanism of injury, concomitant injuries, and stage of the injury according to the Herzberg classification [3] were determined (Fig. 3). Mayo wrist score was used for functional evaluation. The severity of the pain, return to the work, range of motion, and grip strength were evaluated. Scapholunate distance and scapholunate angle were measured; degenerative changes and osteochondral lesions on the head of the capitate were investigated by comparing with contralateral side on plain x-ray images in terms of radiologic evaluation.

3. Results

Twelve patients had right sided and five had left sided injury. The mechanism of injury was fall from height in 15 patients, simple

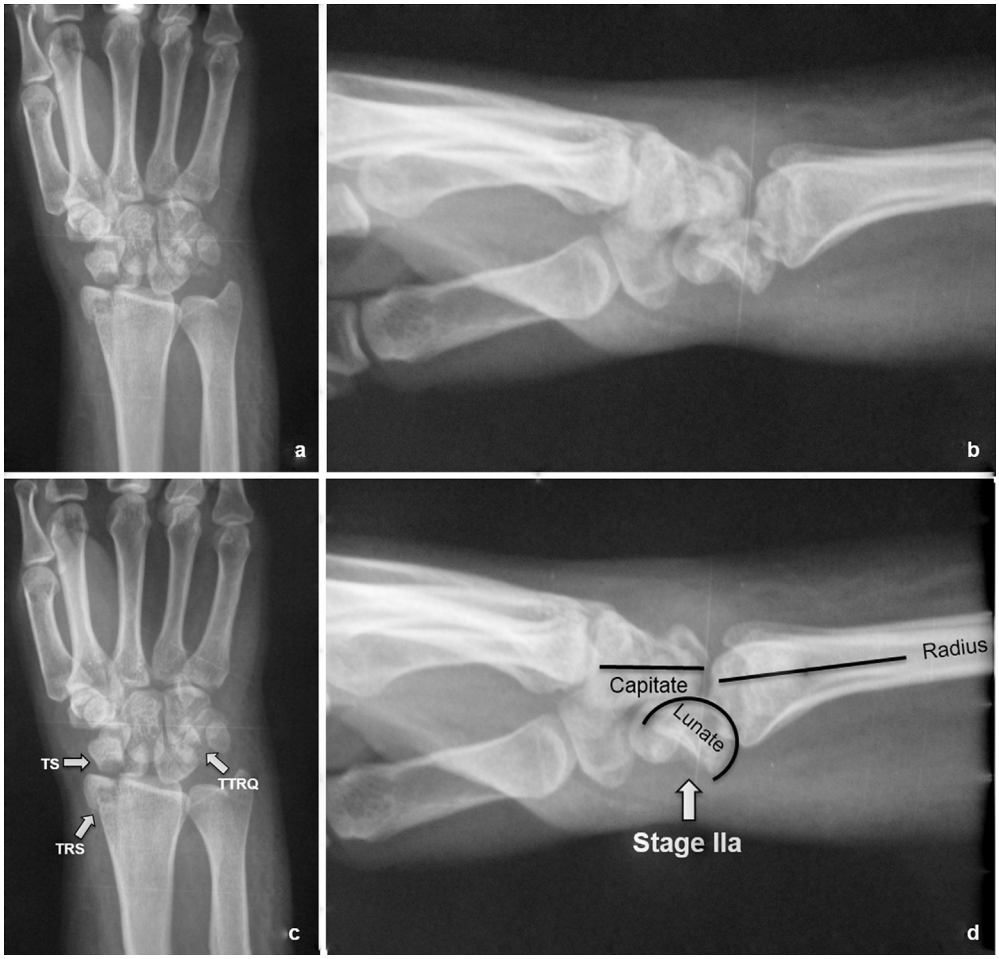

Fig. 1. a, b. The anteroposterior (AP) and lateral radiographs of left wrist of a 25 year-old female after fall from height. c. Trans scaphoid, trans radial-styloid, trans triquetral perilunate fracture dislocation on AP view. d. The relation between longitudinal axes of the radius and capitate. Volar dislocation of the lunate. (Herzberg Stage 2A perilunate fracture dislocation).