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CONGRÈS
SOCIÉTÉ FRANÇAISE DE CHIRURGIE DE LA MAIN

16 · 17 · 18
DÉCEMBRE 2021
PALAIS DES CONGRÈS
PARIS



Dorsal perilunate carpal dislocations : a retrospective study spanning a ten-year period with a minimum nine year follow-Up

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INTRODUCTION :

-Perilunate dislocations are relatively rare, making up a reported of less than 10% of all wrist injuries [1]. They result from high-energy trauma and one fourth of patients are not treated in a timely manner as these injuries are missed by the initial treating physicians [2]. This percentage is still higher in developing countries due to lack of awareness about this lesion, inadequate diagnostic evaluation, or patients not seeking medical care. If overlooked or not treated correctly, perilunate dislocations frequently result in chronic pain and functional loss due to residual ligamentous instability, deformity, or/and arthritis [3]. Thereby, prompt recognition and appropriate management of these devastating carpal injuries are important to optimize outcomes.

-This study aims to evaluate the clinical, functional and radiological outcomes of surgically managed perilunate dislocations.

MATERIALS AND METHODS :

-We reviewed patients with perilunate dislocations who were treated at our hospital from January 2003 to December 2012. The inclusion criteria were: adult patients (age ≥ 18) presented with an isolated perilunate dislocation or a fracture-dislocation. Patients who did not give their consent and patients with under nine-year follow-up were excluded.

-Demographic data, baseline injury details (laterality, hand dominance, mechanism and trauma etiology, concomitant fractures, whether the injury was initially missed or misdiagnosed) as well as clinical and radiological findings were recorded. All patients were managed operatively and surgical details including time to surgery, operative approach, fixation methods, and treatment complications were assessed.

-Patients were followed up at 6 weeks, 3 months, 6 months, 12 months then annually. The mean follow-up period was 13 years (range : 9,17 years).

-At each visit, patients were assessed for range of motion (ROM) and grip strength, pain at rest and with activity was evaluated by visual analog scale (VAS). In addition, Mayo wrist and Disabilities of the Arm, Shoulder, and Hand (DASH) scores were obtained for all patients at the time of final follow-up. The data was also analysed for perioperative complications, reoperation, and revision surgeries.

-Categorical variables were described with absolute and relative frequencies. For quantitative variables, the mean, standard deviation and range were calculated.

RESULTS :

-In this study, 47 patients met inclusion criteria. There were 40 males (85%) and 7 females (15%) with a mean age of 27.5 years (range 18 to 48). Motor vehicle collisions were the main cause of injury (64%), followed by fall from a height (19%) and contact sporting (17%).

-On clinical examination, there was tenderness over carpal bones. The wrist movements were grossly restricted. There were no distal neurovascular deficits. On initial presentation, 30% were missed by primary care providers.

-Conventional radiographs of the wrist joint demonstrated classical signs of a perilunate dislocation or a fracture-dislocation. Overall, 55% were greater arc fracture dislocations with the remainder involving purely ligamentous lesser arc injuries. All displacements were posterior. The transscaphoid perilunate fracture-dislocations represented 90% of the perilunate fracture-dislocations and 50 % of the whole series.

-The average time to surgery was 12.4 days and 11 patients (23%) had more than 3 weeks delay. Most patients (85%) underwent open reduction through a dorsal approach to the wrist -between the 3rd and 4th extensor compartments-, with percutaneous pinning of the scapholunate, capitulunate and triquetrolunate junctions, while the rest (15%) had internal screw fixation. An immobilization for 6 weeks was put in place and was performed using a forearm cast. The patient was encouraged to actively move the fingers immediately postoperatively.

-At the final follow up, the average duration of the work stoppage leave was 7 months. Mean pain on load, measured with VAS was 1.2 ± 1.5 . Clinical examination assessed a mean wrist extension/flexion of $41.9^\circ \pm 18.3^\circ/49.1^\circ \pm 14.2^\circ$. Mean wrist ulnar/radial deviation was, respectively, $22.8^\circ \pm 12.3^\circ/15.5^\circ \pm 6.9^\circ$. The mean range of flexion was 70% and extension was 59% relative to the contralateral side. The mean grip strength was 69%.

-The mean Mayo wrist score was 72.9 ± 15.8 and the mean Quick Disabilities of the Arm Shoulder score was 15.2 ± 13.3 . One patient had a scaphoid non-union identified on his most recent imaging. Complex regional pain syndrome, arthritis and lunate avascular necrosis were identified, respectively, in 20%, 22% and 64% of cases.

DISCUSSION :

-Perilunate dislocations are challenging to treat and can be associated with devastating consequences. The results of our study highlight two main issues, the failure to recognise these injuries at initial presentation and the other one is its appropriate management.

-The patients included in the study were young active men, and other literature has also reported that injuries were usually seen in a similar age range [4,5]. The radiograph of a wrist could be challenging, and the images may require review by a specialist radiologist or an orthopaedic surgeon to avoid missing subtle injuries. In one study, the majority of the patients were missed by primary physicians who may lack the experience to recognise perilunate dislocations on plain radiographs [6]. We noticed similar findings as all the patients missed in our study were first seen in accident and emergency. The specialist orthopaedic team later diagnosed these patients.

-The typical radiographic appearances of a perilunate dislocation include disruption of the Gilula arcs. On the lateral view, the lunate no longer articulates with the head of the capitate, but appears palmarly rotated, the so-called 'spilled teapot sign' [7]. CT scan films are helpful in confirming the diagnosis.

In most of our patients, the injury type was a fracture-dislocation (71%). Similarly, previous studies also reported that fracture-dislocation type injuries were more common [5,8].

-Even though the gold standard for perilunate injuries is surgery, a controversy toward its management remains. Various implants have been used for stabilisation of the dislocation after reduction such as compression screws, cerclage wires and K-wires. In our series, all cases were treated by open reduction and internal fixation (ORIF) with percutaneous K-wires (or compression screws) via a single dorsal approach.

Aspergis et al. compared the result of closed treatment versus operative repair and illustrated that all patients treated closed had poor results, while those treated open reported good-to-excellent results [9]. Yu et al. showed that ORIF can be used to achieve good results in patients with both acute and delayed perilunate dislocations [10].

-Arthroscopic techniques have been reported for the treatment of perilunate injuries. They are used to diagnose occult injuries but there is not enough evidence to show the superiority of the outcome over open operative management [11].

-In this study, the range of motion and grip strength were within the normal range. These findings were consistent with results from previous studies [12,13]. Signs of posttraumatic arthritis increase progressively, but clinically, they are well tolerated according to the study of Forli et al [14]. The mean Mayo and DASH scores were found to be similar to those of the earlier studies [10,12].

CONCLUSION :

We believe patients with perilunate dislocations require detail assessment clinically and radiographically. Hence a specialist help should be sorted earlier in the direction of treatment to avoid unnecessary delay. The best results can be obtained with open reduction and internal fixation with K-wires via a dorsal approach.

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