

Diagnostic Wrist Arthroscopy and Open Repair for Dorsal Lesser Arc Perilunate Injury- A Case Report

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Abstract

Introduction: Perilunate injuries though rare injuries but are one of the most devastating injuries to the carpus that can alter the lifestyle of those sustaining them. One of the problems associated with this injury is the difficulty of its accurate and early recognition, mainly lesser arc dislocation. The exact location and extent of ligament disruption in case of irreducible or unsatisfactory reduction is supplemented by wrist arthroscopy now days.

Case Study: We report a case of lesser arc perilunate dislocation which presented to us two days following trauma managed initially by closed reduction. Diagnostic arthroscopy revealed mid substance tear of scapholunate ligament which was repaired using single dorsal incision and stabilized using two K wire. Patient was assessed clinically using DASH score and radiologically using scapholunate angle and capitulate angle at final follow up. Vigilance with early diagnosis and treatment is required for good functional and radiological results for ligamentous perilunate dislocations.

Keywords: *Perilunate; Arthroscopy; Scapholunate; Lesser Arc*

Introduction

Perilunate dislocation although rare should be considered as one of the important differential diagnosis in patients with history of trauma to the wrist [1]. Of all wrist dislocation, the perilunate is the most common and the most common pattern among perilunate instability is the transscaphoid perilunate fracture dislocation [2]. Lesser arc perilunate dislocation which are characterized by pure ligamentous injuries around the lunate are uncommon injuries. We report such a case and discuss the mechanism, diagnosis, management and outcome.

Case Report

A 32-year adult right hand dominant man sustained an isolated injury to his left wrist after fall from a height of approximately 3m with his left wrist extended. The carpal injury was missed initially and the wrist had been bandaged for two days following trauma. Patient was referred to our hospital two days later with the complaints of increasing pain and numbness on palmar aspect of 1st, 2nd and 3rd finger. On examination wrist was deformed in marked dorsiflexion, swollen, tender to palpation with limitation of movements. Meticulous sensory examination revealed numbness in the median nerve distribution area of hand. The mobility of fingers was normal but painful and tinell's sign was negative over carpal tunnel. These findings led us to think that there is not any condition like acute carpal tunnel syndrome and numbness was due to temporary injury of median nerve caused by direct impact during fall. Therefore, electromyography and nerve

conduction studies of median nerve were not attempted. Radiograph showed no osseous pathology suggesting a lesser arc perilunate dislocation with grade II rotation of lunate according to Witvoet and Allieu [3] (Figure 1). Closed reduction was done in emergency under regional block following which immobilization and repeat radiograph and 3D computed tomography (CT) scan of wrist were done. It showed scapholunate (SL) angle and capitulunate angle (CL) to be 88 degree and 18 degree respectively and Terry Thomas sign suggesting of a persistent scapholunate dissociation (SLD) indicating a poor prognosis if not corrected. SL angle greater than 60 degree suggests SL instability and if greater than 80 degree confirms SL instability. CL angle greater than 15 degree is suspect but if greater than 20 degree confirms SL instability [4] (Figure 2). The pain and numbness that the patient was complaining resolved spontaneously after closed reduction.



Figure 1: AP and lateral radiograph showing perilunate



Figure 2: Radiograph and CT Scan showing persistent SLD after closed reduction with Terry Thomas sign and SL angle of 88 degree (Sc: scaphoid, Lu: lunate, Ca: capitate, Ra radius)

The patient was then taken up for surgical intervention. Diagnostic wrist arthroscopy was done which helped in confirming the mid substance tear of SL ligament. According to Geissler [5] arthroscopic classification of SL injury, grade IV injury was identified. Dorsal approach to the wrist between 3rd and 4th extensor compartment was used. Dorsal capsule was incised to expose the proximal carpal row. Mid substance tear of SL was repaired using prolene 4-0 and reduction was secured using two (1.5 mm) K wire between scaphoid and lunate. Intraoperative reduction was confirmed. Capsule was repaired and wound was closed and immobilization in a below elbow slab was done (Figure 3). After suture removal short arm cast immobilization was done. The cast and K wires were removed after eight weeks and patient was put on physiotherapy sessions starting with gentle active and active assisted range of motion exercises and gradually progressing to grip strengthening exercises. The patient was followed up at regular interval and his recent radiograph at the completion of 16 months showed satisfactory alignment of the carpal bones (Figure 4). Clinically the patient recovered near normal range of movements at the wrist joint. Wrist extension, flexion, radial deviation and ulnar deviation were 59 degrees, 71 degrees, 15 degrees, 29 degrees respectively. Disabilities of the Arm, Shoulder and Hand (DASH) score was used for subjective assessment of outcome and was found to be 43.8 at 3 months and 19.6 at final follow up of 16 months.



Figure 3: Postoperative radiograph showing anatomic reduction and stabilization of the carpus with K wires.



Figure 4: 16 months follow up, radiographs showing SL angle 58 degree and CL angle 13 degree, clinical photographs showing near normal range of motions (Sc: scaphoid, Lu: lunate, Ca: capitate, Ra: radius).

Discussion

In perilunate dislocation, the capitate and remainder of the carpus dislocate around the lunate, which lies within the lunate fossa of the distal radius. While a lunate dislocation refers to the lunate as it dislocates from the lunate fossa of the distal radius, this is but one of the stages in the continuum of a perilunate dislocation [6]. Most dorsal perilunate injuries occur as a consequence of a fall from a height on the outstretched hand in typically extended and ulnarly deviated position [7]. Injury in this patient occurred by hyperextension mechanism due to fall on outstretched hand. Upto 25% of perilunate dislocation are frequently missed at initial presentation [8]. And it is usually the lesser arc dislocation that is missed because of the lack of an obvious osseous pathology and inexperience of the initial observer. Adequate clinical history and careful physical examination will help in early detection of these injuries. The typical radiographic appearance include disruption of proximal and distal outline of proximal carpal rows (Gilula lines) and on lateral view, the lunate no longer articulates with head of capitate [9]. Mayfield [8] showed that disruption of ligaments due to perilunate dislocation follows the progressive perilunate instability pattern with stage I resulting in scapholunate dissociation and stage II to stage IV in progressively worse perilunate instability.

Majority of perilunate injuries are irreducible or unstable in which scapholunate dissociation or lunotriquetral dissociation persists even after closed relocation, both indicating poor reduction and a poor prognosis if not corrected. Open reduction and ligament repair should be undertaken in all such cases where there is the slightest doubt about reduction or stability. The result of closed reduction and cast immobilization even in reducible injuries are unpredictable with loss of reduction due to cast loosening. In a study by Apergis and colleagues [10] of 28 patients, all patients treated by casting had poor to fair results and 65% of ORIF patients had good to excellent results. The use of percutaneous K wire for reducible dislocation after closed reduction is now recommended [4]. Arthroscopy can be used to determine the extent of ligament disruption, as well as to classify and treat SL injuries. Arthroscopically Geissler and colleagues have identified four grades of ligament injury and were treated accordingly [5]. Dorsal approach was used for repair of scapholunate ligament. Budoff [11] supports the fact that the dorsal approach is sufficient as volar capsular tear will heal itself when anatomic reduction is achieved after dorsal fixation. In case where SL ligament is found to be torn off the bone, intraosseous suture retaining anchors allow ligament attachment directly to bone. Several clinical studies have shown that delay between injury and treatment worsens the prognosis with neglected cases resulting in pain, weakness, stiffness, post traumatic arthritis and carpal tunnel syndrome [12]. Adequate regular follow up of the patients is essential to prevent recurrence of carpal instability.

Conclusion

Perilunate dislocations are the complex injuries that must be treated by prompt closed reduction, followed by repair or reconstruction of ligamentous structures. Two of the most important factors affecting outcome are surgical delay of greater than four to six weeks and quality of reduction and carpal alignment following definitive management. Patients must be counseled adequately regarding outcomes and complications even if treated within acceptable time parameters. Recognition of the pattern and magnitude of injury is paramount in providing immediate and complete care to the patients.

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