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Perilunate Dislocation Above the Age of 65 Years: Case Series and Review of Literature

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Abstract

Introduction: Perilunate and fracture dislocations predominantly follow a high-energy mechanism. Perilunate dislocations have an incidence of $0.5/10^5$ individuals/year, occurring at a mean age of 26 years and are frequently seen in men. This study aimed to describe the characteristics of this injury in elderly population of patients using literature review and our experience with four cases aged >65 years. **Materials and Methods:** We treated four patients with perilunate dislocation aged >65 years. All the patients' medical records were reviewed retrospectively. A literature review for case studies of perilunate dislocation was conducted with the purpose of finding cases including patients aged >65 years. **Results:** Three of our patients had injuries that were missed in the first visit in the emergency department. The mechanism of injury was high energy in only two patients. Two patients had posterior perilunate dislocation, while the other two had transradial perilunate dislocation. Three patients were available for follow-up. The overall outcome was satisfaction according the Mayo wrist score and minimal disability according to the Disabilities of the Arm, Shoulder and Hand score. All patients reported that pain was absent and they were able to return to their regular activities. The literature review found only seven papers documenting treatment of patients aged >65 years. **Discussion:** Perilunate dislocation is extremely rare in the population aged >65 years. Although the rate of missed diagnosis in our cohort was extremely high, the overall satisfaction and return to function was high. **Conclusions:** This case series and literature review highlight the unique characteristics of this injury in the age group of patients aged >65 years. Although perilunate dislocation in patients aged >65 years is rare, clinicians should be aware of the presentation of this condition in the elderly.

Keywords

age, dislocation, fracture, perilunate, wrist

Background

Perilunate fracture dislocations predominantly follow a high-energy mechanism of hyperextension, ulnar deviation, and intercarpal supination injury to the wrist. Perilunate fracture dislocation is the most common form of wrist dislocation and encompasses a spectrum of injuries, which can include both ligamentous and osseous disruption.[1]

Data documenting the global epidemiology of these injuries are limited. One study has demonstrated that of all

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patients with a carpal fracture, only 7% sustained multiple carpal fractures, with almost half of these being perilunate fracture dislocations and over 90% involving a fracture to the scaphoid.[2] Work from Edinburgh on dislocations has demonstrated that perilunate dislocations have an incidence of $0.5/10^5$ individuals/year, occurring at a mean age of 26 years, and are frequently seen in men.[3] The injury is frequently seen in young men with strong bones because the distal radius and the scaphoid need to be strong enough to resist the amount of torque that results in a perilunate dislocation.[4]

The six types of wrist dislocations are dorsal perilunate, lesser arc; dorsal perilunate fracture dislocations, greater arc; palmar perilunate, lesser or greater arc; radiocarpal; axial; and isolated carpal bone.[5] Time from injury to treatment (delay in treatment), anatomic classification, and open or closed nature of the injury are the major factors that determine the clinical outcome in perilunate dislocations.[6] Herzberg et al.[4] have classified perilunate dislocations into three phases. The acute phase is defined as the first week after injury, the delayed phase is the period between the 7th and 45th days of injury, and those thereafter are classified as the chronic phase. Despite optimal management, the prognosis of this injury is relatively poor, and most patients experience a loss of grip strength and motion and also develop radiographic signs of arthritis and carpal collapse. The major poor prognostic indicators are a delay in treatment greater than 28 to 45 days, open injuries, and persistent carpal malalignment.[7]

Although this type of injury is severe, incorrect or missed diagnosis may cause a delay in the treatment in up to 25% of the cases.[4] If the acute phase is missed, some authors recommend alternative procedures, such as proximal row carpectomy, intercarpal arthrodesis, or radiocarpal arthrodesis, for delayed or chronic phase transscaphoid perilunate dislocation.[8]

This study aimed to describe the characteristics of this injury in the elderly population using literature review and our experience with four cases.

Methods

We treated four patients with perilunate dislocation (two men and two women) aged >65 years (average age, 75 years; 68, 71, 80, and 81 years). All the patients' medical records were reviewed retrospectively. Data were collected from medical files and radiographs, and the patients were examined in our outpatient clinic. Clinical outcomes were assessed according to the Disabilities of the Arm, Shoulder, and Hand (DASH) score[9] and Mayo wrist score[10,11]; wrist range of motion was assessed using a goniometer and grip power using a JAMAR® dynamometer at the most recent examination.

Literature review was initiated, and the MEDLINE database and the Cochrane Library were searched for English language papers. The terms "perilunate dislocation," "wrist injuries," and "carpal fracture" were used.

Results

We treated four patients. Only one patient with an open injury was operated on the day of injury, while three other patients had injuries that were missed in the first visit in the emergency department (Table 1). The mechanism of injury was high energy in only two patients. Two patients had posterior perilunate dislocation, while the other two had transradial perilunate dislocation.

All patients were managed using a dorsal approach; fractures and the carpal bones were reduced and fixed with Kirschner wires (KWs); one patient had scapholunate ligament repair and one patient had a partial fusion between the lunate–scaphoid–capitate 1.5 months after the injury.

Three of the four patients were available for follow-up (Table 2). The overall outcome was satisfaction according to the Mayo wrist score (65, 60, 65) and minimal disability according to the DASH score (2.5, 3.3, 5.8). All patients reported no pain and returned to their regular activities. The only patient lost to follow-up had an open injury with severe transradial dislocation that was fixed with only two KW, and an X-ray 6 weeks post-operation demonstrated a failure of fixation.

During literature review, we found only seven studies documenting the treatment of patients aged >65 years (Table 3).[10,12-17] Only two studies provided details about the patients. Campbell et al.[12] treated two patients aged 67 and 69 years, the latter with transradial styloid posterior perilunate dislocation. Sotereanos et al.[17] treated a patient aged 72 years with transscaphoid, transradial styloid, transtriquetral perilunate dislocation.

Discussion

Perilunate dislocation is a rare incidence in all comers.[3] Our literature review demonstrated that this injury is extremely rare in the population aged >65 years. We treated two women and two men aged >65 years, of which only two resulted from a high-energy mechanism.

Time from injury to treatment is important for the clinical outcome,[6] and an incorrect or missed diagnosis may cause a delay in the treatment of up to 25% of the cases.[4] We treated three patients with a missed diagnosis. The only patient that was diagnosed immediately suffered from an open injury that could not be missed. The high incidence of missed diagnosis is attributed to the rare incidence of this injury in this age group.

Table 1. Demographic and Injury Characteristics.

Patient	Male/ female	Age at time of injury	Injured side	Dominant side	Mechanism of injury	Other injuries	Time to surgery	Open/ close injury	Dislocation	Fixation
1	F	81	Rt	Rt	Fall from standing	Non	10 days	Closed	Transradial styloid perilunate dislocation	L-SC, SC-CA, TR-L, RADIAL STYLOID
2	M	71	Lt	Rt	Fall from standing	Non	9 days	Closed	Dorsal perilunate dislocation	L-SC, SC-CA + SLIL Recon
3	F	80	Rt	Rt	Fall from electric mobile vehicle	Non	0 day	Open	Transradial styloid dorsal perilunate dislocation	SC-L, RADIAL STYLOID
4	M	68	Rt	Rt	Fall from a ladder	Ipsilateral shoulder dislocation	1.5 months	Closed	Dorsal perilunate dislocation	PARTIAL FUSION SC + L + CA

L-SC, lunate-scaphoid; SC-CA, scaphoid-capitate; TR-L, triquetrum-lunate; SLIL, scapholunate interosseous ligament.

Table 2. Outcome Measures.

Patient	Follow-up	DF	PF	Pronation/supination	Strength (kg)	DASH Score	Mayo wrist score
1	5 years	Rt 40, Lt 60	RT 40, LT 60	Full	Rt-16 Lt-10	2.5	65
2	6 months	Rt 40, Lt 60	RT 40, LT 50	Full	Rt-35 Lt-15	3.3	60
3	1 month	NA	NA	NA	NA	NA	NA
4	9 months	Rt 35, Lt 70	RT 60, LT 60	Full	Rt-22 Lt-35	5.8	65

DF, dorsiflexion; PF, palmar flexion; NA, not applicable.

Table 3. Case Series of Perilunate Dislocation with Patients Above 65 Years Old in the English Literature.

Article	No. of patients	Age range	No. of patients above 65 years (age)	Type of injury	Result
Campbell (1964)	50	16–68	2 (67, 69)	1-transradial styloid posterior perilunate dislocation	Poor
Panting (1984)	61	10–70	NA		NA
Garcia-Elias (1986)	87	17–74	NA		NA
Cooney (1987)	38	15–71	NA		NA
Inoue and Imaeda (1997)	28	17–67	NA		NA
Sotereanos (1997)	11	22–72	1 (72)	Transscaphoid, transradial styloid, transtriquetral	NA
Israel (2016)	65	17–73	NA		NA

Given the high-energy nature of these injuries, up to 10% of these injuries are open, 26% are associated with polytrauma, and 11% have concomitant injuries of the upper extremity, such as a distal radioulnar joint dislocation and/or elbow injury.[18] We treated two patients with high-energy trauma, one of them with concomitant ipsilateral shoulder dislocation. The literature review could not find details on the mechanism of energy nor on the concomitant injuries of elderly patients.

The types of wrist dislocation[5] in our patients were posterior lesser arc in two patients and posterior transradial perilunate dislocation in the two others. We were surprised

to find a 72-year-old patient with transscaphoid, transradial styloid, transtriquetral perilunate dislocation[17] in the literature review because scaphoid fractures in this age group are extremely rare and were estimated to be less than 0.5 per 100 000 person-year.[19]

The treatment of choice for acute injury is open reduction, ligament repair, and internal fixation.[20,21] We treated three patients admitted within 10 days from the injury using this method. One patient missed for 6 weeks had a salvage procedure. In the literature review, we could not find any specific description of the treatment.

The prognosis of this injury is relatively poor; most patients experience a loss of grip strength and motion and develop radiographic signs of arthritis and carpal collapse. However, these clinical measurements and radiographic changes do not correlate with patient satisfaction or the ability to return to work.[21] Three of our patients who were available for follow-up might have presented with good satisfaction because of the low demand with this age group.

This work has the disadvantages of a small number of cases and limited availability of information in literature for this type of injury in this age group probably because of its rarity.

This case series and literature review highlight the unique characteristics of this injury in the age group of patients aged >65 years. The injury pattern is similar, the treatment is the same, but the results are very good compared to younger patients. Although perilunate dislocation in patients aged >65 years is rare, clinicians should be aware of the presentation of this condition in all aged groups, including the elderly and the need for examination and accurate imaging, especially that this condition is uncommon, and the incidence of incorrect or missed diagnosis is high.

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Ethical Approval

The study was approved by the local ethical committee.

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