

Case report

Trans-Scaphoid Lunate Fracture Dislocation: A Case Report of a Rare Injury

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ABSTRACT

Trans-scaphoid lunate dislocation is an uncommon injury but can be devastating, causing loss of wrist joint movement and function, and compromising grip strength. In this report, we present a case of a 48-year-old man with a history of psychiatric disorder who attempted suicide by jumping from the second floor. He sustained a volar lunate dislocation and scaphoid fracture, with migration of the proximal part of the scaphoid to the volar aspect of the forearm. Open surgical reduction was planned through a dorsal approach: first, the lunate was reduced, then the proximal part of the scaphoid was retrieved from the volar aspect of the forearm and anatomically fixed with a 2.5 mm headless screw. The scapholunate relationship was reduced and fixed with two wires through the scapholunate and scaphocapitate joints. The wound was closed in layers, and the wrist joint was immobilized with a dorsal splint for six weeks. Six weeks postoperatively, the K wires were removed, and the patient started physiotherapy. At three months postoperative follow-up, the wrist joint function was good, with good grip strength and a good range of motion. The gold standard treatment option is open reduction and fixation of the fractured bone and stabilization of the carpal bones in anatomical alignment to reduce possible complications such as median nerve compression, chronic carpal instability, chronic wrist pain, loss of grip strength, wrist arthritis, and carpal collapse.

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INTRODUCTION

Carpal bone injuries, though rare compared to other fractures, can present in a wide variety of patterns including pure dislocations of the intercarpal joints, isolated fractures, or complex fracture-dislocations. Trans-scaphoid lunate fracture-dislocations, a particularly complex form of carpal injuries, result from high-energy trauma. These injuries are challenging to diagnose and treat due to the intricate anatomy of the wrist, and if left untreated or misdiagnosed, they can result in serious functional deficits including loss of wrist mobility, grip strength, and chronic wrist pain [1]. Lunate dislocations and scaphoid fractures are typically caused by wrist hyperextension combined with ulnar deviation during high-energy trauma such as falls or motor vehicle accidents. The unique anatomical and mechanical properties of the wrist allow such injuries to occur when significant axial forces are applied [2]. In cases of lunate dislocation combined with scaphoid fracture, the proximal fragment of the scaphoid may migrate, leading to further complications if not promptly addressed. These injuries are often misdiagnosed in emergency settings due to subtle radiographic findings. Early identification is crucial to reduce the risk of long-term complications such as chronic carpal instability and arthritis [3]. Diagnostic clues include the "piece of pie" sign on posteroanterior (PA) views and the "spilled teacup" sign on lateral views, both indicating lunate dislocation [4]. Management of such injuries typically involves open surgical reduction of the dislocated lunate and fixation of the fractured scaphoid to ensure proper realignment of the

carpal bones. Proper stabilization is crucial to prevent long-term complications, which may include median nerve compression, chronic pain, or carpal collapse [5]. This case report presents a rare case of trans-scapoid lunate fracture-dislocation and highlights the importance of timely intervention and follow-up care.

Case presentation

A 48-year-old man with a history of psychiatric disorder attempted suicide by jumping from the second floor. He came to Albyda Medical Center Hospital in Libya on 20 May 2024 complaining of bilateral wrist pain and swelling. On examination, there was obvious left wrist swelling and deformation, but there were no other injuries. X-rays of both wrist joints revealed a non-displaced scaphoid waist fracture in the right wrist and a trans-scapoid lunate fracture-dislocation in the left wrist, with migration of the proximal third of the scaphoid to the volar aspect of the left forearm. The AP view of the left wrist revealed disruption of Gilula's lines, indicating intercarpal dislocation and the 'piece of pie' sign, indicating lunate dislocation. The lateral view (Figure 1) revealed the 'spilled teacup' sign, indicating lunate dislocation and abnormal scapholunate and radiolunate angles.



Figure 1. Disruption of carpal arches and piece of pie sign on posteroanterior view and the spilt teacup sign of lunate dislocation on lateral view.

Open surgical reduction was planned through a dorsal approach. First, the lunate was reduced, then the proximal part of the scaphoid was retrieved from the volar aspect of the forearm (Figure 2) and anatomically fixed with a 2.5 mm headless screw.

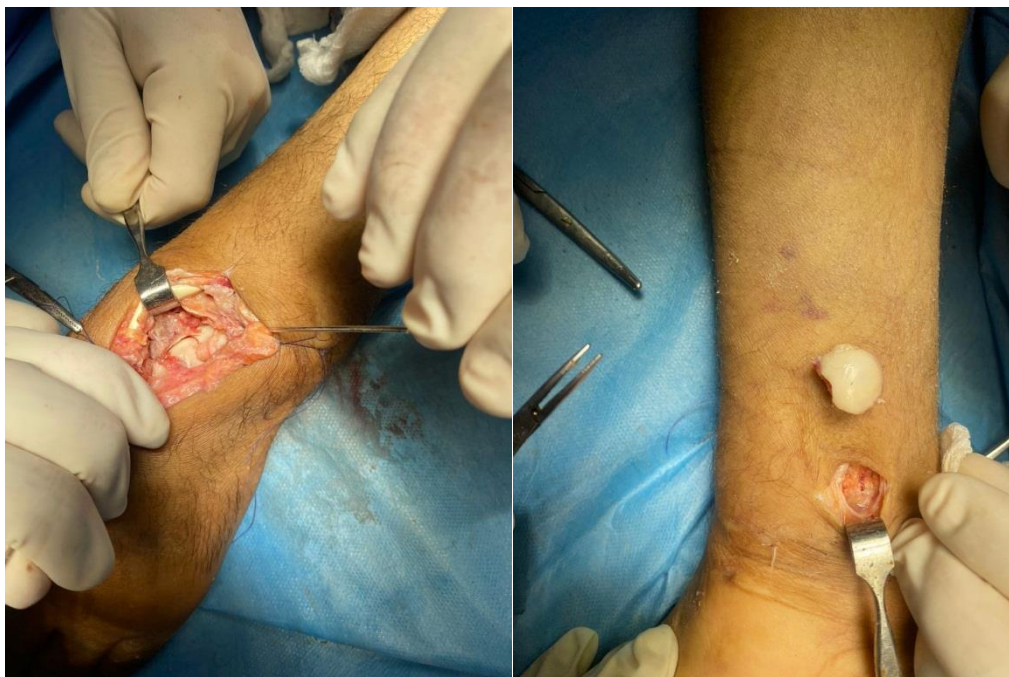


Figure 2. The dorsal approach for lunate reduction and exposing scaphoid fracture site, and the volar incision for retrieving the proximal scaphoid segment.

The scapholunate relationship was reduced and fixed with two wires through the scapholunate and scaphocapitate joints (Figure 3). The wound was closed in layers, and the wrist joint was immobilized with a dorsal splint for six weeks. Six weeks postoperatively, the K wires were removed, and the patient started physiotherapy to improve the range of movement.

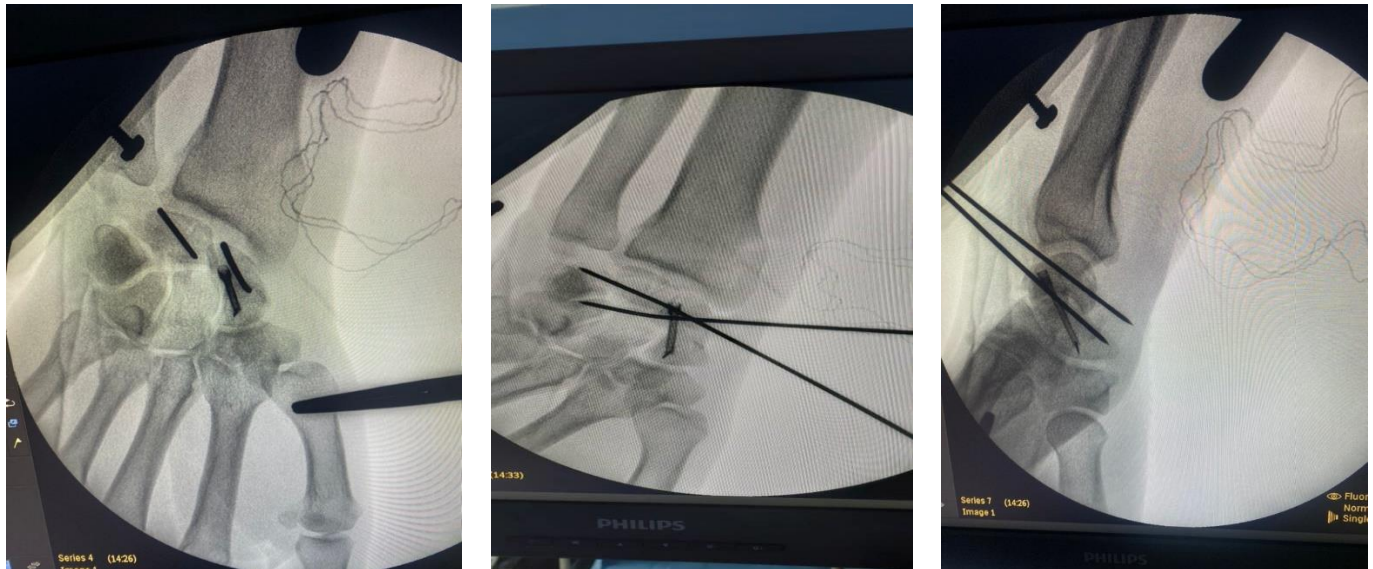


Figure 3. Intraoperative imaging for reduction of lunate, scaphoid fixation and stabilization of carpal alignment.

DISCUSSION

Trans-scaphoid lunate fracture-dislocations are rare and complex injuries that are typically caused by high-energy trauma [7]. These injuries involve both ligamentous disruption and fracture of the carpal bones, making their diagnosis and treatment particularly challenging. In this case, the patient sustained the injury while attempting suicide by jumping from a height, which resulted in significant axial loading and hyperextension of the wrist [8]. The Injury pattern in this case corresponds to a Mayfield stage IV carpal instability, which is the most severe form, involving disruption of the scapholunate and lunotriquetral ligaments [9]. If not managed properly, such injuries can result in long-term complications including chronic wrist pain, carpal instability, and post-traumatic arthritis [10].

Radiographic diagnosis can be challenging due to the subtlety of early signs, and plain radiographs often suffice for detecting lunate dislocation. In some cases, CT or MRI may be warranted to better visualize the injury, particularly when ligamentous injury is suspected [11]. In this patient, characteristic radiographic findings such as the “piece of pie” sign and “spilled teacup” sign were noted, confirming the diagnosis of lunate dislocation [12].

The primary treatment goal in such cases is open surgical reduction and stabilization of the carpal bones. The dorsal approach was selected in this case due to its ability to provide excellent visualization of the scaphoid and lunate, enabling proper reduction of the fracture and realignment of the carpal bones [13]. Fixation with K wires helped maintain carpal alignment during healing, preventing re-dislocation.

Long-term outcomes following such injuries depend largely on timely intervention, proper fixation, and post-surgical rehabilitation. In this case, early mobilization and structured physiotherapy played an important role in restoring function. However, the patient remains at risk of developing chronic carpal instability or arthritis, and long-term follow-up is required to monitor for these potential complications [14].

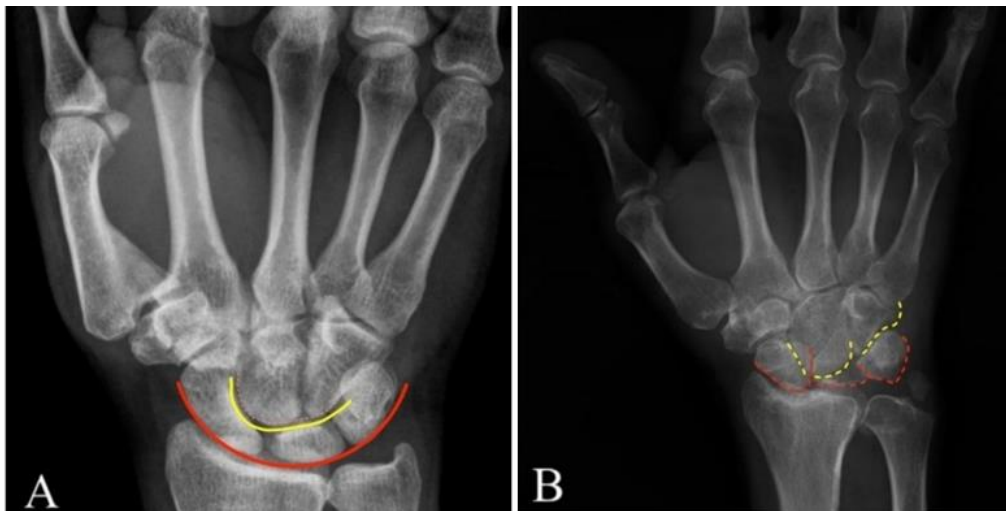


Figure 4. Carpal arch disruption indicating carpal dislocation.

CONCLUSION

Trans-scaphoid lunate fracture-dislocation is a rare and challenging injury that requires early and precise intervention. This case illustrates the complexity involved in diagnosing and treating such injuries, as they often result from high-energy trauma and may be overlooked in initial assessments. Early detection and prompt surgical management, as seen in this case, are essential to restoring wrist function and preventing long-term complications such as chronic pain, instability, and arthritis. In this particular case, the patient's recovery was favorable, thanks to timely surgical intervention and a structured rehabilitation program. However, long-term follow-up remains crucial to monitor for any potential complications that might arise, such as carpal instability or post-traumatic arthritis. This case emphasizes the importance of a multidisciplinary approach in managing complex wrist injuries, ensuring both the immediate and long-term needs of the patient are addressed. Despite the inherent challenges, successful outcomes can be achieved when surgery and rehabilitation are performed in a timely and well-coordinated manner.

Conflict of interest. Nil

REFERENCES

- Herzberg G, Comtet JJ, Linscheid RL, Amadio PC, Cooney WP, Stalder J. Perilunate dislocations and fracture-dislocations: a multicenter study. *J Hand Surg Am.* 1993;18(5):768-779.
- Kremer T, Wendt M, Riedel K, Sauerbier M, Germann G, Bickert B. Open reduction for perilunate injuries--clinical outcome and patient satisfaction. *J Hand Surg Am.* 2010;35(10):1599-1606.
- Kardashian G, Christoforou DC, Lee SK. Perilunate dislocations. *Bulletin of the NYU Hospital for Joint Diseases.* 2011;69(1):87-90.
- Frane N, Goldenberg W. Perilunate dislocation. 2020.
- Muppavarapu RC, Capo JT. Perilunate dislocations and fracture dislocations. *Hand Clinics.* 2015;31(3):399-408.
- Thomas J, Makki D. Palmar lunate dislocation with trans-scaphoid fracture dislocation and trapezium fracture: A case report of rare fracture presentation. *Trauma Case Reports.* 2022;42:100736.
- Huang C, et al. First-stage scapholunate fusion for the treatment of a chronic lunate dislocation: A case report. *Medicine.* 2019;98(28):e16453.
- Newberry JA, Garmel GM. Image diagnosis: Perilunate and lunate dislocations. *The Permanente Journal.* 2012;16(1):70.
- Dimitriou C, Chalidis B, Pournaras J. Bilateral volar lunate dislocation. *Journal of Hand Surgery (European Volume).* 2007;32(4):447-449.
- Muppavarapu RC, Capo JT. Perilunate dislocations and fracture-dislocations. *Hand Clinics.* 2015;31(3):399-408.
- Mayfield JK. Mechanism of carpal injuries. *Clinical Orthopaedics and Related Research.* 1980;149:45-54.
- Rettig ME, Raskin KB. Wrist injuries: Ligamentous and carpal bone injuries. *The Orthopedic Clinics of North America.* 1999;30(1):95-107.
- Taleisnik J. Carpal instability. *Journal of Bone and Joint Surgery Am.* 1984;66(7):1262-1268.
- Cooney WP. Scaphoid fractures and carpal instability. *Journal of Hand Surgery Am.* 1995;20(3):S98-S101.

خلع كسر العظم الزورقي الهلالي: تقرير حالة لإصابة نادرة

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المستخلص

خلع العظم الهلالي عبر الزورقي هو إصابة غير شائعة ولكنها قد تكون ذات مضاعفات كبيرة، مما يتسبب في فقدان حركة مفصل الرسغ ووظيفته، ويضعف قوة القبضة. في هذا التقرير، نقدم حالة رجل يبلغ من العمر 48 عامًا ولديه تاريخ من الاضطراب النفسي حاول الانتحار بالقفز من الطابق الثاني. أصيب بخلع هلالي في الزورقي وكسر في الزورقي، مع انتقال الجزء القريب من العظم الزورقي إلى الساعد. تم التخطيط الجراحي المفتوح من خلال نهج ظهري: أولاً، تم إرجاع العظم الهلالي، ثم تم استرداد الجزء القريب من الزورقي من الساعد وتثبيتته تشريحياً بمسمار بدون رأس مقاس 2.5 مم. تم إرجاع العلاقة الزورقية الهلالية وتثبيتها بسلكين من خلال الجلد، تم غلق الجرح على شكل طبقات، وتم تثبيت مفصل الرسغ بجبيرة ظهرية لمدة ستة أسابيع. بعد ستة أسابيع من الجراحة، تمت إزالة الأسلاك، وبدأ المريض العلاج الفيزيائي. بعد ثلاثة أشهر من المتابعة بعد الجراحة، كانت وظيفة مفصل الرسغ جيدة، مع قوة قبضة جيدة ونطاق جيد من الحركة. الخيار الأفضل لعلاج مثل هذه الحالات هو الخيار الجراحي من خلال إرجاع المفاصل المفتوح وتثبيت العظم المكسور وتثبيت عظام الرسغ في وضع تشريحي لتقليل المضاعفات المحتملة مثل ضغط العصب المتوسط وعدم استقرار الرسغ المزمن وألم الرسغ المزمن وفقدان قوة القبضة والتهاب المفاصل في الرسغ وانهيار الرسغ.

الكلمات الدالة: خلع العظم الزورقي الهلالي، تقرير حالة.