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Scaphocapitate fracture - dislocation

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Abstract
Case: A 22-year-old man presented with a scaphocapitate fracture-dislocation with the proximal fragment of the capitate in 180° rotation and a proximal pole volar scaphoid fracture. He was treated with open reduction and internal fixation using a dorsal approach, with reduction of dislocation and osteosynthesis of the capitate using a Herbert screw and three K-wires. Postoperative immobilisation was performed using an antebrachial palmar splint for 8 weeks. The modified Mayo wrist score was 100 6 months postoperatively. Radiologically, complete consolidation without intracarpal misalignment was observed.
Conclusion: Open reduction with internal fixation is an option for preventing complications in scaphocapitate fracture-dislocations.

Keywords: Scaphocapitate fracture-dislocation, further dorsiflexion, outstretched hand, presentation

Introduction
Scaphocapitate fracture-dislocations are rare and consist of a variation of greater-arc dislocations, in which the scaphoid and capitate are fractured, the latter being displaced with a proximal pole rotation of 90° or 180°.
The mechanism of injury consists of axial compression of a dorsiflexed wrist that forces further dorsiflexion, after which the dorsal lip of the radius forcefully impacts the head of the capitate, causing fractures. As the wrist continues to dorsiflexed further, after the scaphoid and capitate fractures, the capitate head rotates 90°. The hand, when returned to the neutral position, brings the proximal fragment of the capitate to 180° of rotation [1] (Figure 1).
This injury can be associated with dorsal perilunate dislocations or fractures at the distal end of the radius [1].

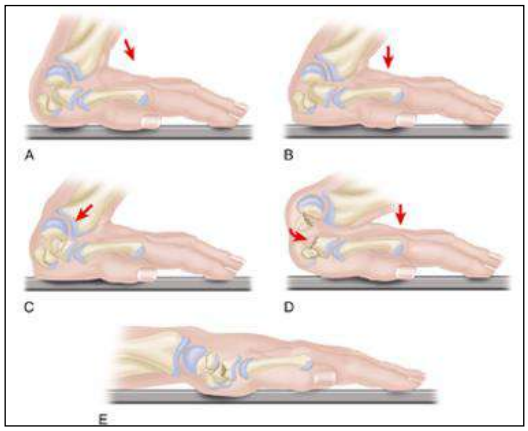

Fig 1: Lesion Mechanism

Statement of informed consent
The patient was informed that data concerning the case would be submitted for publication, and provided consent.

Case Report
We report the case of a 22-year-old man with no relevant medical history who fell on his outstretched hand.

At presentation, swelling, painful mobility, and no neurovascular deficits were observed. An X-ray was initially performed, showing a proximal pole scaphoid fracture and a capitated fragment rotation of 180° (Figure 2). There was no delay in the diagnosis in this case.

Fig 2: X-ray

A computed tomography (CT) scan was performed to exclude any associated bone injuries, and the patient underwent immediate surgery (Figure 3).

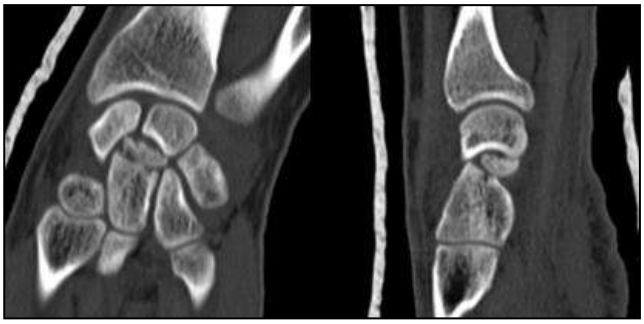

Fig 3: CT scan

Surgery was performed under general anaesthesia and with the aid of tourniquets and fluoroscopy. Open reduction and internal fixation via the dorsal approach were performed with three K-wires (two scaphocapitate K-wires and one capitatelunate K-wire) and one Herbert screw from the proximal to the distal capitate. The capitate fragment was free of ligamentous connections (Figures 4 and 5). An antebraquialpalmar splint was maintained for 8 weeks.

Fig 4: Intra-op fluoroscopy

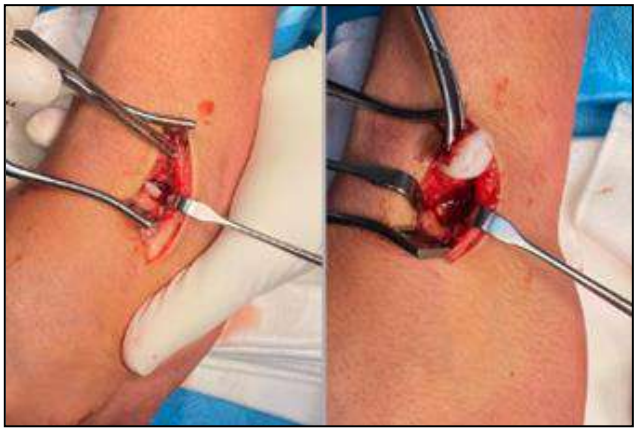

Fig 5: Intra-op images

At 8 weeks, the splint and K-wires were removed, and physiotherapy was initiated. At 4 months, a CT scan showed consolidation without signs of osteoarthritis (Figure 6).

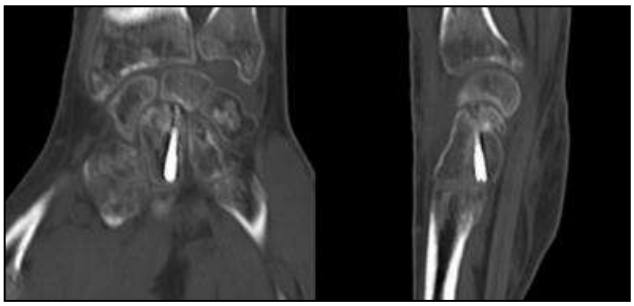

Fig 6: 4 month CT-SCAN

The Mayo Modified Wrist Score was 100 6 months postoperatively. The MRI performed 8 months posto-peratively showed no signs of osteonecrosis (Figure 7).

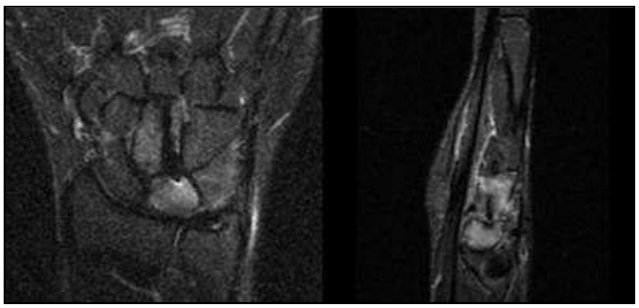

Fig 7: MRI at 6 months

The patient had no relevant differences between the wrists regarding grip strength, ulnar and radial deviations, flexion, and extension 15 months postoperatively (Figure 8).

Fig 8: clinical follow-up images at 15 months

Discussion

Few cases of scaphocapitate fracture-dislocation have been reported and there is no consensus regarding the optimal treatment strategy. Some surgeons have excised the fragment, while others have reduced the scaphoid and capitate fractures and maintained them with internal fixation or cast immobilisation [1].

Fixation of the scaphoid fracture was not performed in this case because it was an undisplaced fracture that was maintained during surgery despite stress factors during wrist mobilisation.

Factors such as the approach being the same and the anatomy of the vascularisation of the proximal pole favour fixation to prevent complications. On the other hand, factors such as undisplaced fractures favour non-surgical treatment; therefore, we believed that non-fixation and close monitoring will be effective for undisplaced fractures, as was the case. In a study by Carol Paulus *et al.* (2016) 494 surgeons expressed their preferred management for nondisplaced scaphoid fractures; surgical treatment was preferred by only 13% of respondents, with surgeons younger than forty-five being nearly twice as likely to choose surgery. In this case, the team consisted of one orthopedic resident (3^{RD} year) and one hand specialist. The same study also found that due to the shorter recovery period, each additional week of immobilization for nonoperative treatment brought the total costs of surgical treatment nearer to those of nonoperative treatment.

To our knowledge, no studies have compared the stabilisation of lunotriquetral articulation in such injuries.

In general, perilunate dislocations occur due to injuries to the surrounding stabilising structures, such as fractures and disruptions in the articulations or ligaments[2]. Although we did not notice any ligamentous injury intraoperatively, we decided to temporarily fix the scaphocapitate and capitatelunate articulations to improve stability. To rotate the capitate fragment by 180°, some space had to be created, and we believe that such a small undisplaced fracture of the scaphoid did not entirely justify its requirement and an unnoticed ligamentous injury may be present; as such, we decided to fix it.

Carpal tunnel release tends to be used in the presence of symptoms [3]. In this case, carpal tunnel release was not performed because the patient had no symptoms at presentation and no signs of median nerve neuropathy during the follow-up.

Frequently encountered complications include avascular necrosis or non-union of the scaphoid or capitate, which can result in wrist arthritis and functional impairment[4]. Sufficient symptomatic osteonecrosis of the capitate can be treated with excisional-interposition arthroplasty or midcarpal or capitate-hamate arthrodesis [1].

Conclusions

Scaphocapitate fracture-dislocations are rare and complex injuries that are challenging to diagnose and manage. Sometimes, the initial injury may go unnoticed[4,5], and a CT scan can help in the diagnosis. Open reduction and internal fixation are effective options to prevent complications in cases of scaphocapitate fracture-dislocation.

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Conflict of Interest

Not available

Financial Support

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