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Case Series

Percutaneous Fixation of the Carpal Scaphoid with Herbert Screws - Regarding 10 Cases

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Abstract: Scaphoid fractures are difficult to diagnose and treat. The authors report the results of treating these fractures with percutaneous screw fixation using the Herbert screw. The results were interesting given the rapid consolidation and the quality of the functional outcome.

Keywords: Scaphoïde, ostéosynthèse, percutanée, vis de Herbert.

INTRODUCTION

The carpal scaphoid is the most commonly fractured bone in the carpus. The usual treatment involves plaster immobilization for two to three months, requiring the patient to take a prolonged break from work and sports activities. Moreover, open fixation constitutes an aggressive intervention on the precarious vascularization of this bone as well as its ligamentous environment. Percutaneous screw fixation of the scaphoid is currently the preferred therapeutic alternative, avoiding the downsides of prolonged immobilization and open surgery. The authors present a series of 10 cases of non-displaced scaphoid fractures treated by percutaneous screw fixation.

METHODES

The series

In a retrospective series from 2021 to 2024, we treated 10 cases of non-displaced scaphoid fractures managed through closed reduction and percutaneous screw fixation. The sex ratio was 9 men to 1 woman, with an average age of 27 years (ranging from 18 to 34). The fracture involved the dominant side in 8 patients. The mechanism was a fall onto an extended wrist. All fractures were fresh with no delay in diagnosis, with an average consultation delay of 4 days (ranging from 1 to 7). The primary diagnostic method was based on standard radiological imaging (Figure 1). The classification used was that of Shernberg; the fractures were non-displaced involving the body of the scaphoid: 40% in zone II, 40% in zone III, and 20% in zone IV.

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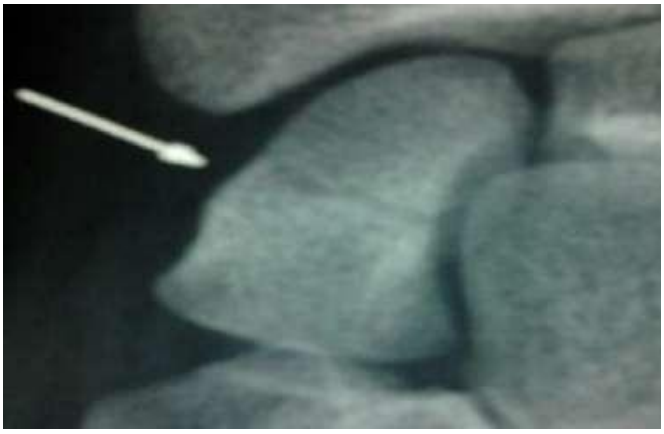

Figure 1: Radiograph of the center of the face on the scarred object of a fractured body that is not damaged

The Operating Technique

All our patients were operated on under regional anesthesia and in an outpatient manner. The most commonly used approach was the retrograde access, which involves making an incision of about 1 cm on the palmar side under the control of the image intensifier, followed by a retrograde pinning using a guide pin, with the wrist in extension and ulnar deviation (Figure 2). The pin is inserted at the level of the outer part of the distal tubercle of the scaphoid, aligned with this bone both from the front and from the side to the fluoroscopy (Figure 3, Figure 4). The second step of the procedure is packing followed by screwing, with the cannulated Herber screw being the most commonly used. The two pitches of the screw were placed on either side of the fracture site, and the tip of the screw should not rest on the proximal cortex to avoid compromising the fracture site. A splint was applied for pain relief purposes for one week for all our Patients have been allowed to resume their usual activities with restrictions on work and intense sports activities.

Figure 2: Main installation on the scope poignet in hyperextension

Figure 3: Misplace the broche guide that does it at the center of the scaphoïde and vertically due to the fracture (vue of the face)

Figure 4: Misplace the broche guide that does it at the scaphoïde center and vertically due to the fracture (view of the profile)

Figure 5: Control X-ray at the 12th week post-operation in the same patient

Figure 6: Functional result at 3 months

Figure 7: Functional result at 7 months

RESULTATS

The average follow-up is 10 months (4 to 24 months). Monitoring consists of a clinical examination and a standard radiographic assessment a month and a half after the intervention, then every 3 months. Radiological consolidation was achieved in 100% of cases between the second and third month (Figure 5). Pain-free mobility was achieved in all our patients, with an average wrist flexion of 71° compared to 76° on the healthy side, extension at 80° compared to 83°, radial inclination at 15° compared to 17°, and ulnar inclination at 29° compared to 32° (Figure 6, Figure 7). All patients resumed their professional activities after 3 months and reported no pain during thumb mobilization, nor any subjective loss of strength. Thumb opposition was at least 9 (pulp contact) thumb - lower palmar fold of the V) for all our patients regarding the Kapandji rating.

DISCUSSION

The orthopedic treatment of non-displaced scaphoid fractures still raises many questions: What is the minimum duration of immobilization? Is elbow immobilization necessary? What about the metacarpophalangeal joint of the thumb? If so, for how long? What is the suitable position for wrist immobilization? What type of material should be used? Plaster of Paris, resin, simple splint. Furthermore, open surgery for non-displaced body scaphoid fractures has many advantages, including: precise anatomical reduction, the possibility of treating associated lesions, and providing better stability.

In addition, open surgery exposes patients to certain disadvantages: damage to soft tissues, damage to the extrinsic palmar or dorsal radiocarpal ligaments depending on the approach used, it is more invasive and thus leads to devascularization of the fracture site, postoperative pain, and a slower recovery, even stiffness. In this perspective, percutaneous screw fixation of scaphoid fractures offers the advantage of minimizing the surgical risks associated with open surgery while providing the same benefits concerning immobilization duration. The literature review shows that various authors share this viewpoint.

The technique is standardized; it consists of a percutaneous palmar approach to the distal tubercle of the scaphoid under scopical guidance, with the wrist placed in extension, passing between the tendons of the FCR (Flexor Carpi Radialis) and APL (Abductor Pollicis Longus). This mini-approach allows for the preservation of the anterior ligamentous apparatus of the carpus, particularly the radiocapitate ligament, which plays a crucial role in the tilting movement of the scaphoid during flexion and extension movements, and radial and ulnar deviation of the wrist. Comparative studies between the anterior and posterior approaches have not shown a significant difference in the positioning of the screw. Furthermore, antegrade screwing is indicated for proximal third fractures and unstable fractures requiring better control of the axis.

The main step is the placement of the guide pin: a guide wire inserted in the longitudinal and vertical axis relative to the fracture. Then, progressive drilling is performed while respecting the measured length. Some authors recommend using another pin called anti-rotational placed parallel to the first one. Arthroscopy can be essential to control the reduction and proper placement of the screw, but it is also useful for the reduction of displaced fractures, thus broadening the indications for percutaneous screw fixation of the scaphoid to displaced fractures.

Finally, it is important to keep in mind that scapholunate ligament lesions associated with non-displaced scaphoid fractures are common, and it makes sense that one exposes themselves to uncovering scapholunate instabilities away from a screw placement due to early wrist mobilization. These same scapholunate

lesions would likely have mostly healed during the plaster immobilization of several months.

The preoperative wrist arthroscopy then becomes very important in the absence of preoperative arthrodiagnosis. The consolidation rates are excellent in various studies, 100% in our series, 90% for Brutus *et al.,* 100% for Ledoux *et al.,* 100% for Haddad et al, and 90% for Resines-Erasun *et al.,* Complications are rare; they mainly involve twisting or breaking of the guide wire. A case of rupture of the tendon of the radial flexor of the wrist has been reported by G. Ducharne *et al.,* However, even in cases of scaphoid pseudarthrosis that has been adequately compressed with screws, if it remains completely asymptomatic and without any radiological lysis, no other intervention will be performed immediately, but annual follow-up will be necessary.

CONCLUSION

Currently, percutaneous screwing of the scaphoid is the treatment of choice for non-displaced or slightly displaced body fractures. The consolidation rate is excellent within a short period, allowing for a quick return to work and sports activities.

Conflicts of interest: Les auteurs ne déclarent aucun conflit d'intérêt.

Contributions of the Authors

Tous les auteurs ont contribué à la conduite de ce travail de recherche et ont lu et approuve la version finale du manuscrit.

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