

Traumatic bilateral scaphoid fractures

Dariush Ghargozloo¹, Alessandro Tomarchio², Mauro Ballerini¹, Gianpaolo Chitoni¹

¹Department of Orthopaedics and Traumatology, Esine hospital, Valcamonica (Bs), ²Department of Orthopaedics and Traumatology, S. Croce e Carle Hospital, Cuneo; Italy

ABSTRACT

Aim To illustrate the surgical treatment of bilateral post-traumatic scaphoid fracture.

Methods We came across a young student, who sustained bilateral, undisplaced scaphoid waist fractures following a fall during a football match. Despite careful clinical and radiographic evaluation by four views at the Accident and Emergency (A&E) Department, we initially performed only the diagnosis of the left scaphoid fracture treating it with a percutaneous Acutrack headless screw. Eight months later this patient returned to the A&E department due to a new trauma to his right wrist with the onset of painful symptoms: cystic scaphoid non-union. No pain had been reported on the wrist in those months.

Results We performed osteosynthesis with Herbert headless screw through an extended volar approach placing a non-vascularized cortico-spongius bone grafts taken from radius. Periodic follow up by clinical examination, X-ray and CT scan with evidence of bone healing was performed.

Conclusion Bilateral scaphoid fractures are rarely encountered, mostly as stress fractures in athletes and manual workers. If left untreated, arthritis, deformity, and instability can lead to significant disability. Comprehensive imaging should be done in case of suspected scaphoid fractures, especially after a trauma, even in the presence of modest symptoms, as failure to do so may lead to missed fracture. Considering what was exposed, the radiographic check on the right wrist repeated about two weeks after the trauma would have avoided a missed diagnosis, even in the absence of reported clinical symptoms. We therefore recommend to repeat the radiographic examination in all situations like these.

Key words: bone screws, carpal bones, delayed diagnosis, osteosynthesis, scaphoid bone

Corresponding author:

Alessandro Tomarchio
Department of Orthopaedics and
Traumatology, S. Croce e Carle Hospital
Via M. Coppino 26, Cuneo 12100, Italy
Phone: +39 3206014935;
Fax: +39 0171642208;
E-mail: alessandro.tomarchio@libero.it
Dariush Ghargozloo ORCID ID: [https://
orcid.org/0000-0003-1839-4362](https://orcid.org/0000-0003-1839-4362)

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INTRODUCTION

The scaphoid is the largest bone of the proximal carpal row, serving as a bridge between the proximal and the distal carpal bones; it has a major role in maintaining carpal stability (1). The primary mechanism of scaphoid fracture is hyperextension of the wrist beyond, which commonly occurs by a fall onto an outstretched hand (2,3). The waist of the scaphoid tends to be the focus of this stress, which leads to fractures at this site in approximately 80% of cases of scaphoid fractures (4,5).

The diagnosis is sometimes missed on initial radiographs done immediately: in fact x-rays are often repeated after a few days (to the persistence of pain) to diagnose these occult fractures. Computer tomography or Magnetic Resonance Imaging (MRI) are often used for clinically suspicious fractures in patients with negative X-rays (6).

Failure to diagnose and treat scaphoid fractures lead to complications like nonunion, avascular necrosis and osteoarthritis.

The treatment generally includes conservative treatment with cast in not displaced fracture or percutaneous fixation, to open reduction and internal fixation in case of displaced ones. The treatment of non-unions requires, instead, an open reduction, bone grafting and internal fixation.

Unilateral fracture of the scaphoid is widely known (5,7,8). However, isolated bilateral fractures of the scaphoid are rare in occurrence.

PATIENTS AND METHODS

Patient and study design

A seventeen-year-old young student, after falling on the field during a soccer match with a bilateral hand-wrist trauma, arrived at the Accident and Emergency (A&E) at Esine hospital, and admitted referring with pain to the left wrist. He had functional limitation of the wrist's range of motion and moderate pain in correspondence to the pressure of the tubercle of the scaphoid. Before presenting to us, he had only taken an analgesic medication to lessen the pain. The physical examination showed a healthy-looking young man. He did not report pain or functional limitation to the right wrist.

Radiographic examination at both wrists through four views showed a displaced waist fracture at the left hand (Figure 1) that we classified as a



Figure 1. Waist fracture at the left scaphoid (Ghargozloo D, 2016)

Herbert classification B2 type (9). A computed tomography (CT) scan was done to confirm this finding, to check the displacement and to rule out any other injury.

About 8 months after the previous trauma, the patient suffered crushing in the right hand during a football match. Presented at our A&E Department again, we performed radiographic control (Figure 2), showed the fracture of the scaphoid waist with evident shortening of the same with hump back deformity and cystic non-union, classified as Herbert D2 type (9).



Figure 2. Presenting view with hump back deformity and cystic non-union of the right scaphoid (Ghargozloo D, 2016)

Immediately performed, CT scan (Figure 3) confirmed this diagnosis. It was therefore a picture of non-union on a previously unrecognized fracture. The patient denied previous other traumas saying that he had observed rest as prescribed by us after the surgical treatment of the left wrist.

Methods

Having informed the patient, three days after the trauma on the left wrist we performed a vo-

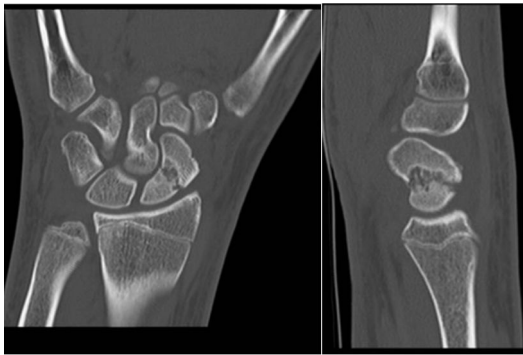


Figure 3. CT scan of the right scaphoid (Ghargozloo D, 2016)

lar percutaneous approach osteosynthesis, with micro Acutrack Acumed headless screw 2.8mm x 24mm (Figure 4) and immobilization with short spica cast including first metacarpal for 30 days. The operating time was 50 minutes.



Figure 4. Six-month postoperative X ray view with micro Acutrack Acumed headless screw 2.8 x 24mm fixation (Ghargozloo D, 2016)

About 8 months after the previous trauma and after pre-operative planning of scaphoid non-union, we performed osteosynthesis, on the right wrist, with 3.5 mm x24 mm Herbert headless screw through an extended volar approach. We also took from the ulnar portion of the radial distal epiphysis and positioned non-vascularized cortico-spongious bone grafts to restore the correct height of the scaphoid and the dorsal deviation of the surface of the lunate (dorsal intercalated segment instability, DISI aspect) (Figure 5). Also, an immobilization the upper limb was done, with short spica cast including first metacarpal for 30 days. After that, gentle ranges of motion exercises were started. The operating time was 116 minutes and we found no complications.

In addition, for 60 days we used a capacitively coupled electric field stimulation

(Osteobit® Terapia, IGEA)



Figure 5. Six-month post-surgery CT scan view with 3.5 x 24mm Herbert headless screw through an extended volar approach right wrist (Ghargozloo D, 2017)

RESULTS

We found no complications after volar percutaneous approach osteosynthesis neither on the left wrist nor on the right. Bilaterally, at the final clinical follow-up (six month) we found the resolution of pain symptoms and good radiographic bone consolidation without loosening of the hardware.

The patient attended to our outpatient clinic at 30 and 90 days for an X-ray check, the joint excursion, the possible presence of pain and muscle strength.

At 12 weeks of the follow-up, the fractures healed completely. At final clinical follow-up the patient confirmed the absence of pain symptoms and we found through radiographic and CT scan a good bone consolidation without loosening of the hardware or bone resorption.

DISCUSSION

Considering that scaphoid fractures are the most common of all carpal bone fractures, in all patients with wrist injury, anatomical snuff box tenderness is sensitive but not specific for scaphoid fractures (10). Instead, scaphoid tubercle and scaphoid compression tests are considered more specific to scaphoid fractures (10,11). Despite X-ray examination, the initial diagnosis of the carpal scaphoid fracture on the right side was missed. So, in addition to a careful clinical examination, we recommend the complete radiographic examination (comprising of at least 4 views– PA, lateral, semipronated oblique, and scaphoid with the wrist pronated in ulnar deviation). The standard guidelines now are to treat a case clinically suggestive of scaphoid fracture as a fracture, even if it is not visible in any of the X-ray views. Such a patient with wrist pain should be followed up after 2 weeks with an X-ray or a CT scan (12,13). In our case, however, the patient

does not report pain to his right wrist after the injury, even weeks later.

A treatment of scaphoid fractures is controversial (14,15). Regarding the performed surgical treatment we decided together with the patient with an acute fracture, having done a CT scan to confirm the fracture pattern, to do an immediate headless screw fixation. On the other hand, with scaphoid non-union fracture, we were obviously forced to perform the surgical treatment as soon as the diagnosis was made. According to what had been said to Frisk (16), we performed a radial exposure with osteotomy of the radial styloid and after reduction of the instability of the carpus, the palmar radial wedge-shaped defect of the navicular was filled in with a graft taken from the osteotomized styloid process. This is a non-vascularized cortico-spongious bone grafts. Conventional non-vascularized bone grafts as well as vascularized bone grafts are used to treat scaphoid non-union (SN). Due to limited avail-

able studies, the field of application using both grafts for SN still remains controversial (15). On the other hand, we know for sure that failure to diagnose or treat these fractures adequately can lead to the formation of scaphoid nonunion advanced collapse (SNAC). The SNAC wrist is one of the most frequent complications as a result of scaphoid fractures; the most common treatments are Partial Carpal Arthrodesis (17,18) or proximal row carpectomy (18).

In conclusion, to our knowledge this is the first report of traumatic bilateral scaphoid fractures surgically treated and the good clinical and instrumental result obtained testifies on good surgical practice.

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TRANSPARENCY DECLARATION

Competing interests: None to declare.

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