

Non-union of Isolated Displaced Triquetral Body Fracture – a Case Study

**Mamun Al Rashid^{1(A,B,D,E,F)}, Sonia Rasoli^{1(A,B,D,E,F)}, Wasim S. Khan^{2(A,B,D,E,F)},
Gregory Packer^{1(A,D,E)}**

¹ Department of Trauma and Orthopaedics, Southend University Hospital NHS Foundation Trust, Essex, UK

² University College London Institute of Orthopaedic and Musculoskeletal Sciences, Royal National Orthopaedic Hospital, Stanmore, Middlesex, UK

SUMMARY

Triquetral fractures are the second most common carpal fractures. Triquetral body fractures are the less common type of triquetral fractures but they can be missed on plain radiographs and a non-union can be associated with considerable morbidity and reduction in functional activities. We report a unique case of displaced isolated triquetral body fracture that was initially missed on plain radiographs and resulted in non-union. The fracture non-union was diagnosed on magnetic resonance imaging and was treated successfully with open reduction and internal fixation using compression screws, without bone grafting, and early mobilisation of the wrist allowing a return to pre-morbid activity levels. To our knowledge, this has not been previously described in the literature. We advocate early clinical suspicion of triquetral fractures in patients with persistent ulnar-sided wrist pain following trauma, and early evaluation using computed tomography or magnetic resonance imaging.

Key words: non-union; triquetrum; fracture

INTRODUCTION

Fractures of the triquetrum are the second most common carpal fractures after the scaphoid [1-3]. Fractures of the triquetrum include the more common cortical chip fractures and the less common triquetral body fractures [2,4,5]. Triquetral body fractures are associated with high energy impact, either as a result of a direct blow to the dorsum of the wrist or from the ulnar styloid striking the dorsal triquetrum during a fall on an outstretched arm with the wrist in dorsiflexion and ulnar deviation [3,4].

Fractures involving triquetral body can be missed on plain radiographs, and can be associated with considerable morbidity and reduction in functional activities. Non-unions of these fractures, however, are extremely rare, with only three cases described in the literature. We report a unique case of a displaced isolated triquetral body fracture that resulted in non-union and was treated successfully with open reduction and internal fixation using compression screws, without bone grafting, and immediate mobilisation of the wrist. To our knowledge, this has not been previously described in the literature.

CASE REPORT

A 29-year-old office worker fell on his outstretched dominant right arm while playing football. He had fallen with his wrist in dorsiflexion and injured his wrist. He did not seek immediate medical attention but presented to the orthopaedic clinic three weeks following the fall, complaining of persistent

wrist pain. On examination of the wrist there was discrete tenderness over the ulnar aspect but there was no evidence of instability of the wrist, and grind test was unremarkable for triangular fibrocartilage complex tear. No bony injuries were identified on plain radiographs (Figure 1). A diagnosis of soft tissue injury to the wrist was made and the patient treated with wrist immobilisation in a wrist splint. The patient continued with wrist pain and on examination sixteen weeks after the injury still had tenderness over the ulnar aspect of his wrist. A Magnetic Resonance Imaging (MRI) scan was performed that showed an un-united displaced triquetral body fracture (Figure 2a). The scan was otherwise normal. A Computed Tomography (CT) was performed to better assess the bony anatomy and plan surgery (Figure 2b). The patient underwent an open reduction and internal fixation at twenty four weeks due to persistent symptoms. A dorsal approach was used to access the triquetrum through a 3 cm incision between the third and fourth metacarpals. The triquetrum was exposed and the un-united fragments visualized. The fragments were reduced under direct vision and fixed with two headless, mini compression screws (Stryker Ltd) (Figure 3). No bone graft was used and the wrist was mobilised after two weeks. The patient was followed up at two, six and twelve weeks after surgery, and achieved clinical and radiological union (Figure 4). At final follow-up at one year following surgery, the patient had returned to work and resumed his premorbid activity level.



Fig. 1. Postero-anterior (a) and lateral (b) plain radiographs of the right wrist three weeks following the injury showing no obvious fractures



Fig. 2. Coronal magnetic resonance image (a) and axial computed tomography image (b) of the right wrist performed sixteen weeks after the injury showing an un-united, displaced, and isolated fracture of the body of the triquetrum



Fig. 3. Intraoperative photograph of the triquetrum exposed through the dorsal approach, showing fracture reduction with compression screw in situ



Fig. 4. Postero-anterior (a) and lateral (b) radiographs of the right wrist two weeks post-operatively showing no evidence of triquetral body non-union, and compression screws in situ

DISCUSSION

In our report we describe a unique case of a displaced triquetral body fracture non-union that was treated successfully with surgical fixation and early mobilisation. After an extensive systematic review of the literature, searching EMBASE, MEDLINE, COCHRANE, CINHAI, GOOGLE search engine, we could identify only three previous reports of non-union of triquetral body fracture [6-8]. This low incidence could be attributed to the rich vascular supply of the triquetrum, and may explain the low risk of developing avascular necrosis in these fractures [9]. Although non-unions of triquetral body fractures are rare, they can lead to considerable disability.

In our patient the fracture was missed on plain radiographs, and diagnosis was made by MRI scan. A previous report found that only 20% of triquetrum fractures were identified on plain radiographs [10]. Given the morbidity associated with non-union of triquetrum body fractures, we advocate a high index of suspicion for these fractures in people who have fallen on an outstretched hand, and present with ulnar-sided wrist pain. We recommend evaluating patients suspected of having these fractures with a CT or

MRI scan. CT and MRI have high sensitivity in identifying bony injuries, and determining the morphology of fractures and the need for early fixation, and could potentially reduce morbidity in these patients.

Durban et al (1950) unsuccessfully treated a triquetral non-union with immobilisation in plaster cast and the patient remained symptomatic [6]. Abboud et al (2003), after unsuccessful treatment of the triquetral non-union with plaster cast immobilisation, carried out an open reduction and internal fixation using headless compression screws and an iliac bone graft [7]. Kawakami et al (2007) also achieved successful bone union of the triquetrum non-union with open reduction and internal fixation using headless compression screws and an iliac bone graft [8]. In our patient, although we carried out open reduction and internal fixation twenty-four weeks after the original injury, we did not use a bone graft. Kawakami et al (2007) immobilised their patient for eight weeks following surgery [8] but we only used post-surgical immobilisation for two weeks. Our patient, despite the delayed surgery for non-union, resumed a full level of activity at last follow-up twelve weeks post-operatively.

REFERENCES

1. Hove LM. Fractures of the hand: distribution and relative incidence. *Scand J Plast Reconstr Surg Hand Surg.* 1993;27:317-9.
2. Hocker K, Menschik A. Chip fractures of the triquetrum. Mechanism, classification and results. *J Hand Surg.* 1994;19B:584-8.
3. Bartone NF, Grieco RV. Fracture of the triquetrum. *J Bone Joint Surg.* 1956;38A:353-6.
4. Garcia-Elias M. Dorsal fractures of the triquetrum – avulsion or compression fractures? *J Hand Surg.* 1987;12A:266-8.
5. Levy M, Fischel RE, Stern GM, Goldberg I. Chip fractures of the os triquetrum. The mechanism of injury. *J Joint Bone Surg.* 1979;61B:355-7.
6. Durbin FC. Non-union of the triquetrum. *J Bone Joint Surg.* 1950;32B:388.
7. Abboud JA, Beredjikilian PK, Bozenka DJ. Nonunion of a triquetral body fracture. A case report. *J Bone Joint Surg.* 2003;85A:2441-4.
8. Kawakami Y, Fujioka H, Kurosaka M. Treatment of non-union of a triquetral body fracture. *J Hand Surg.* 2007;32B:717-8.
9. Gelberman RH, Gross MS. The vascularity of the wrist. Identification of arterial patterns at risk. *Clini Orthop.* 1986;202:40-9.
10. Welling RD, Jacobson JA, Jamadar DA, Ching S, Caoili EM, Jebson PJ. MDCT and radiography of wrist fractures: radiographic sensitivity and fracture patterns. *Am J Roent* 2008;190:10-6.

Liczba słów/Word count: 1324

Tabele/Tables: 0

Ryciny/Figures: 4

Piśmiennictwo/References: 10

Adres do korespondencji / Address for correspondence

Mr Wasim S Khan, Clinical Lecturer, University College London Institute of Orthopaedics and Musculoskeletal Science, Royal National Orthopaedic Hospital, Stanmore, Middlesex, London, HA7 4LP, UK, Phone/fax: +44 (0) 7791 025554, e-mail address: wasimkhan@doctors.org.uk

Otrzymano / Received 17.03.2011 r.
Zaakceptowano / Accepted 28.09.2011 r.