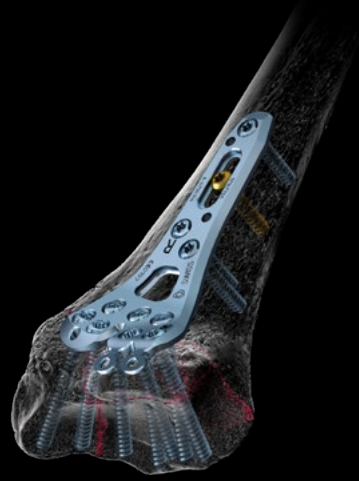


CASE REPORT



Volar rim fractures of the distal radius – Why we need a special plate?

The Surgeons

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Mr. Karuppaiah is a consultant and academic with a special interest in the management of upper limb injuries. He is primarily based at King's College Hospital in London, one of the busiest Major Trauma Centres in the UK, which also serves as a tertiary referral centre for complex upper limb injuries. Mr. Karuppaiah is actively involved in the teaching and training of orthopaedic surgeons. He has an outstanding academic record and has published approximately 50 peer-reviewed articles.

Introduction

The volar rim of the distal radius plays a critical role in maintaining the stability of both the radiocarpal and distal radioulnar joints. Fractures involving the volar rim, particularly those occurring at or distal to the watershed line, are typically the result of high-energy trauma. These injuries can be easily overlooked, and if not appropriately managed, may lead to carpal subluxation and permanent functional impairment for patients^{1,2}. Conventional volar locking plates are designed to terminate a few millimetres proximal to the watershed line, making them inadequate for addressing these specific fracture patterns. Furthermore, the volar rim fragments are subjected to considerable forces during load transmission via the radiolunate and radioulnar ligaments, necessitating rigid fixation to enable early mobilisation and prevent fixation failure^{1,2}.

The Case



Patient Profile

A 58-year-old fit and healthy gentleman who fell off from a flight of stairs and landed on a metal base, sustained a complex distal radius volar rim fracture. He works in a manual job and is otherwise fit and healthy.



Clinical Findings / Preoperative Analysis

The patient presented with a severely deformed and swollen hand, the pre reduction x-rays (Fig 1) show, a complex comminuted intra-articular distal radius fracture. The patient also had mild median nerve symptoms that settled post reduction of fracture and plaster application (Fig 2). Further assessment using CT scans revealed a volar rim fracture of distal radius with intraarticular comminution (Fig 3).



Figure 1



Figure 2

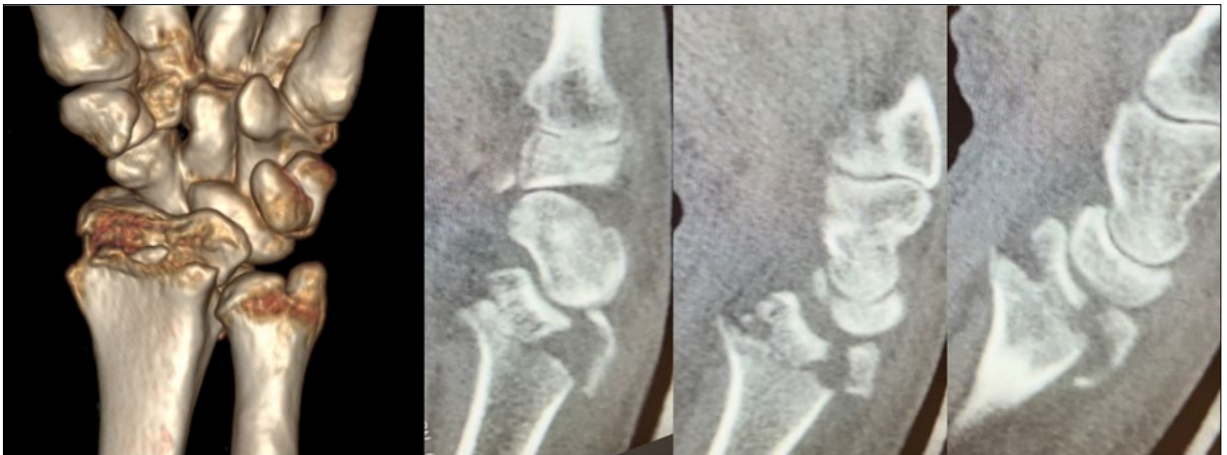


Figure 3



Surgical Treatment

Using the Volar Henry approach, the fracture was identified, the haematoma and soft tissues were cleared from the fracture site. The fracture was manipulated and temporarily reduced using K-wires to get the correct radial length and volar tilt (Fig 4). Following through the same incision, interval between FCU and palmaris longus tendon developed superficially and in deeper dissection, interval between ulnar neurovascular bundle and the carpal tunnel contents is created to reach the volar ulnar corner of the distal radius (Fig 6). A bone hook was used to reduce the fracture under an image intensifier control and temporarily fixed with 1.2mm k-wire (Fig 5). The anatomy of the volar ulnar corner of the distal radius and distal radio-ulnar joint is unique and it is easier to reduce and temporarily fix the fragments through this interval (Fig 7).

This also allowed the surgeons to position the plate appropriately on the volar surface of the distal radius without compromise. The volar rim plate flaps were then bent to 35 degrees using 1.6mm k-wire and were applied over the volar ulnar corner through the radial interval.

This was further checked with an image intensifier and filled with screws (Fig 7). To get additional stability in this comminuted fracture, the radio-carpal and radio-ulnar ligaments were repaired to the plate using strong sutures. The radial styloid fragment was fixed with a cannulated compression screw (CCS) to the plate. Post fixation, the wrist was examined under fluoroscopy for any evidence of instability.

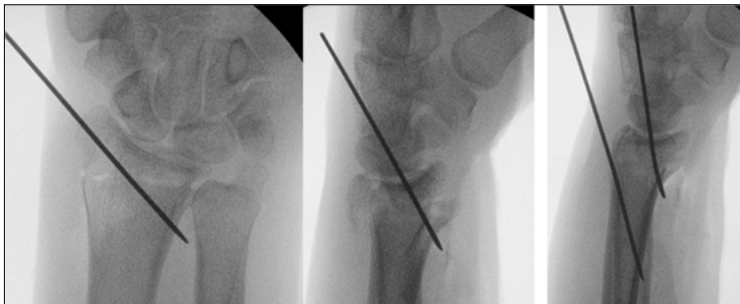


Figure 4

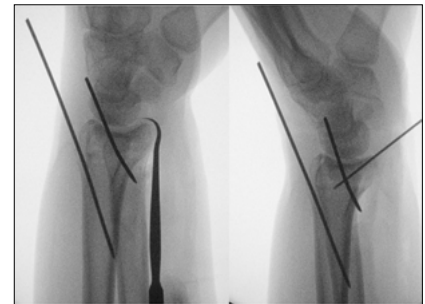


Figure 5

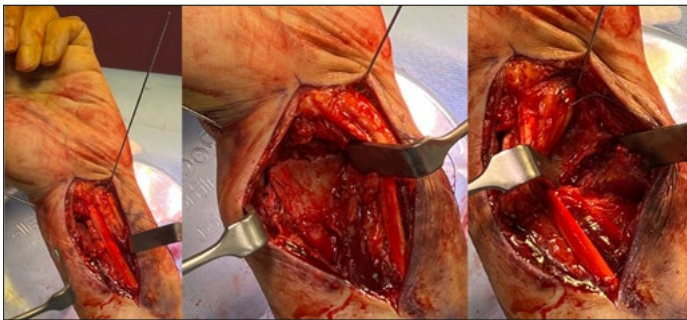


Figure 6

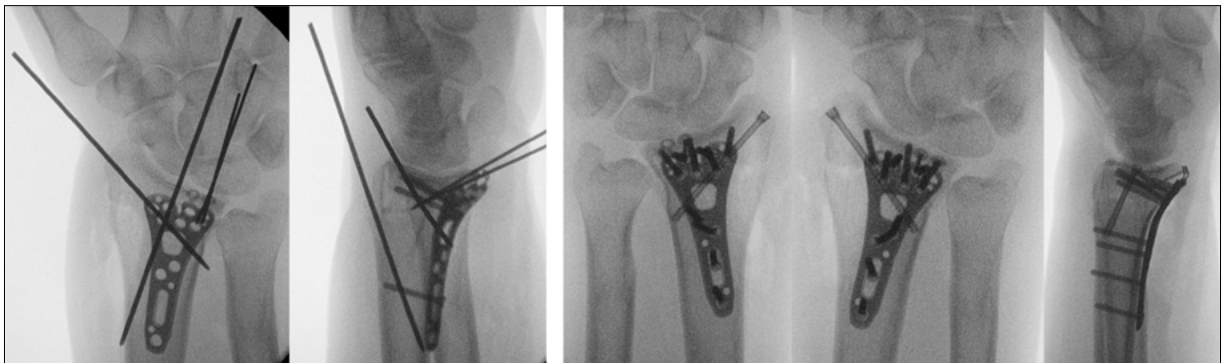


Figure 7



Postoperative Treatment

The wrist was temporarily immobilised in a below elbow plaster for a week and changed to a thermoplastic splint for a further 5 weeks. Hand therapy was started post-surgery with finger/elbow/shoulder full range of movement (ROM) exercises. Once the plaster was removed, gentle full range of movement exercises of the wrist including rotational movements commenced. Strengthening exercises were started at 6 weeks post-surgery and the patient was gradually allowed to return to full function at 3 months post-surgery.



Conclusion

Management of volar rim fractures of distal radius is challenging and is often missed. Identifying the fracture pattern with CT scan and use of fracture specific implant is associated with good functional and radiological outcome.



References

- 1) Heifner JJ, Orbay JL. Assessment and Management of Acute Volar Rim Fractures. J Wrist Surg. 2021 Jul 30;11(3):214-218.
- 2) Maclean, S.B.M., Bain, G.I. Volar marginal rim fractures of the distal radius, Journal of Orthopaedic Reports, Volume 3, Issue 3, 2024.

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