



Neglected volar Barton fracture in adult managed in a rural setting: a case report

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Introduction: Barton fractures are distal radius fractures that extend through the dorsal aspect of the articular surface, with associated dislocation of the radiocarpal joint. They are extremely unstable and require open reduction and internal fixation (ORIF). Delayed presentation is often encountered with difficulty in achieving reduction, and more extensive surgery may be needed. Here, we present a case of a 3-week-old neglected volar Barton fracture of the right wrist treated with the conventional method in a rural setting.

Case presentation: A 32-year-old gentleman was initially denied surgical intervention for a distal radius fracture he sustained after a motor vehicle accident and was discharged with a long arm slab plus analgesics represented in the outpatient department and agreed upon surgical intervention after his condition did not improve with conservative treatment. The trans-FCR (flexor carpi radialis) approach was used for surgery under the brachial plexus block. The fragment was reduced by applying pressure volarly into the distal radius and was confirmed with imaging. A K-wire (Kirschner) was used to temporarily hold the fragment. A volar distal radius locking plate was used to buttress the distal fragment. Final fixation was made using altogether six screws. The wrist was splinted in a short dorsal slab. Skin sutures were removed after 2 weeks, and an active assisted range of motion of the wrist was begun after 6 postoperative weeks.

Discussion: Volar Barton is an uncommon subset of intra-articular fractures and typically results from damage sustained at high speeds. The general agreement for neglected fractures is that 'fractures that are not handled or mishandled resulting in treatment delay, worsening of the fracture and even a disability' are to be considered neglected fractures. Rebuilding the damaged anatomy properly and enabling a prompt, problem-free recovery of hand function are the main objectives of treatment. As conservative therapy is often ineffective and rife with side effects, including early osteoarthritis, deformity, subluxation, and instability, stabilization and anatomic reduction by surgery is the key to managing these fractures. Plating is one of the therapeutic modalities among various therapeutic modalities depicted in the literature that enables shorter time of immobilization and early restoration of wrist function through direct anatomic repair and stable internal fixation. In our case, the callus was relatively immature, and the original fracture site could easily be cleared. Also, there was no significant soft tissue shortening, and the volar fragment had not migrated proximally, in contrast to what is expected in prolonged neglected cases. Hence, the intraoperative reduction was possible, and the fracture was fixed with a volar locking plate as usual.

Conclusion: Given the modest tissue shortening and young callus, such cases may be treated as conventional Barton's fractures and managed using conventional means of fixation with locking buttress plates. However, it makes sense to prepare for potential malreduction by carrying K wires and wrist distractions. To restore complete function to the injured wrist, adequate physiotherapy and postoperative splinting are essential components of postoperative rehabilitation.

Keywords: Bartons, fracture, neglected

Introduction

Barton fracture, first described by John Rhea Barton, a surgeon from Philadelphia, is a fracture of the distal radius that extends through the dorsal aspect of the articular surface with associated dislocation of the radiocarpal joint^[1]. Barton's fractures are extremely unstable and require open reduction and internal

fixation (ORIF). Delayed presentation is often encountered with difficulty in achieving reduction, and more extensive surgery may be needed. Here, we present a case of a 3-week-old neglected volar Barton fracture of the right wrist treated with conventional method in a rural setting. This case report has been reported in line with the SCARE criteria^[2].

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Case report

A 32-year-old gentleman was brought to emergency after he had a road traffic accident, sustaining an injury to his right wrist, leading to pain, swelling, and deformity. Distal neurovascular status was intact. The vitals were stable, and there were no other associated injuries. X-rays of the right wrist were done, and they showed a fracture of the distal radius in the coronal plane associated with volar subluxation of carpal bones, also known as volar Barton fracture (Fig. 1). The patient was counseled about the nature of the injury he had sustained and the need for surgical intervention. However, the patient denied surgery. The patient was kept on a long arm slab and was discharged on analgesics.

After 24 days of the incident, the patient presented again in the outpatient department. The patient was counseled again, and he was made to realize that there was no scope for conservative management. The trans-FCR (flexor carpi radialis) approach was used for surgery under the brachial plexus block. An incision was made longitudinally in line with the flexor carpi radialis tendon. The wrist crease was crossed obliquely. The tendon sheath of the flexor carpi radialis tendon was opened, and the tendon was fully mobilized and retracted ulnarly. Through the tendon sheath floor, the deep volar compartment was entered. The pronator quadratus was released along its radial border of the distal radius and raised ulnarly. The ulnar styloid process was left as such because the patient presented late, and there was no tenderness over the ulnar styloid process.

The fracture fragment was identified, and the surrounding callus and soft tissue were cleared. The fragment was reduced by applying pressure volarly into the distal radius and was confirmed with imaging. A K-wire was used to temporarily hold the fragment. A volar distal radius locking plate was used to buttress the distal fragment. Final fixation was made using altogether six

HIGHLIGHTS

- Barton's fractures are extremely unstable high-velocity trauma requiring open reduction.
- Delayed presentation of neglected Barton fractures is a challenge in achieving reduction and fixation.
- Different modalities of internal fixation methods are described in the literature.
- We present a case of a 3-week-old neglected volar Barton fracture of the right.
- The conventional method of Barton fracture management with a volar locking plate was sufficient enough to reduce and fix the fracture in a rural setting.

screws. Final fixation was checked in the image. Pronator muscles were sutured using an absorbable suture. The skin was closed using a stapler, and a sterile dressing was applied (Fig. 2). The wrist was splinted in a short dorsal slab. Skin sutures were removed after 2 weeks (Fig. 3) and an active assisted range of motion of the wrist was begun after 6 postoperative weeks.

Discussion

With only 1.3% of distal radius fractures being volar Barton, they are an uncommon subset of intra-articular fractures and typically result from damage sustained at high speeds^[3]. As there is no universal consensus regarding the definition of neglected fractures, various definitions for different locations and types of fractures are reported in the literature. The general agreement is 'fractures that are not handled or mishandled resulting in treatment delay, worsening of the fracture and even a disability' to be considered as neglected fractures^[4,5].



Figure 1. Preoperative X-ray showing volar Barton's fracture.

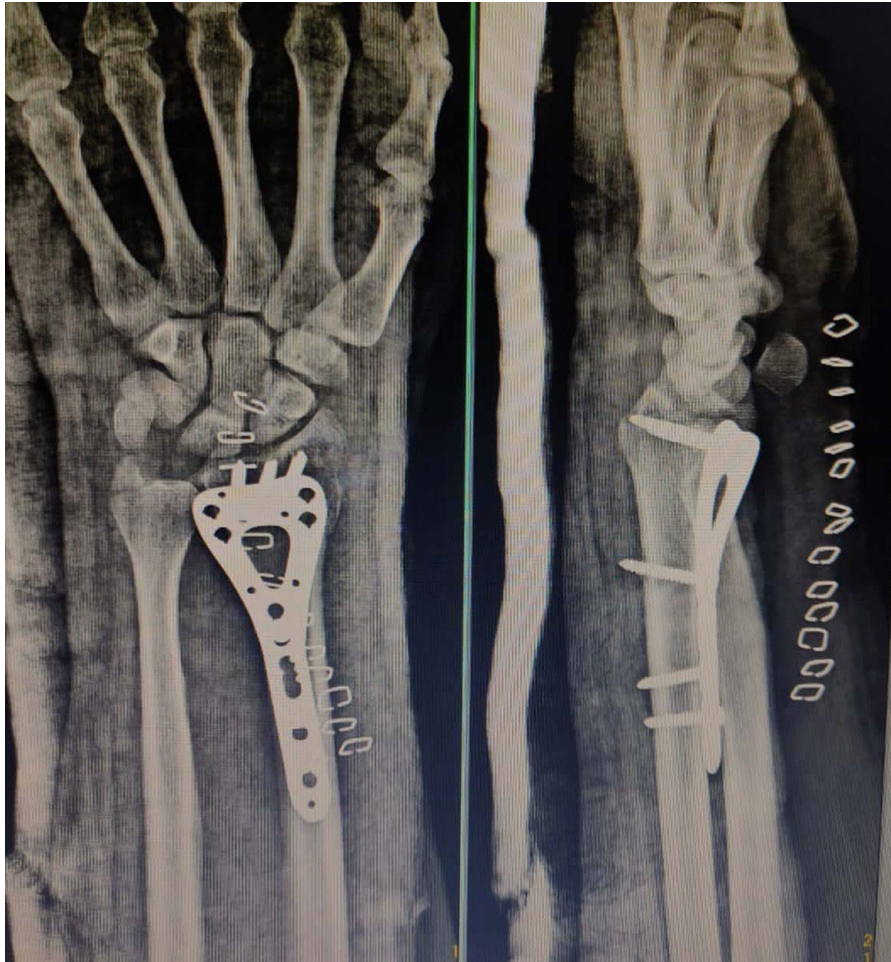


Figure 2. Immediate postoperative X-ray.

The possible complications of distal radius fracture, including Barton's fracture, described in the literature include carpal tunnel syndrome, radial nerve compression, ulnar nerve injury, and tendon rupture. A myriad of postoperative complications are cited and include complex regional pain syndrome (CRPS), post-traumatic arthritis, radiocarpal instability, malunion, distal radioulnar joint instability, flexor tendon adhesions, tendinitis, tenosynovitis, trigger finger, Dupuytren's contracture, and compartment syndrome^[6].

Rebuilding the damaged anatomy properly and enabling a prompt, problem-free recovery of hand function are the main objectives of treatment. As conservative therapy is often ineffective and rife with side effects, including early osteoarthritis, deformity, subluxation, and instability, stabilization and anatomic reduction by surgery is the key to managing these fractures^[7]. A variety of therapeutic modalities are documented, a few of which include external fixation, open reduction and internal fixation (ORIF) with Kirschner wires, buttress plates and screws, closed reduction and plaster application, percutaneous pinning, and external fixation^[8].

Plating is one of the therapeutic modalities that enables a shorter time of immobilization and early restoration of wrist function through direct anatomic repair and stable internal fixation^[9]. Buttress plates reduce and stabilize vertical shear

intra-articular fractures through an antiglide effect, whereas modern locking plates address metaphyseal comminution and preserve articular congruity/reduction^[9]. Complications associated with plating include tendon irritation or rupture and the need for plate removal^[10].

Intraoperative reduction of Barton fractures is hampered by their delayed appearance. Their management usually involves the use of wrist distractors to gradually distract the patient, followed by open reduction and internal fixation utilizing a locked distal radius plate and bone graft^[11]. They frequently require bone grafting, more surgical morbidity, and extended immobilization. Even with surgery, there is still an increased risk of malunion.

In our case, the callus was relatively immature, and the original fracture site could easily be cleared. Also, there was no significant soft tissue shortening and the volar fragment had not migrated proximally in contrast to what is expected in prolonged neglected cases. Hence, the intraoperative reduction was possible, and the fracture was fixed with a volar locking plate as usual.

Conclusion

Surgeons are faced with the challenge of reducing and maintaining the reduction in cases of neglected volar Barton's



Figure 3. Postoperative X-ray after 6 weeks.

fractures. Given the modest tissue shortening and young callus, such cases may be treated as conventional Barton's fractures and managed using conventional means of fixation with locking buttress plates. However, it makes sense to prepare for potential malreduction by carrying k wires and wrist distractions. To restore complete function to the injured wrist, adequate physiotherapy and postoperative splinting are essential components of postoperative rehabilitation.

Ethical approval

Our institution does not require ethical approval for publishing case reports.

Consent

Written informed consent was obtained from the parents to publish this report in accordance with the journal's patient consent policy.

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Author contribution

A.B.: conceptualization and manuscript writing and editing; D.S., J.B., S.H., S.P., and J.G.: manuscript writing and editing.

Conflicts of interest disclosure

The author declares no conflicts of interest.

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None.

Guarantor

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Data availability statement

Data will be provided by the corresponding author on reasonable request.

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