Indian Journal of Orthopaedics Surgery 2023;9(1):34–37

Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Orthopaedics Surgery

Journal homepage: https://www.ijos.co.in/

Case Report

Single dorsal incision approach for plate fixation of radius ulna midshaft fracture; interesting case report

Akash Nagnath Mane[1,*], **Neel Kamal Sourav**[1], **Ankit B Waghela**[1], **Vijay M Panchnadikar**[1]

[1]*Dept. of Orthopaedics, Deenanath Mangeshkar Hospital, Pune, Maharashtra, India*

ARTICLE INFO

Article history:
Received 22-11-2022
Accepted 15-12-2022
Available online 14-03-2023

Keywords:
Gustilo anderson type
DCP
Dorsal curvilinear incision
Synostosis

ABSTRACT

Introduction: Radius and ulna shaft fractures, also known as both bone forearm fractures, are common fractures caused due to direct or indirect trauma. Open reduction and internal fixation with plating by two separate incisions is a standard and widely accepted mode of fixation. We report a case where we approached the fracture with a single dorsal incision.

Materials and Methods: An eighty years old female had fractures of both radius and ulna shaft with Gustilo Anderson type two open injury. We managed the patient with single-stage debridement, open reduction, and dynamic compression plate (DCP) fixation of both bones with a single dorsal curvilinear incision and followed up postoperatively for one year.

Result: At the end of the last follow-up, the patient had no pain with a full range of movement. There were no wound-related issues. Radiologically complete union occurred without complications mentioned in the literature, such as synostosis.

Conclusion: We found that under specific circumstances such as open injury where two separate incisions for radius and ulna are inappropriate, a single dorsal curvilinear incision for radius and Ulna midshaft fractures is a safe and effective alternative method.

1. Introduction

Both-bone diaphyseal forearm fractures are one of the most common forms of forearm fractures seen in adult orthopedic clinical practice. Current forearm surgical fixation techniques with double incisions are safe and efficient, but they require two surgical incisions and more soft tissue handling during surgery. We undertook an alternative approach with a single dorsal incision that allows for adequate anatomical exposure for the fixation of both bone fractures by a dynamic compression plate. An open wound over the dorsum of the forearm is a forced indication of this approach.

2. Materials and Methods

An 80-year-old female presented with a history of trauma and was diagnosed with a left radius ulna midshaft fracture (Figure 1) with an open injury 5x7 cm in size over the dorsal aspect of the forearm (Figure 2). Primary standard care for open fracture was given. We planned for debridement and fixation of both bone forearm fractures in a single setting. Informed consent was obtained. On the operation table, the patient was positioned supine with the arm on the side table. Under general anesthesia, the operative arm was thoroughly scrubbed, painted, and draped. Wound wash was given with 10% povidone-iodine and hydrogen peroxide with 4 liters of water. This was followed by wound debridement and removal of devitalized tissue. Thereafter, a posterior incision starting from the wound edge and

* *Corresponding author*.
E-mail address: dr.akashmane54@gmail.com (A. N. Mane).

https://doi.org/10.18231/j.ijos.2023.009

extending proximally in a curvilinear manner was taken (Figure 3). Afterward, blunt dissection was done between the extensor carpi radialis brevis and the extensor digitorum muscle to expose the radius fracture site. The abductor pollicis longus and extensor pollicis brevis muscles were gently retracted from the radius in the distal third. Fracture margins were cleaned and washed in view of the open nature of the fracture. Later, the reduction was achieved and held with a clamp and fixed by a contoured 7 holes dynamic compression plate with 3 proximal and 3 distal cortical screws. Then ulna was exposed by blunt dissection between extensor carpi ulnaris muscle and flexor carpi ulnaris muscle. The fracture site was cleaned, held with a clamp, and fixed with a contoured 7-hole plate with 3 proximal and 3 distal screws. The plates were applied to the posterior surface of the bones. The plate was positioned underneath the extensor carpi ulnaris muscle on the ulna, avoiding the subcutaneous border. The procedure was done under C-arm guidance. The closure was done only proximally extending up to the point where no tension was observed. No sutures were taken in the distal part and it was left open with precaution to cover the plate adequately with muscle and soft tissue (Figure 4). Finally, non adhesive dressing material was used for dressing and an above elbow slab was applied. Postoperative x-ray was satisfactory (Figure 5). The patient was discharged after 2-days of surgery and was followed up a week later for dressing. Sutures were removed after 2-weeks. The slab was discontinued after suture removal, and movements were initiated gradually (Figure 6).

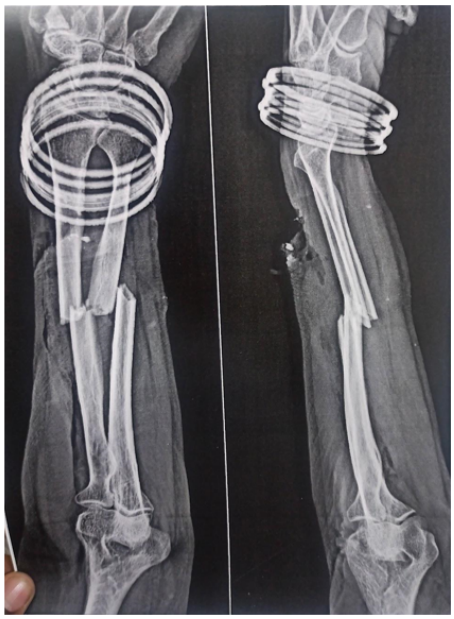

Fig. 1: Preoperative x-ray AP and LAT view

Fig. 2: Preoperative clinical picture after wound wash given in emergency room

Fig. 3: Intra operative images 1

3. Results

The x-ray after 6-weeks showed a good position of fracture and implants. The patient was regularly followed up at 6 months, 12 months and 18 months with strict physical therapy and rehabilitation plan. At the latest follow-up, there was complete radiological union of both bones and the patient achieved full range of motion. There was no sign of synostosis.

Fig. 4: Intra operative images 2

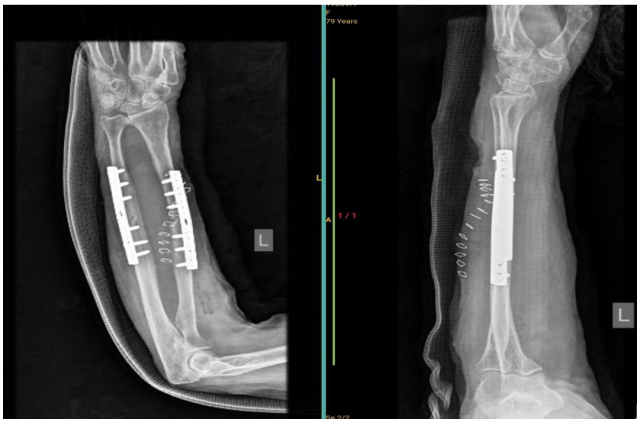

Fig. 5: Post operative x-ray

Fig. 6: Follow up clinical assessment

4. Discussion

There are only 3 publications that describe a single incision approach. 1. Speed and Boyd's approach[1,2] give good exposure to proximal radius and ulna but there are high chances of radioulnar synostosis. Bauer et al.[3] reported 5 cases with synostosis after operating on 12 cases with fractures of both the radius and ulna using the Speed and Boyd approach. 2. Colton and hall approach[4] also has high chances of radioulnar synostosis. 3. We used Shenoy's curvilinear biplanar approach[5] for our case.

Commonly most surgeons prefer 2 separate incisions for fixation of radius and ulna. For radius Henry approach[6] and for ulna posterior approach rather than single incision due to perceived risk of nerve injuries and radioulnar synostosis. During anterior approach detachment of muscle such as supinator, pronator teres, flexor digitorum superficialis which increases risk of radioulnar synostosis[7] and also vital structures such as branches of radial artery, posterior interosseous nerve are at risk. In the posterior approach also called as Thompson's approach[8] along with subcutaneous ulnar approach has difficulty due to 2 near surgical scars adjacent to each other and exposure is also limited. In literature the incidence of radioulnar synostosis ranges from 1.2% to 9% in 2 separate incisions. R.M. Shenoy performed this operation and published this approach without single case of synostosis, similarly Abdel-Azim Hassan Wahsh[2] studied 115 cases with single incision approach without complication of synososis or nerve injuries. In our case also there is no evidence of radioulnar synostosis. In our case, curvilinear incisions provided us exposure of radius as well as ulna and after skin incision we dissected up to bone through 2 separate planes, this decreases chances of radioulnar synostosis but this approach has limitations in proximal or distal shaft fracture.

In conclusion though for fixation of both bone forearm fractures combined anterior approach for radius and subcutaneous posterior approach for ulna is preferred but in special circumstances such as large wound over dorsal aspect where 3 wounds over single limb may lead complications we can choose single dorsal incision for fixation, with excellent outcomes.

5. Conclusion

We conclude that a single curvilinear dorsal incision for radius ulna midshaft fracture fixation is a safe and effective alternative to a two-incision approach in specific circumstances such as open injury, infection, or when the two incision techniques are not feasible.

6. Source of Funding

No.

7. Conflict of Interest

Author declare that there is no conflict of interest.

References

1. Boyd HB. Surgical exposure of the ulna and proximal third of the radius through one incision. *Surg Gynecol Obstet*. 1940;71(1):86–8.
2. Wahsh AA. Exposure of both the radius and ulna through a single posterior incision: a technical note. *SICOT J* . 2015;1:21.
3. Bauer G, Arand M, Mutschler W. Post-traumatic radioulnar synostosis after forearm fracture osteosynthesis. *Arch Orthop Trauma Surg*. 1991;110(3):142–5.

4. Colton CL, Hall AJ. Atlas of orthopedic surgical approaches. Oxford: Butterworth Heinman; 1991. p. 192–3.
5. Shenoy RM. Biplanar exposure of the radius and ulna through a single incision. *J Bone Joint Surg Br*. 1995;77(4):568–70.
6. Wierer M, Huber-Wagner S, Mutschler W. Post-traumatic proximal radioulnar synostosis. Surgical technique and review of the literature. *Unfallchirurg*. 2012;115(5):451–6.
7. Henry AK. Exposures of long bones and other surgical methods. *JAMA*. 1928;90(14):1148.
8. Thompson JE. Anatomical methods of approach in operations on the long bones of the extremities. *Ann Surg*. 1918;68(3):309–29.

Author biography

Akash Nagnath Mane, Lecturer https://orcid.org/0000-0002-3225-297X

Neel Kamal Sourav, Lecturer https://orcid.org/0000-0002-9948-816X

Ankit B Waghela, Resident https://orcid.org/0000-0001-9969-074X

Vijay M Panchnadikar, Consultant https://orcid.org/0000-0001-8246-173X

Cite this article: Mane AN, Sourav NK, Waghela AB, Panchnadikar VM. Single dorsal incision approach for plate fixation of radius ulna midshaft fracture; interesting case report. *Indian J Orthop Surg* 2023;9(1):34-37.