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Original article

# On-table reconstruction and fixation of Mason type III radial head fractures

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ABSTRACT

*Purpose:* To evaluate the functional and radiological outcome of comminuted radial head fractures, which were not amenable for classical open reduction with internal fixation, treated by on-table reconstruction and fixation using low profile plates.

*Methods:* We reviewed 6 patients of Mason type III radial head fractures treated by on-table reconstruction technique between 2011 and 2013. There were 5 men and 1 woman with a mean age of 35 years (range 25–46 years). All surgeries were carried out at our tertiary care level 1 trauma centre within a mean of 3 days (range 1–8 days) from date of injury using on-table reconstruction technique. The functional outcome was measured using elbow functional rating index described by Broberg and Morrey and the patient-based Disabilities of the Arm, Shoulder and Hand (DASH) outcome measure.

*Results:* The mean follow-up period was 25 months. The average elbow flexion was 135° (range 125°–140°) and the average flexion contracture was 5° (range 0–10°). The average supination and pronation was 75° (range 70°–80°) and 70° (range 65°–82°) respectively. According to Broberg and Morrey scoring system, the average score was 90 points (range 75–100). The mean DASH score was 2.49 points.

*Conclusion:* On-table reconstruction and fixation of comminuted radial head fractures using low profile plates is a reasonable option. The reconstructed radial head acts as spacer and provides reasonably good results and no surgical intervention is required for asymptomatic nonunion of these fractures regardless of the radiological findings.



## 1. Introduction

Fractures of the radial head are common,[1] constituting approximately one-third of all elbow fractures. Fractures of the radial head or neck usually occur after a fall on an outstretched arm.[2] The Mason classification of radial head fracture was described in 1954.[3] Mason type III fracture of the radial head is defined as a comminuted, displaced fracture involving the entire radial head.[2] An important role of the radial head in the overall stability of the elbow and forearm has led many investigators to recommend preservation of the radial head, either by surgical fixation or by prosthetic replacement after fracture.[2,4–6]

Internal fixation techniques are highly demanding and time consuming due to the presence of comminuted fragments. Here we reported the functional and radiological outcome of comminuted radial head fractures which were not amenable for classical open reduction with internal fixation (ORIF) and treated by on-table reconstruction and fixation using low profile plates.

## 2. Patients and methods

Between 2011 and 2013, 6 comminuted radial head fractures were treated at our level 1 trauma centre by on-table reconstruction technique. There were 5 men and 1 woman with a mean age of 35 years (range 25–46 years) and 4 cases involved the dominant extremity. Two cases were the results of fall on outstretched hand from standing height (low-energy injury), rest occurred because of motor vehicle accidents. Radiographs (anteroposterior and lateral) of the involved elbow (Fig. 1) along with CT scans were obtained in

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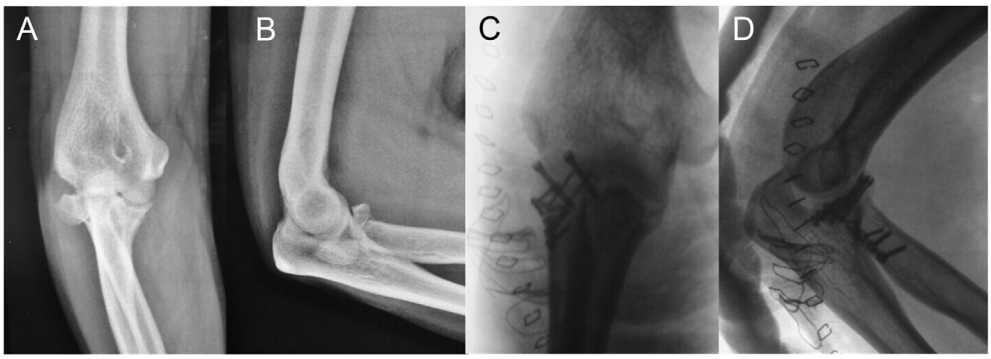


**Fig. 1.** Anteroposterior (A) and lateral (B) radiographs of a 25-year-old patient showing Mason type III radial head fracture. Immediate postoperative radiographs after on table radial head reconstruction and fixation (C and D).

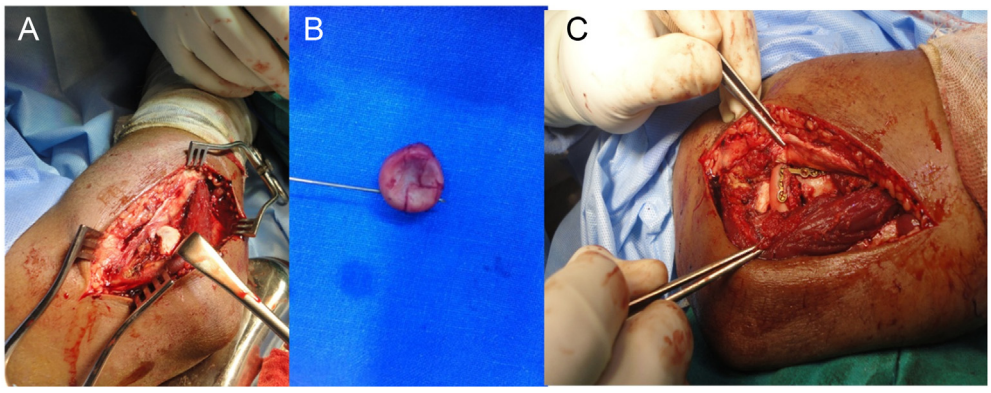


**Fig. 2.** Intraoperative photograph showing radial head fracture (A), on-table reconstruction with preliminary fixation (B), reconstructed radial head after internal fixation (C).

all patients. All fractures were classified as Mason type III with a minimum of more than two fractured fragments with complete displacement. The mean interval between injury and surgery was 3 days (range 1–8 days), and 3 patients were associated with collateral ligament injuries. There were no cases of associated coronoid fracture, elbow dislocation, Essex-Lopresti lesion or associated neurovascular injuries noted in our study group.

### 2.1. Operative technique

All surgeries were performed with the patient placed in supine position under brachial plexus block, through Kocher (posterolateral) approach to the elbow between the extensor carpi ulnaris and anconeus muscles. The lateral collateral ligament was exposed and incised longitudinally in its anterior part, extending from lateral condyle of the humerus to just distal to radial neck. Fracture fragments were exposed after incising annular ligament and capsule (Fig. 2A). Intraarticular haematoma was irrigated. Most of the fragments were devoid of any periosteal attachment. All fragments were retrieved and kept on a table. Radial head reconstruction was done on table temporarily using K-wires (Fig. 2B). Definitive fixation was done using low profile T-plates. Sometimes interfragmentary screws were necessary in the radial head outside the plate. Radial head along with plate was reimplanted and fixed with radial shaft with two or three conventional screws (Fig. 2C). The plate on the radial shaft was placed in the interval between the radial styloid and Lister's tubercle (safe zone) so as not to impair rotational movements of forearm. In three patients, metaphyseal bone loss (Fig. 3) with comminution was noted. Capsule and annular ligament were sutured back. Stability of collateral ligaments was checked in 30° of elbow flexion by applying varus and valgus stress. Lateral collateral ligament in two patients and medial collateral ligament tear in one patient were noted and repaired using intraosseous nonabsorbable sutures. At the end of the procedure, distal radioulnar joint was examined clinically and under C-arm. No cases of Essex-Lopresti lesion were noted. Above elbow plaster of Paris slab was applied in neutral position for a week and later sling was given for 3 weeks. Gentle elbow flexion extension and forearm rotations were allowed. Active and active-assisted range of motion

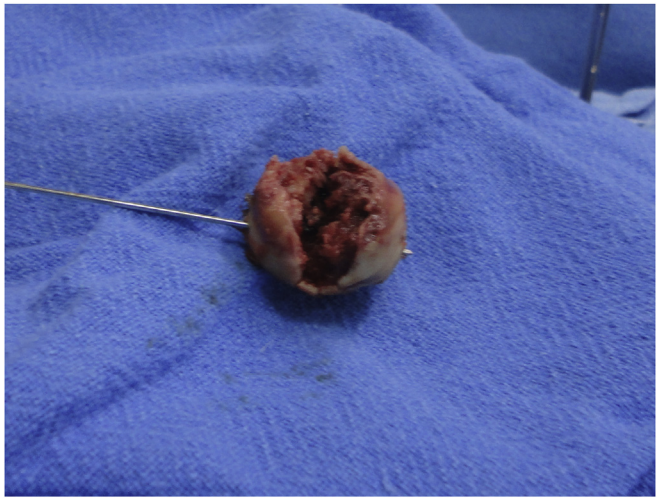

**Fig. 3.** Undersurface of radial head showing bone loss.