

Case Report

Treatment of Comminuted Radial Head Fracture with Modular Radial Head Replacement Prosthesis: A Case Report

Gaurang Chanchpara¹, Paresh Vilasrao Patil², Pravin Patil³, Nishant Gaonkar³, Navdeep Lokare³, Ketan Gupta⁴, Mihir Solanki¹, Prashant Alwani¹

¹Resident, ²Professor, ³Assist Professor, ⁴Senior Resident,
KIMS, Karad, Maharashtra, India.

Corresponding Author: Gaurang Chanchpara

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ABSTRACT

Radial Head Fracture is most common following a fall on the outstretched hand. Outcome of radial head fracture is usually dependent on the type of fracture, involvement of articular surface, degree of comminution and treatment method. Radial head is an important stabilizer of the elbow joint. If the Radial Head is comminuted and is associated with Mason Type III & IV, excision of radial head may lead to loss of strength, valgus instability and proximal migration of radius leading to wrist pain. Therefore, Aim should be achievement of normal anatomy so that the function of elbow, radio-ulnar and wrist joint will be restored. We present a case report where a patient with comminuted & displaced radial head fracture was operated with Metallic Modular Radial Head Replacement Prosthesis.

Key words: Fracture, Radial Head, Modular Replacement Prosthesis.

INTRODUCTION

Fractures of the radial head are relatively common injuries and are found in nearly 20% of all elbow traumas. ^[1] It is occurring in 5% to 10% of elbow dislocations. ^[2,3] A common injury pattern involves a radial head fracture, coronoid fracture, and elbow dislocation (the “terrible triad”) with collateral ligament disruption. ^[4] The radial head is an important stabilizer of the elbow joint. Excision of the radial head may lead to loss of strength, valgus instability and proximal migration of the radius leading to wrist pain.

Studies of static loading across the elbow have suggested that as much as 60% of the force is transmitted across the radio-capitulars articulation. ^[1] Radial head is also a secondary stabilizer to valgus stress,

with the primary restraint being the medial collateral ligament. Thus, pathological valgus instability can result from radial head resections which later on causes humero-ulnar joint arthritis leads chronic pain at elbow joint. In this situation, effort should be made to preserve or replace the radial head.

CASE REPORT

A 28 year old, male patient, Electrician by occupation came with chief complaints pain in right elbow and forearm with alleged history of fall from two wheeler. On clinical examination, he had tenderness over right elbow and over radial head with restricted range of movements and no distal neurovascular compromise. Radiological examination with X-Ray of Right Elbow in AP &

Lateral views had showed radial head fracture (Fig. 1).



Fig. 1. Pre Operative X-Ray in AP & LATERAL views showing Radial Head Fracture

Patient was admitted and routine blood investigation was done. Elbow joint was found unstable therefore CT scan was done to know the extent of comminution of fracture. On CT scan, Comminuted radial head fracture with displacement (Mason Type III) was confirmed (Fig. 2).

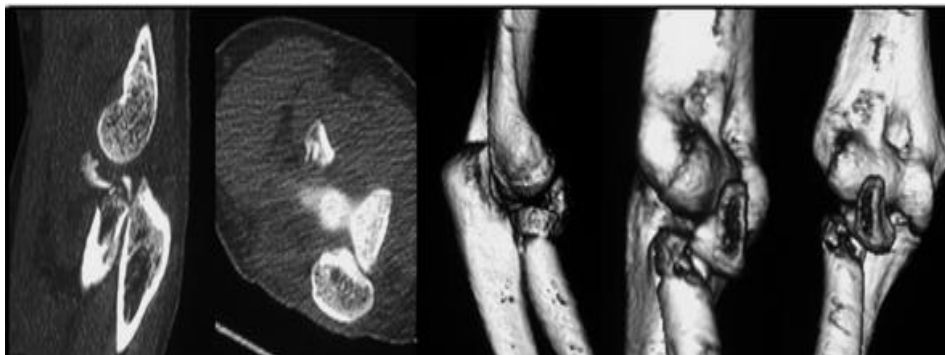


Fig. 2. Pre Operative CT Scan Images showing Radial Head Fracture with Displacement



Fig. 3. Post-Operative X-Rays in AP & Lateral View in Flexion & Extension

After surgery, Elbow was immobilized for 3 weeks at about 90° of flexion and forearm in full supination. Passive range of movements i.e. Flexion-Extension & Supination-Pronation was started after 3 weeks followed by active

Pre Anaesthetic Check Up was done. Because of young age of the patient and his occupation, Radial Head Replacement Surgery was planned. Surgery was done by using Kocher's Postero-lateral approach. There was about 3-5 mm of linear translatory movement between the radius and ulna confirming the axial forearm instability. Radial head was removed by excision and fracture pieces were arranged in its anatomical position. Radial head size and thickness was measured by Vernier Callipers and according to that modular head size was chosen. Radial neck was prepared followed by implantation of metallic fenestrated stem of modular Radial Head Prosthesis. After reducing radial head there was no valgus instability or linear translatory movements intra-operatively.

assisted movements. At the end of 6-8 weeks, patient was returned to light functional tasks with involved extremity. At 4 months of follow up, patient was having 90°-110° of flexion. Patient was having full flexion & extension

movements at 8 months of follow up. There was terminal restriction of full supination & pronation movements but the same grip strength was achieved as of the normal limb at the end of 11 months of follow up. Elbow joint was stable and there was no pain in wrist joint at DRUJ at the end of 1 year of follow up.

DISCUSSION

The management of comminuted Mason type- III radial head fractures with associated ligament disruption remains controversial. [5] Several surgical options have been advocated for these complex injuries, including Open Reduction Internal Fixation (ORIF), excision of the radial head and Radial Head Replacement (RHR). [6] Simple excision of the radial head in patients with associated interosseous membrane disruption or a medial collateral ligament injury yields poor results, with wrist or elbow instability a frequent outcome.

Mikic et al. reported poor results in 50% of patients after excision of the radial head. [7] Josefsson et al. & Leppilahti et al. revealed that excision of the radial head may lead to stiffness, weakness, pain and a high complication rate. [8,9] Hall et al. treated 42 dislocated elbows with radial head fracture by excision of the radial head and 17% of their cases had showed Postero-lateral rotatory instability. [10] Radial head excision has fallen out of favour as a result of complications such as valgus elbow instability, elbow stiffness and proximal migration of the radius. [7]

Radial head arthroplasty is indicated for displaced comminuted radial head fractures that cannot be managed reliably with ORIF and have an associated elbow dislocation. [11] Prosthesis replacement is better treatment to restore the stability, flexion and extension of the elbow with the rotational movements of the forearm. [12] Silicone implants which are available are related with some complications like synovitis of the joint, poor axial and valgus stability of the elbow

and fragmentation of implant. [13] Biomechanical studies have demonstrated that metallic implants restore elbow stability to a level similar to that of the native anatomical radial head when a fracture of the radial head occurs in combination with dislocation of the elbow, rupture of the medial collateral ligament, fracture of the proximal ulna, or fracture of the coronoid process. [14]

Newer modular radial head designs have improved sizing to better reconstruct the anatomy of the proximal radius and they are easier to insert intra-operatively. However over stuffing of the Radio capitellar joint must be avoided, as it may produce capitellar erosion especially when done as a late reconstructive procedure for chronic wrist pain. [15]

CONCLUSION

of irreparable comminuted radial head fractures with a metallic modular radial head prosthesis and soft-tissue reconstruction yields satisfactory results as it offers better stability against valgus forces at elbow, restores the axial load-bearing functions of the radial head and allow proper healing of the soft tissues without proximal migration of the radius.

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