

Results of Management of Radial Head Fractures by Internal Fixation and Conservative Management: A Study of 30 Cases

Dr. Ravi Kumar Bhesaniya¹, Dr. Zalakkumar Patel²

¹M. S. Orthopaedics, Assistant Professor, Department of Orthopaedics, P. D. U Medical College and Hospital, Rajkot
rrr_bhesaniya[at]yahoo.com

²M. S. Orthopaedics, Senior Resident, Department of Orthopaedics, P. D. U Medical College and Hospital, Rajkot
zalakpatel85[at]gmail.com

Abstract: *Aim and Objective: To assess the clinical and functional outcome of radial head fractures managed by internal fixation and conservative management. . Material and Methods: The prospective study will be done from August 2020 onwards. Sample will be taken from the patients treated in P. D. U. Medical College and Hospital having radial head fracture on basis of plain radiograph and CT scan, Mason classification. Follow up taken on 1 month, 3 months and 6 months. Results: In the study of 30 cases, 15 patients having a Mason type 1 and 12 patients of Mason type 2 and 3 patients of Mason type 3 radial head fracture were treated by open reduction and internal fixation. Out of all treated 20% of the patients presented with elbow joint stiffness and 8% presented with infection. Conclusion: From this perspective, functional and clinical outcome by open reduction internal fixation of radial head fractures appear to be providing excellent function.*

Keywords: Radial Head Fracture

1. Introduction

It has been found that radial head fractures are accounted for 5.4% of all fractures and a third of all the elbow fractures. Radial head fractures being the most frequent fracture around the elbow leaves many questions still unanswered regarding epidemiology and outcome of these injuries^[1]. Documented to occur in isolation with other associated bony and soft tissue injuries, with awareness for the potential patterns of injury essential in determining the appropriate management to attain restoration of elbow function, diagnosis is made with plain radiographs, other imaging techniques such as CT Scan with an aim to better the understanding of the injury patterns. Mason classification is commonly used system to classify these injuries throughout the literature. Management includes non-operative treatment for isolated stable radial head fractures (Mason type 1), with a variety of operative techniques used for the unstable fracture patterns (Mason type 2 and type 3). There has been an increased appreciation for the role of the radial head in elbow stability. Despite there being an extensive research into these injuries there still exist considerable controversies regarding the role of imaging technologies, managing conservatively, and also the indications and techniques for surgical intervention. Due to the lack of prospective short and long-term patient reported outcome data for the simple isolated radial head and neck fractures, this clearly defines the indication and outcome following the non-operative management of these injuries.

2. Aims

To study the clinical and functional outcome of radial head

fractures managed by internal fixation and conservative management.

3. Objectives

- 1) To analyze the clinical outcome of radial head fractures managed by internal fixation and conservative management.
- 2) To analyze the functional outcome of radial head fractures managed by internal fixation and conservative management.
- 3) To analyze the complications associated with radial head fractures managed by mean of internal fixation and conservative management.

4. Literature Survey

The first description of a radial head fracture can be attributed to Beard in 1834 who noted the presence of this injury at autopsy. In 1891, Hoffa described two types of radial head fractures, displaced and undisplaced. In the early 20th century, radial head resection became the treatment of choice for displaced radial head fractures^{[2], [3], [4]}. In 1940 Murray rested the injured limb in a sling of plaster-of-Paris back-slab for one to three weeks, depending on the severity of the lesion^[5]. In 1949 Gaston et al consider that the operation should be performed within 24 hours, and active exercises begun the following day^[6]. In 1954 Mason et al. stated that excision of the segmental fracture is required if more than a quarter of the head or if there is even minimal tilting^{[7], [8]}. In 1955 Wagner et al, stated that if the fractured fragment interferes with movement operative procedure can be considered. In 2001

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Beingessner et al., stated that Small partial articular fractures may not require surgery, but fragments that involve 25% or more of the radial head require operative repair. In 2009 Mathew et al. stated that Non operative treatment may be considered if the elbow is able to extend to at least 30° before becoming unstable after reduction.

5. Materials and Methods

This prospective study was conducted from 2020 to 2021 for which sample patients taken from P. D. U. Civil Hospital, Rajkot. MASON classification was used for and radial head fractures were managed by internal fixation and conservative management. Mayo Elbow Score was calculated at 1 month, 3 months, 6 months respectively.

Inclusion Criteria: Subsets all the male and female patients having closed fracture of radial head having Mason type 1, 2, and 3 fractures in the age group of >15 to <60 years

Exclusion Criteria: Subsets patients having age <15 and age >60years; giving negative consent for participating in the study; having Polytrauma; Neurovascular injury; Mason type 4 radial head fracture; pregnancy or having pathological conditions.

Identification and classification basing on Anteroposterior and Lateral view Roentgenograms of Elbow and also with Greenspan view was done for radial head fractures. Assessing fracture communiton and fragment displacement by computed-tomography scanning helps in preoperative planning. Essex Lopresti lesions should be looked for in all cases of radial head fractures.

Table 2: Materials Used

1	Knife Handle
2	No.23 and no.15 knife
3	Tissue Retractor
4	Kirshcner wires
5	T-Handle
6	Power Gun
7	Herbert Screw
8	Proximal radius buttress plate
9	Rush nail

6. Surgical Procedure

On simple table, patient is laid in spread eagled position with affected limb resting on forearm board providing good radiological evaluation and traction application. Exposure of radial head and neck done by Kocher's approach in which a 5cm longitudinal or gently curved incision put off the lateral epicondyle and extending distally over the radial head. Further deep fascia is incised in line with skin incision and a plane is ridged between extensor carpiulnaris and anconeus. Posterior Interosseous Nerve can be moved away from the field by pronating the arm. Proximal fibres of supinator on the posterior cortex of the radius, away from Posterior Interosseous Nerve, and capsule is incised longitudinally and

distal dissection is avoided or maintained anteriorly in mid radiocapitellar plane^[9]. Kirschner's wire is inserted initially to maintain periosteum. If needed origin of Lateral Collateral ligament is incised. Stable fixation is achieved by using Herbert screw and radial head buttressing plate after getting anatomical reduction. Surgical sterile tourniquet is applied to the arm and arm is exsanguinated by elevation followed by tourniquet inflation.

The Mayo Elbow Performance score (MEPS) or Mayo Elbow Performance Index²⁴⁸ (MEPI) is an instrumentation created to evaluate the limitations, caused by pathology, of the elbow during activities of daily living (ADL). This specific test uses 4 subscales:

- 1) Pain,
- 2) Range of Motion
- 3) Stability
- 4) Daily Function

MEPS is a 4 part test where clinical information is rated based on a 100 points scale²⁴⁸.

- <60-poor
- 60-74 – fair
- 75-89-good
- 90-100 – excellent

Part 1: Pain

45 points for patients without pain,
30 points to patients with mild pain, moderate pain results in 15 points, severe pain get 0 points.

Part 2: Range of motion

The patient starts with his elbow fully extended and then tries to flex the elbow. 20 points when the arm flexes more than 100°,

15 points If the angle is between 100°-50° 5 Points when the elbow bends 50° or less

Part 3: Stability

Stable elbow 10 points are given

A mildly unstable elbow results in 5 points.

An unstable elbow does not receive points (0)

Part 4: ADL

Based on 5 ADL's who are each given 5 points an image is drew how well the patient is able to participate in the daily life. The activities are:

- Combing your hair
- Performing personal hygiene
- Eating
- Putting on shirt and shoes.

7. Results and Discussion

In our study, 50 % patients had radial head fractures due to fall from standing, 27% due to sports related injuries, 3 % due to fall down from stairs, 10 % had motor vehicle accident, 3 % had fall from height, 3 % had twisting injury and 3 % resulted from direct blows. The average age of patients was found to be 38.35 years with Standard Deviation of 12.25 years with maximum number of patients seen between 40-49

years of age. Out of 30 patients 67 % were female and rest male. Out of all, 67 % patients appeared to have fracture on right side while rest had left sided. Out of all the patients 53 % had fracture in dominant limb and rest in non-dominant limb. In our study, 50 % were of Mason type 1 followed by Mason type 2 (40 %) followed by Mason type 3 (10 %). In our study, functional and clinical outcome of surgery is assessed by Mayo Elbow Score. In this score, 70 % of total score was occupied by subjective parameters of pain and activity of daily living (ADL) while only 30 % accounted for objective parameter like range of motion and stability. A higher score of 100 points accounted for better function and greater patient satisfaction while a score of '0' or nearer to '0' was associated with great functional disability.

Out of all the patients of radial head fracture those who are treated with conservative management had a mean elbow score of 85.5 with SD of ± 12.103 which is lower than that of patients treated by open reduction and internal fixation having a mean elbow score of 92.5 with SD of ± 12.75 at the end of 6 months. Because of post operative complication higher with open reduction so it is feasible to go for conservative management whenever there is radial head fracture with less severe injury because in such cases both providing same result as in conservative management there is preservation of normal weight bearing characteristic of elbow joint.



POST TRAUMATIC RAY



X RAY AT 1 MONTH FOLLOWUP



X RAY AT 6 MONTH FOLLOWUP



6 Months Follow Up



Post Traumatic Xray

Table 1

Studies	Technique	Number of Patients	Follow Up	Elbow Score Mean +SD
Xiaon Chen ET AL	ORIF	23	24 Months	72.4 \pm 7.1
Our Study	CONSERVATIVE	20	18 Months	85.5 \pm 12.103
	ORIF	10	18 Months	92.5 \pm 12.75

Table 2: Clinical and Functional Outcomes of Radial Head Fracture

Clinical and Functional Outcomes	Elias ET AL ^[11]		Our Study	
	Operative Group	Non Operative Group	Operative Group	Non Operative Group
Excellent	80%	13%	80%	40%

Good	10%	31%	10%	50%
Fair	10%	25%	10%	10%
Poor	0	31%	0	0

Based on this study we can summarize that the patients operated upon by open reduction and internal fixation have excellent clinical and functional outcome with mean elbow score of 92.5 ± 12.75 which appears to be promising.

8. Complications

In our study of 30 cases, 6 patients suffering from stiffness of elbow joint, 1 patient suffering from infection and 1 patient had Posterior Interosseous Nerve Palsy. There is no elbow instability or elbow dislocation. Anaesthesia related complication has not been seen in our study.

Table 2: Complication of Radial Head Fracture in Our Study

Complication type	Xiaon Chen Et al ^[21]	Our study
Stiffness	4	6
No Healing	1	0
Wound Infection	1	1
PIN Palsy	0	1

9. Conclusions

From our point of view, nondisplaced fractures (Mason type 1) involving part of the radial head do well with nonoperative treatment. They rarely block motion, cause pain, or lead to arthrosis. Although radiographic criteria for operative treatment have been suggested. Majority of patient with mason type 1 radial head fractures treated conservatively shows promising result. Marginal fractures of radial head (Mason type 2) usually are displaced and unstable with little or no soft-tissue attachments. Such fractures would seem to be obvious candidates for open reduction and internal fixation. clinical and functional outcome of the patient having radial head fracture treated by open reduction and internal fixation appeared to provide greater function without any greater disability. In our study, we assessed clinical and functional outcome of different type of radial head fractures. While treating patients by mean of open reduction and internal fixation one should know that operative treatment represents complications such as infections, wound problems, anaesthesia related complications which should be undertaken with care. To standardize fracture classification strong need for randomized control trials.

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