

A comparative study of open reduction and internal fixation versus arthroplasty treatment of modified mason type III or IV radial head fracture at tertiary health care center

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Abstract

Background: Radial head fractures can occur in isolation or with associated elbow and forearm injuries, including fractures, fracture-dislocations, and/or ligamentous injuries. **Aims and Objectives:** To study Open reduction and internal fixation versus arthroplasty treatment of modified Mason Type III or IV radial head fracture at tertiary health care center. **Methodology:** This was a cross-sectional study carried out in the department of Orthopedics of a tertiary health care centre during the one year period i.e. January 2017 to January 2018 in the patients admitted with modified Mason Type III or IV radial head fracture with the written and explained consent all such patients were allotted to two different treatment groups i.e. Radial head Arthroplasty (RHA, n=32); The statistical analysis was done by un-paired t-test, Chi-square test, Mann Whitney U test, all calculated by SPSS 19 version software. **Result:** In our study we have found that, the mean age of in RHA group was 43 ± 5.42 Yrs. and in ORIF group was 44 ± 3.73 Yrs. was comparable ($t = 1.34$, $df = 62$, $p > 0.05$). The male to female ratio in both the groups was 1.13 and 1.28 was comparable with each other ($X^2 = 0.57$, $df = 1$, $P > 0.05$). Except the Flexion/extension arc ($^\circ$) -109.12 ± 14.23 , 103.21 ± 8.92 ($p < 0.02^*$); Supination ($^\circ$) -72.34 ± 6.98 , 65.12 ± 4.56 ($p < 0.01^*$) which was found to be better in RHA as compared to ORIF, all other parameters were comparable to each other i.e. PREE- 14.1 ± 14.54 , 13.98 ± 12.81 ($p > 0.87$); DASH- 10.11 ± 15.12 , 11.7 ± 13.87 ($p > 0.91$); Flexion ($^\circ$) -127.13 ± 13.12 , 128.13 ± 7.92 ($p > 0.43$); Extension ($^\circ$) -16.4 ± 8.92 , 17.45 ± 7.34 ($p > 0.97$); Pronation ($^\circ$) -57.23 ± 11.23 , 59.34 ± 8.34 ($p > 0.38$); rotation/supination ($^\circ$) -131.23 ± 18.34 , 129.12 ± 11.87 ($p > 0.73$). **Conclusion:** It can be concluded from our study that Except the Flexion/extension arc, Supination movement in all other aspect both the result were comparable with each with respect to surgical outcome are concerned.

Key Word: fmodified Mason Type III or IV radial head fracture, open reduction and internal fixation (ORIF), radial head arthroplasty (RHA), PREE=Patient-rated elbow evaluation, DASH=Disabilities of the arm and all the movements of Joint

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INTRODUCTION

Radial head fractures can occur in isolation or with associated elbow and forearm injuries, including fractures, fracture-dislocations, and/or ligamentous injuries^{1,2,3,4,5}. Options for treatment include nonoperative management^{1,6}, fragment or whole-head excision^{7,8,9,10}, open reduction and internal fixation (ORIF)^{12,13,14}, and radial head arthroplasty^{12,13,14}. In addition to the particular characteristics of the radial head fracture, associated injuries may influence treatment selection. While many options are employed in the treatment of displaced radial head fractures, the

indications for ORIF of displaced radial head fractures are not clearly established^{15,16}. In contrast, for irreparable fractures, there is increasing support for radial head arthroplasty as an effective treatment option^{18,16}, so we have done comparative study of Open reduction and internal fixation versus arthroplasty treatment of modified Mason Type III or IV radial head fracture at tertiary health care center.

METHODOLOGY

This was a cross-sectional study carried out in the department of Orthopedics of a tertiary health care centre during the one year period i.e. January 2017 to January 2018 in the patients admitted with modified Mason Type III or IV radial head fracture with the written and explained consent all such patients were allotted to two different treatment groups i.e. Radial head Arthroplasty (RHA, n=32); Open reduction and internal fixation (ORIF, n=32) randomly. All such patients were operated with all standard protocols and evaluated post operatively by PREE=Patient-rated elbow evaluation, DASH=Disabilities of the arm and all the movements of Joints. The statistical analysis was done by un-paired t-test, Chi-Square test, Mann Whitney U test, all calculated by SPSS 19 version software.

RESULT

Table 1: Distribution of the patients as per the Age

Average age (mean ±SD)	RHA (n=32)	ORIF (n=32)	p-value
	43± 5.42	44 ± 3.73	t = 1.34, df = 62, p>0.05

The mean age of in RHA group was 43± 5.42 Yrs. and in ORIF group was 44 ± 3.73 Yrs. was comparable (t = 1.34, df = 62, p>0.05).

Table 2: Distribution of the patients as per the Sex

Sex	RHA (n=32)	ORIF (n=32)	P-value
Male	17	18	X ² =0.57, df=1, P>0.05
Female	15	14	

The male to female ratio in both the groups was 1.13 and 1.28 was comparable with each other (X²=0.57, df=1, P>0.05)

Table 3: Distribution of the patients as per the surgical outcome

Variable	RHA(n=32)	ORIF(n=32)	P
PREE	14.1±14.54	13.98±12.81	0.87
DASH	10.11±15.12	11.7±13.87	0.91
Flexion (°)	127.13±13.12	128.13±7.92	0.43
Extension (°)	16.4±8.92	17.45± 7.34	0.97
Flexion/extension arc (°)	109.12±14.23	103.21±8.92	0.02*
Pronation (°)	57.23±11.23	59.34±8.34	0.38
Supination (°)	72.34±6.98	65.12±4.56	0.01*
Pronation/supination (°)	131.23±18.34	129.12±11.87	0.73

Except the Flexion/extension arc (°)-109.12±14.23, 103.21±8.92 (p<0.02*); Supination (°)-72.34±6.98, 65.12±4.56 (p<0.01*) which was found to be better in RHA as compared to ORIF, all other parameters were comparable to each other i.e. PREE 14.1±14.54, 13.98±12.81 (p>0.87); DASH 10.11±15.12, 11.7±13.87 (p>0.91); Flexion (°) 127.13±13.12, 128.13±7.92 (p>0.43); Extension (°) 16.4±8.92, 17.45± 7.34 (p>0.97); Pronation (°) 57.23±11.23, 59.34±8.34 (p>0.38); Pronation/supination (°) 131.23±18.34, 129.12±11.87 (p>0.73).

DISCUSSION

The elbow is a highly congruent joint, and the radial head plays an important role as a secondary stabilizer.^{20,21} When this articulation is disrupted, surgical treatment is often required. The radial head is a key element in elbow stability during varus, and valgus loading,²² and the radial head is not only important for the humeroradial joint, but also for the stability of the distal radioulnar joint.²³ Therefore, traditional radial head resection is not recommended and is declining in use because of complications such as wrist degeneration, persistent instability, and loss of muscle strength.²⁴ RHA is indicated for irreparable radial head fractures associated with elbow instability. The clinical outcomes which have been reported are mostly from short term follow up, but the results are generally favorable.²⁵⁻²⁸ In our study we have found that, the mean age of in RHA group was 43± 5.42 Yrs. and in ORIF group was 44 ± 3.73 Yrs. was comparable (t = 1.34, df = 62, p>0.05). The male to female ratio in both the groups was 1.13 and 1.28 was comparable with each other (X²=0.57, df=1, P>0.05). Except the Flexion/extension arc (°)-109.12±14.23, 103.21±8.92 (p<0.02*); Supination (°)-72.34±6.98, 65.12±4.56 (p<0.01*) which was found to be better in RHA as compared to ORIF, all other parameters were comparable to each other i.e. PREE 14.1±14.54, 13.98±12.81 (p>0.87); DASH 10.11±15.12, 11.7±13.87 (p>0.91); Flexion (°) 127.13±13.12, 128.13±7.92 (p>0.43); Extension (°) 16.4±8.92, 17.45± 7.34 (p>0.97); Pronation (°) 57.23±11.23, 59.34±8.34 (p>0.38); Pronation/supination (°) 131.23±18.34, 129.12±11.87 (p>0.73). These findings are similar to Seung Min Ryu²⁹ they found The mean PREE scores were 13.9 for the RHA group and 13.0 for the ORIF group, and mean DASH scores were 9.5 and 10.7, respectively. The differences were not statistically significant. When comparing ROM, the patients in the RHA group showed greater movement at all measured angles.

CONCLUSION

It can be concluded from our study that Except the Flexion/extension arc, Supination movement in all other aspect both the result were comparable with each with respect to surgical outc

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