ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 8, Issue – 2, April – 2023 , Page No. : 118 – 122

Radial Head Resection Versus Radial Head Arthroplasty In Unrepairable Radial Head Fractures Mason Type III and Type IV

[1]Mohasin Khan Tanwar, MBBS, Department of Orthopaedics, Jhalawar Medical College, Jhalawar, Rajasthan, India.
[1]Om Prakash Meena, MBBS, Department of Orthopaedics, Jhalawar Medical College, Jhalawar, Rajasthan, India.
[1]Muniraj Meena, MBBS, Department of Orthopaedics, Jhalawar Medical College, Jhalawar, Rajasthan, India.
[1]Mukul Jain, MS, Department of Orthopaedics, Jhalawar Medical College, Jhalawar, Rajasthan, India.
Corresponding Author: Mohasin Khan Tanwar, MBBS, Department of Orthopaedics, Jhalawar Medical College, Jhalawar, Rajasthan, India.

Citation this Article: Mohasin Khan Tanwar, Om Prakash Meena, Muniraj Meena, Mukul Jain, "Radial Head Resection Versus Radial Head Arthroplasty in Unrepairable Radial Head Fractures Mason Type III and Type IV", IJMSIR- April - 2023, Vol – 8, Issue - 2, P. No. 118 – 122.
Type of Publication: Original Research Article
Conflicts of Interest: Nil

Abstract

Background: The aim of this study was to retro spectively compare a series of patients surgically treated with radial head resection versus radial head arthroplasty in un repairable radial head fractures Mason Type III and Type IV

Materials and Methods: In this retro spective com parative study, 50 patients with an isolated radial head fracture who were surgically treated with either radial head resection or radial head arthroplasty were evaluated clinically and radio graphically on the basis of DASH, Mayo wrist and Oxford elbow score.

Results: Comparing two groups, radial head resection group patients had decreased hand grip strength and radial head resection patients had decreased extension at elbow. Overall functional outcome is better in radial head arthroplasty group as accessed by DASH, Mayo wrist and Oxford elbow score. 2

Conclusion: Patients with unrepairable Mason Type-III and Type IV radial head fractures who require excellent hand grip strength and functional outcome are excellent candi dates for radial head arthroplasty. However radial head resection is easy to perform and is a fair treatment choice for patients who wish to reclaim their ability to perform the activities of daily life at the cost of grip strength.

Keywords: Arthroplasty; Radial Head resection

Introduction

Surgical treatment for comminuted and unrepairable fractures of the radial head may be challenging. These types of fractures are often associated with multiple ligamentous injuries amounting to elbow instability. Radial head resection has been proposed as a good option for surgical treatment, while in the last decades, the development of technology and design in radial head prostheses has increased efficacy in prosthetic replace ment. The radial head is a secondary valgus stabilizer of the joint and it is involved in the transmission of axial force load through the elbow during flexion.[1] It is also a various and external rotatory constrainer.[2]

Comminuted radial head fractures Mason type III and type IV are commonly associated with other injuries of the elbow as capitellum and coronoid fractures and/or ligaments disruption, both medial and lateral ligaments and inter osseus membrane. [3] The primary goal in surgical treatment is to restore elbow stability in order to preserve the complex physio logic elbow kinematics. In this respect, medial collateral ligament is the primary constrainer in valgus stress. Radial head contributes secondarily to valgus stability [4] and its preservation is mandatory in case of fractures that involve soft tissue and ligaments to avoid chronic instability. Many authors have described serious complications in case of resection of the radial head such as proximal migration of radius and long itudinal insta bility, humeroulnar osteo arthritis,[4] decrease in grip strength, cubitus valgus, and ulnar neuro pathy.[5] Therefore, radial head arthroplasty has obtained a large consensus in orthopaedic surgeons as the primary option of treatment in fractures Mason types III and IV. It allows an anatomical reconstruction and it maintains stability and physio logic kinematics of the elbow if associated with ligament reconstruction.

Material and methods

Type of study-Hospital based retrospective comparative study

In this retrospective comparative study, patients with an isolated radial head fracture who were surgically treated with either radial head resection or radial head arthro plasty were evaluated clinically and radiographically.

Inclusion criteria

Patients having radial head fractures were classified according to the Mason classification system and Type-III & IV fractures were included.

Exclusion criteria

Patients with additional bony injury at elbow, neuro logical deficit or instability at the time of diagnosis or with prior upper - extremity trauma anamnesis were excluded.

50 patients matched the criteria and were divided into two groups: those in Group I were treated with radial head resection and those in Group II were treated with radial head arthro plasty. Mean follow up time is 31 months in group I and 28 months in group II. All the patients were evaluated clinically and radiographically during follow up period. The range of motion of elbow and forearm were measured using goniometer and compared to unaffected side. The functional outcome was measured on the basis of Disabilities of Arm, Shoulder and Hand (DASH) score, Mayo Wrist score and Oxford Elbow score.

Data analysis was carried out using SPSS16.0 version software. Micro soft word and excel were used for gene rating charts and graphs.

Results

The results of the study are summarized in table 1. In group I the mean DASH, Oxford elbow and Mayo wrist scores were 25.84, 32.43 and 84.29, respectively. During the final examination the mean value for flexion and extension were 112.05 and -10.02, respectively. In group II the mean DASH, Oxford elbow and Mayo wrist scores were 19.9, 40.29 and 94.29, respectively. During the final examination the mean value for flexion and extension were 104.02 and -25.03, respectively. In terms of grip strength, group I was compromised and group II had limited extension of the affected side. No significant com plications such as wound infection, implant loosening, sepsis or neurological compromise were observed during study time. No instability was detected on the last physical examination of each group.

Discussion

In this comparative study, patients with an isolated radial head fracture who were surgically treated with either

radial head resection or radial head arthro plasty were evaluated clinically and radio graphically. Biological methods are first-choice treatments for isolated Mason Type-III & IV fractures but are considered controversial in the treatment of fractures with ≥3 fragments.[6]

Dou Q et al found that the treatment of Mason Type-III fractures favored the outcomes of radial head arthroplasty over those of osteosynthesis.[7]

If time PP et al found that radial head resection and radial head arthroplasty are the preferred treatment choices for irreparable Mason Type-III fractures. [8] However, conflicting results have been reported in the literature regarding both treatment modalities.

Our results are supported by a study conducted by Karl sson MK et al [9] that evaluated isolated com minuted radial head fractures; this study found that the mean range of motion deficit in the elbow was 5°–10°. In addition, good to excellent results according to the Mayo Elbow Performance Index were reported by An tuna SA et al [10] in a review of 26 patients treated with primary radial head excision who were followed up for a minimum of 15 years.

Swanson AB et al [11] presented a clear sequence of events when a loss of radio capitellar contact resulted in lateral elbow instability, arthritis, loss of strength and motion, and ulnar nerve symptoms. In terms of radial head resection, it has been reported that 55% patients encountered restrictions in their daily life, and 36% experienced limitations at work.[12]

Herbert son P et al [13] suggested that if the initial attempt to save the radial head caused unfavorable results, a delayed excision may be performed.

Radial head arthroplasty is indicated for the management of comminuted displaced radial head fractures when stable internal fixation is unachievable or in cases of instability following radial head excision, malunion, and nonunion. In our study, satisfactory functional and clinical results were achieved in patients treated with radial head arthroplasty with no signs of implant loosening or instability. These outcomes were supported by Harrington IJ et al,[14] who presented the results of the long-term follow up of 20 patients treated with radial head arthroplasty; use of a prosthesis was advocated when the radial head could not be reconstructed to restore the stability of the elbow and forearm. Moreover, Zunkiewicz MR et al [15] reported the results of 29 patients with a mean follow-up period of 34 months. Satisfactory functional scores, with a Mayo Elbow Per for mance Index score of 92 and an acceptable level of complications, were noted. The outcomes of patients with acute traumatic elbow instability treated with radial head arthroplasty were presented in a study that included 27 patients. In that study, 22 patients had good or excellent results according to the Mayo Elbow Performance Index. Unlike our evaluation, complications including stem loosen ing, component failure, instability, infection, dis location, and arthritis were reported. [16] Another com plication difference was reported by FlinkkiläT et al, [17] who reviewed the results of press-fit radial head arthro plasty in 37 patients with a mean follow-up of 50 months. One-third of their patients had early symptomatic loosen ing, which necessitated implant removal in nine patients.

Conclusion

We conclude that radial head arthroplasty is superior treatment for unrepairable comminuted radial head fracture Mason Type III and Type IV in terms of stability, functional outcome and grip strength. Although radial head resection is easy to perform and is fair options for patients with radial head fractures Mason Type - III & IV who wish to reclaim their ability to perform the activities of daily life at the cost of grip strength.

References

1. Jensen SL, Olsen BS, Tyrdal S, Søjbjerg JO, Sneppen O. Elbow joint laxity after experimental radial head excision and lateral collateral ligament rupture: efficacy of prosthetic replacement and ligament repair. J Shoulder Elbow Surg. 2005 Jan-Feb;14(1):78-84.
2. Van Riet RP, Morrey BF, O'Driscoll SW, Van Glab beek F. Associated injuries complicating radial head fractures: a demo graphic study. Clin Orthop Relat Res. 2005 Dec;441:351-5.
3. Hilgers Om NF, Eygendaal D, van den Beke Rom MP. Is radial head resection the first choice treatment of comminuted radial head fractures without associated instability? Injury. 2017 Feb;48(2):560-562.
4. Itamura J, Roidis N, Mirza yan R, Vaishnav S, Learch T, Shean C. Radial head fractures: MRI evalua tion of associated injuries. J Shoulder Elbow Surg. 2005 Jul-Aug;14(4):421-4.
5. McGinley JC, Gold G, Cheung E, Yao J. MRI detection of forearm soft tissue injuries with radial head fractures. Hand (N Y). 2014 Mar;9(1):87-92.
6. Ring D. Displaced, unstable fractures of the radial head: fixation vs. replace ment--what is the evidence ? Injury. 2008 Dec; 39 (12): 1329-37.
7. Dou Q, Yin Z, Sun L, Feng X. Prosthesis replace ment in Mason III radial head fractures: A meta-analysis. Orthop Traumatol Surg Res. 2015 Oct;101(6):729-34.
8. If timie PP, Calmet Garcia J, de Loyola Garcia Forcada I, Gonzalez Ped ouzo JE, Giné Goma J. Resection arthro plasty for radial head fractures: Long-term follow-up. J Shoulder Elbow Surg. 2011 Jan; 20 (1): 45–50.
9. Karlsson MK, Herbert son P, Nordqvist A, Hasserius R, Besjakov J, Josefsson PO. Long-term out come of displaced radial neck fractures in adulthood: 16-21 year follow-up of 5 patients treated with radial head excision. Acta Orthop 2009 Jun;80(3):368–70.
10. An tuna SA, Sánchez-Márquez JM, Barco R. Long-term results of radial head resection following isolated radial head fractures in patients younger than forty years old. J Bone Joint Surg Am 2010 Mar;92(3):558–66
11. Swanson AB, Jaeger SH, La Rochelle D. Comminuted fractures of the radial head. The role of silicone-implant replacement arthroplasty. J Bone Joint Surg Am 1981 Sep;63(7):1039–49.
12. Fuchs S, Chylarecki C. Do functional deficits result from radial head resection? J Shoulder Elbow Surg 1999 May-Jun;8(3):247–51.
13. Herbert son P, Josefsson PO, Hasserius R, Besjakov J, Nyqvist F, Karlsson MK. Fractures of the radial head and neck treated with radial head excision. J Bone Joint Surg Am 2004 Sep;86(9):1925–30.
14. Harrington IJ, Sekyi-Otu A, Barrington TW, Evans DC, Tuli V. The functional outcome with metallic radial head implants in the treatment of unstable elbow fractures: a long-term review. J Trauma 2001 Jan; 50 (1): 46–52
15. Zunkiewicz MR, Clemente JS, Miller MC, Baratz ME, Wysocki RW, Cohen MS. Radial head replacement with a bipolar system: a minimum 2-year follow-up. J Shoulder Elbow Surg 2012 Jan;21(1):98–104
16. Doorn berg JN, Parisien R, van Duijn PJ, Ring D. Radial head arthroplasty with a modular metal spacer to treat acute traumatic elbow instability. J Bone Joint Surg Am 2007 May;89(5):1075–80
17. Flinkkilä T, Kais to T, Sirniö K, Hyvönen P, Lep pilahti J. Short- to midterm results of metallic press-fit radial head arthroplasty in unstable injuries of the elbow. J Bone Joint Surg Br 2012 Jun;94(6):805–10

Table 1: Characteristics of the patients in both groups.

Variable		Radial head resection (Group I)	Resection arthroplasty (Group II)	p-value
Age in years		41.23±3.26	45.36±4.15	0.128
Male: Female		18:7	17:8	0.578
Follow-up (months)		31	28	0.222
DASH score		25.8	19.9	0.798
Oxford Elbow score		32	40	0.334
Mayo Wrist Score		84	94	0.209
ROM flexion	AS	112.05±9.26	104.02±5.18	0.054
	NAS	127.02±6.52	127.02±6.52	0.99
	P-value	0.04	0.01	
ROM extension	AS	-10.02±8.26	-25.03±9.52	0.01
	NAS	0±0	0±0	0.99
	P-value	0.001	0.001	
GS neutral	AS	41.02±27.02	51.96±16.23	0.230
	NAS	75.14±9.23	70.66±14.01	0.201
	P-value	0.013	0.074	
GS pronation	AS	41.02±27.02	51.96±16.23	0.23
	NAS	62.36±8.15	62.24±14.23	0.524
	P-value	0.016	0.085	
GS supination	AS	44.02±24.26	54.26±15.02	0.271
	NAS	70.12±6.02	62.06±4.29	0.045
	P-value	0.018	0.176	

*Abbreviations used in the table: ROM= Range of motion; GS= Grip strength; AS= Affected side; NAS= Non affected side