ADVANCES IN BIORESEARCH
Adv. Biores., Vol 8 [3] May 2017: 108-111

Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr.html
CODEN: ABRDC3
DOI: 10.15515/abr.0976-4585.8.3.108111

Advances in Bioresearch

ORIGINAL ARTICLE

Long-Term results of Radial Head Excision in the Patients with Isolated and Comminuted Radial Head fracture

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ABSTRACT
The treatment of comminuted radial head fractures remains controversial. It is generally agreed that a comminuted (Mason type-III) fracture of the radial head is best treated by excision when anatomical reconstruction is not possible. Thirty-four patients (23 men, 11 women) with a mean age of 41.7 years (28-65 years) who had sustained an isolated comminuted fracture of the radial head that had been treated with primary radial head resection were reviewed retrospectively at 10 years (2006-2015). Outcomes were evaluated according to the examination included a subjective assessment of pain, range of motion of the elbow and forearm. Radiographic assessment of degenerative changes was also performed. The mean elbow flexion was 124.7º (100-145) and the mean elbow extension was -19.4º (0 - (-40)) that were significant decreased compared to the non-involved sides. The mean forearm supination was 68.82º (40-80) and the mean forearm pronation was 64.26º (35-90) that were significant decreased compared to the non-involved sides. Twenty-seven patients (79.4%) had elbow pain and 19 (55.9%) patients had wrist pain. In radiography 23 (67.6%) patients had degenerative changes in elbow (grade I: 14, grade II: 6, grade III: 3) and 11 patients had degenerative changes in wrist (grade I: 7, grade II: 3, grade III: 1). In conclusion, excision of the head of radius cannot be considered ideal treatment for isolated comminuted fractures.
Keywords: *Radial head fracture, Radial head resection, range of motion*

Received 01.03.2017 Revised 10.04.2017 Accepted 29.04.2017

How to cite this article:
Ahmad Dasht Bozorg, Mahmood Sahriati, Samaneh Rashidi. Long-Term results of Radial Head Excision in the Patients with Isolated and Comminuted Radial Head fracture. Adv. Biores., Vol 8 [3] May 2017.108-111

INTRODUCTION

The treatment of comminuted radial head fractures remains controversial. Although the best therapeutic option for an isolated fracture is unclear, but the most common treatments for radial head fractures with elbow dislocation or longitudinal forearm instability are fixation or radial head replacement. Results of several studies had shown open reduction and internal fixation in the patients with a comminuted fracture pattern had high rate of complications [1, 2]. Several factors must be considered in management of radial head fractures such as amount of displacement, numbers of fragments, impaction, bone quality, and associated fractures and ligament injuries [3].

There has been contrasting results of the treatment outcome of comminuted radial head fractures by radial head excision and radial head arthroplasty in literatures [4, 5]. The long-term results of this procedure have been described by several authors, with some of them reporting excellent elbow motion [6-10] and several authors reporting a high proportion of complications such as valgus instability, stiffness, or proximal migration of the radius [11, 12].

MATERIALS AND METHODS

Thirty-four patients (23 men ,11 women) with mean age of 41.7 years (28-65 years) who had sustained an isolated and comminuted fracture of the radial head that had been treated with primary radial head resection were reviewed retrospectively at a 10 years (2006-2015).

Outcomes were evaluated according to the examination included a subjective assessment of pain, range of motion of the elbow and forearm.

Radiographic assessment of degenerative changes was also performed.

Degenerative changes in the wrist and elbow was graded as: grade I: few, if any, osteophytes and joint narrowing; grade II: moderate–prominent osteophytes and joint narrowing; grade III: severe and gross deformity using the criteria of Swanson *et al.* [13].

Pain in the elbow and wrist was evaluated on a 0–3 scale (0= no pain; 1= mild pain, with no limitation of recreational activities; 2= moderate pain with some limitation of recreational but not daily activities; 3= severe pain with limitation of both recreational and daily activities.

RESULTS

The subjects in this study were 34 patients with comminuted and isolated fracture of the radial head. Distribution and abundance of age and gender of patients are shown in Table 1.

Table 1. Distribution and abundance of age and gender of patients

Gender	Number	Mean of age
Man	23	40.23
Woman	11	42.62

All patients had a resection of radial head mean 4.85 (1-11) days after the injury.

Twenty-seven (79.41%) patients had pain in the elbow and 19 (55.88%) patients in the wrist (Table 2).

Table 2. Results of subjective assessment

	No (n)	**Mild (n)**	**Moderate (n)**	**Sever (n)**
Elbow pain	7	19	7	1
Wrist pain	15	11	8	0

Elbow Flexion of the involved side was compared with the healthy side. The average elbow flexion in the involved side was 124.7º that in comparison with the average value of this parameter in the healthy side as 144.77º the difference was significant (P <0.001).

Moreover, the extension of the involved elbow was compared with the healthy side. The average extension on the involved elbow was -19 that compared to this parameter on the healthy side with average value of 3, the difference was statistically significant (P <0.001).

Supination of the involved elbow and the healthy side were also compared in patients. The average supination of the involved elbow was 68.82º and showed statistically a significant difference (P <0.001) in comparison with this parameter in the healthy side with average value of 88.97. Pronation of the involved elbow and the healthy side were also compared in patients. Average Elbow Pronation was 64.26º and showed statistically a significant difference (P <0.001) in comparison with this parameter in the healthy side with average value of 89.5 º.

Table 2. Results of clinical examination assessment

Range of motion	**Involved side**	**Non- involved side**
Elbow flexion (º)	124.7 (100-145)	144.7 (140-150)
Elbow extension (º)	-19.08 (-40-0)	3 (0-10)
Forearm supination (º)	68.82 (40-80)	88.97 (85-90)
Forearm pronation (º)	64.26 (35-90)	89.5 (85-90)

Degenerative changes of the patients were evaluated based on radiography of the elbow (Table 4).

Elbow radiography of 23 patients (67.6%) showed degenerative changes. Grades of the patients included 14 patients grade I, 6 patients grade II and 3 patients grade III.

Wrist radiographic assessment of 11 patients (32.3%) showed degenerative changes. Patients grades included 7 patients grade I, 3 patients grade II and 1 patient grade III (Table 4).

Table 4. Result of radiological assessment

Degenerative change	No (n)	Mild (n)	Moderate (n)	Sever (n)
Degenerative changes of elbow	11	14	6	3
Degenerative changes of wrist	23	3	7	1

DISCUSSION AND CONCLUSION

The ideal treatment for Mason type III fractures of the head of the radius remains controversial. Early excision has been recommended by several authors [14-17].

Radial head replacement by prostheses remains controversial [18]. Some implants have shown problems, and the lack of stiffness to withstand normal loads without deformation. Some prostheses have given satisfactory results for unstable fractures of the radial head [19-21]. The options of comminuted radial head fractures are open reduction and internal fixation, resection arthroplasty and radial head implant, but the ideal treatment remains controversial [22-28].

The previous studies had shown high rate of complication due to head resection including varus-valgus instability and posterolateral rotatory instability, pain, heterotopic ossification, proximal radial migration, cubitus valgus and associated ulnar nerve symptoms, and elbow and wrist arthritis; these studies suggest radial head preservation if possible or replacement when necessary [29-36].

The purpose of this study was to evaluate the long-term clinical, radiographic, and functional results of excision of isolated and comminuted radial fractures.

Our study had shown a high complication rate following excision of the head of radius. Restriction in elbow and forearm motion following radial head resection can occur in all directions, but elbow extension and forearm supination appear to be affected the most [12, 37, 38]. In present study limitation in elbow and forearm motion after the radial head resection were occurred in all directions. Two possible causes for degenerative changes following radial head resection, which occurs more often in the elbow than in the wrist [8, 11] are the initial injury itself causing a simultaneous articular injury and altered elbow biomechanical features and stability [24].

In the current series, degenerative changes were more common in elbows than in wrists.

CONCLUSION

In conclusion; excision of the head of the radius cannot be considered ideal treatment for isolated fractures; the head of the radius should be preserved whenever technically possible and replaced when necessary.

REFERENCES

1. Ring D, Quintero J, Jupiter JB. (2002). Open reduction and internal fixation of fractures of the radial head. J Bone Joint Surg Am ;84: 1811-5.
2. Morrey BF**. (1995).** Current concepts in the treatment of fractures of the radial head, the olecranon, and the coronoid. *J Bone Joint Surg [Am]* ;77-A:316-27.
3. Pike JM, Athwal GS, Faber KJ, King GJ. (2009). Radial head fractures—an update. *J Hand Surg Am.*; 34(3):557-565.
4. Ikeda M, Sugiyama K, Kang C, Takagaki T, Oka Y. (2006). Comminuted fractures of the radial head: Comparison of resection and internal fixation. Surgical technique. J Bone Joint Surg Am;88:11-23.
5. Bain GI. (1999) A review of complex trauma to the elbow. Aust N Z J Surg;69:578-81.
6. Faldini C, Pagkrati S, Grandi G, Digennaro V, Lauretani G, Faldini O, Giannini S. (2006). What happens to the elbow joint after fractured radial head excision? Clinical and radiographic study at a mean 15-year follow-up. J Orthop Traumatol. ;7: 126-30.
7. Goldberg I, Peylan J, Yosipovitch Z.(1986). Late results of excision of the radial head for an isolated closed fracture. J Bone Joint Surg Am. ;68:675-9.
8. Coleman DA, Blair WF, Shurr D.(1987). Resection of the radial head for fracture of the radial head. Long-term follow-up of seventeen cases. J Bone Joint Surg Am. ;69:385-92.
9. Miralles FA, Sebastia´c E, Cebria´cn R, Lizaur A. (2004). Resultados funcionales de las resecciones de la cabeza radial tras su fractura. Rev Ortop Traumatol.;48:12-6.
10. Broberg MA, Morrey BF. (1986). Results of delayed excision of the radial head after fracture. J Bone Joint Surg Am.68:669-74.
11. Ikeda M, Oka Y. (200). Function after early radial head resection for fracture: a retrospective evaluation of 15 patients followed for 3-18 years. Acta Orthop Scand;71:191-4.
12. Ikeda M, Sugiyama K, Kang C, Takagaki T, Oka Y.(2005). Comminuted fractures of the radial head. Comparison of resection and internal fixation. J Bone Joint Surg Am. ;87:76-84.
13. Swanson A B, Jaeger S H, Rochelle D L. (1981). Comminuted fractures of the radial head. The role of Silicone-implant replacement arthroplasty. J Bone Joint Surg (Am) ;63: 1039-49.

14. Arner O, Ekengren K, Schreeb T von (1957) Fractures of the head and neck of the radius. A clinical and roentgenographic study of 310 cases. Acta Chir Scand 112:115–134.
15. Goldberg I, Peylan J, Yosipovitch Z, Tiqva P (1986) Late results of excision of the radial head for an isolated closed fracture.J Bone Joint Surg [Am] 68:675–679.
16. Jacobs JE, Kernodle HB (1946) Fractures of the head of the radius. J Bone Joint Surg 28:616–622.
17. Radin EL, Riseborough EJ (1966) Fractures of the radial head. J Bone Joint Surg [Am] 48:1055–1064.
18. Bennett JB. (1993). Radial head fractures: diagnosis and management. *J Should Elb Surg* ;2:264-73.
19. Carr CR, Howard JW. (1951).Metallic cap replacement of radial head following fracture. *Western J Surg (Obstet and Gynec)*;59:539-46.
20. Edwards GE, Rostrup O. (1960). Radial head prosthesis in the management of radial head fractures. *Can J Surg*;3:153-5.
21. Harrington IJ, Tountas AA. (1981). Replacement of the radial head in the treatment of unstable elbow fractures. *Injury* 1981;12:405-12.
22. Carroll RM, Osgood G, Blaine TA. (2002). Radial head fractures: repair, excise, or replace? *Curr Opin Orthop*. 13(4):315-322.
23. Iftimie PP, Calmet Garcia J, de Loyola Garcia Forcada I, Gonzalez Pedrouzo JE, Giné Gomà J. Resection arthroplasty for radial head fractures: long-term follow-up. *J Shoulder Elbow Surg*. 2011; 20(1):45-50.
24. Pike JM, Athwal GS, Faber KJ, King GJ. Radial head fractures—an update. *J Hand Surg Am.* 2009; 34(3):557-565.
25. Fuchs S, Chylarecki C. Do functional deficits result from radial head resection? *J Shoulder Elbow Surg*. 1999; 8(3):247-251.
26. Maghen Y, Leo AJ, Hsu JW, Hausman MR. (2011). Is a Silastic radial head still a reasonable option? *Clin Orthop Relat Res.* ; 469(4):1061-1070.
27. Moro JK, Werier J, MacDermid JC, Patterson SD, King GJ. (2001). Arthroplasty with a metal radial head for unreconstructible fractures of the radial head. *J Bone Joint Surg Am.* ; 83(8):1201-1211.
28. Obert L, Lepage D, Huot D, et al. (2005). Unreconstructible radial head fracture: resection, implant of Swanson or prosthesis? Retrospective comparative study. *Chir Main*. 24(1):17-23.
29. Lindenhovius AL, Felsch Q, Doornberg JN, Ring D, Kloen P. (2007). Open reduction and internal fixation compared with excision for unstable displaced fractures of the radial head. *J Hand Surg Am*. 32(5):630-636.
30. Leppilahti J, Jalovaara P.(2000). Early excision of the radial head for fracture. *Int Orthop*. 24(3):160-162.
31. Schiffern A, Bettwieser SP, Porucznik CA, Crim JR, Tashjian RZ. Proximal radial drift following radial head resection. *J Shoulder Elbow Surg*. 2011; 20(3):426 433.
32. Hall JA, McKee MD. (2005). Posterolateral rotatory instability of the elbow following radial head resection. *J Bone Joint Surg Am.* ; 87(7):1571-1579.
33. Mikíc ZD, Vukadinovíc SM. (1981). Late results in fractures of the radial head treated by excision. *Clin Orthop Relat Res*. (181):220- 228.
34. Jensen SL, Olsen BS, Tyrdal S, Søjbjerg JO, Sneppen O. (2005). Elbow joint laxity after experimental radial head excision and lateral collateral ligament rupture: efficacy of efficacy of prosthetic replacement and ligament repair. *J Shoulder Elbow Surg*. ; 14(1):78-84.
35. Beingessner DM, Dunning CE, Gordon KD, Johnson JA, King GJ. (2004). The effect of radial head excision and arthroplasty on elbow kinematics and stability. *J Bone Joint Surg Am*.; 86(8):1730-1739.
36. Jensen SL, Olsen BS, Søjbjerg JO. (1999). Elbow joint kinematics after excision of the radial head. *J Shoulder Elbow Surg*. 8(3):238-241.
37. Herbertsson P, Josefsson PO, Hasserius R, Besjakov J, Nyqvist F, Karlsson MK. (2004). Fractures of the radial head and neck treated with radial head excision. *J Bone Joint Surg Am*.; 86(9):1925-1930.
38. Ikeda M, Yamashina Y, Kamimoto M, Oka Y. (2003). Open reduction and internal fixation of comminuted fractures of the radial head using low-profile mini-plates. *J Bone Joint Surg Br*. 85(7):1040-1044