

Assessment of Function in Fracture Head Radius

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Abstract

Fracture head of the radius management has long been a controversial subject. Disagreement has centered around four main points: The indication for non-operative and operative treatment: The period of immobilization; The need for aspiration of the joint and the timing of radial head excision, if indicated.

The aim of this work is to evaluate the elbow function and incidence of complications. Comparing results of different options of treatment. Seventy - six (76) adult patients with fracture of the radial head were reported from the casualty of AL-JALA Hospital in Benghazi.

Assessment of this cases both Clinically and Radiological) in the follow up clinic showed that the functional end-results in the conservatively treated patients were better than in those operatively treated. Un-displaced fractures were better treated by sling and early motion. Displaced non-Comminuted radial head fractures were better treated by immobilization in Plaster of Paris cast for three weeks. Operative excision of the radial head is indicated only in Comminuted fractures. Early treatment gave better results in either conservative or operative methods of treatment.

Keywords: Fracture head radius, elbow function, Clinically and Radiological Assessment.

1. Introduction

The elbow joint tolerates trauma very badly. Even a minor injury can be responsible for some residual loss in the range of the joint movement. Mason found that fracture head of the radius form 30% of all elbow fractures and dislocation including the supracondylar fractures of the humours. Failure to regain full extension movement of the elbow joint was reported in 58% of Mason's cases which were treated either conservatively or operatively,

crepitation was reported in some cases but it was found to be of no functional significance, pain wasn't mentioned to be a prominent feature and was correlated to ligamentous injury.

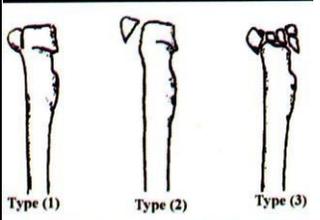
Myositis Ossificans was reported to be another complication that may arise from the original injury or the chosen therapy. Wadsworth stated that Osteo-arthritis was the ultimate complication in some of these patients. Morrey et al; found that there was some weakness of the strength of pronation, supination and flexion.

The aim of this work is to evaluate the elbow function and incidence of complications. Comparing results of different options of treatment. Seventy-six (76) adult patients with fracture of the radial head were reported from the casualty of AL-JALA Hospital in Benghazi and 52 of them were possible to be followed up in our fracture clinic for significant period and different options of treatment effect on end result both clinically and radiologically was reported to assess the Elbow function.

2. Methods and Patients

Seventy- six (76) adult patients with fracture of the radial head were reported from the casualty of AL-JALA Hospital in Benghazi. Out of these. 34 patients (44.7%) treated from April to November 2000. the other 42 (55.3%) were traced during the last five years. Our group of patients constitute the following.

According to Mason's classification (1954) of radial head fractures

Type I	35 (46.1%)	Fissure fracture or sector fractures without displacement	 <p>Mason's classification of radial head fractures.</p>
Type II	26 (34.2%)	Marginal sector fractures with displacement	
Type III	15 (19.7%)	Comminuted fractures involving the whole head of the radius	
Type IV	0 (00.0%)	Fracture of the head of the radius in association with dislocation of the elbow. (Eppright and Wilkins).	

Fracture head of radius was found in this group to be common below 30 years of age and constitute 55.3% in males. Direct trauma injury was noted in 61.X% of the same group. Only 52 patients were available for follow-up a period of six months to three years. (Average follow- up was 27 months).

Thirty-Five patients were treated by conservative treatment either by a sling, aspiration and sling for type I fractures or immobilisation in an above-elbow plaster cast for type II fractures. Seventeen patients had been treated operatively by excision of the radial head in type II (significant displacement) and type III fractures.

The diagnosis of fracture of the radial head is based on clinical and radiological data.

Most fractures of the radial head are caused by indirect mechanism of trauma.

The results were graded as good, fair and poor based on the modified system described by Radin and Riseborough :

Good: If there was less than 10° loss of movement in any direction, unchanged working ability and no symptoms.

Fair: If there was 10 - 30° loss of movement in any direction or minor complaints, or both.

Poor: If there was more than 30° loss of movement in any direction or major complaints, or both. The test used for statistical analysis of the result is the "Z" test. The result was considered statistically significant when Z equals or exceeds 1.96. When Z is less than 1.96, the result was considered statistically insignificant.

3. Results

Fifty-two patients attended the follow-up examination. The period of follow-up varied from 6 - 65 months with an average of 27 months. Thirty-five patients were treated by conservative methods: while in 17 excision of the radial head was done.

Clinical findings in the conservatively treated patients

Subjectively : Twenty-five patients (71.4%) had no complaint of pain in the elbow. Ten (28.6 %) complained of an occasional ache on the medial side of the elbow.

Objectively : Full range of elbow movement was present in 24 patients (68.6%) while 11(31.4 %) showed an average of 11° loss of extension movement of the elbow. No

tenderness over the medial or lateral ligaments and no joint laxity were elicited. The carrying angle was normal in nil patients.

All patient showed normal strength of the elbow except one patient (2.9%) who showed grade 4 weakness of elbow flexion. The function of the elbow was full in 33 patients (94.3 %). They were back to their previous work without any disability at an average of 5.7 weeks. Only 2 patients (5.7 %) showed inability to do their original work.

Radiological findings

No evidence of osteoarthritic changes was Visible in all cases. Only one patient (2.9%) showed displacement of an initially undisplaced fracture. This patient was treated by aspiration and sling.

Clinical findings of the 17 patients treated by excision of the radial head:

Subjectively Six patients (35.3 %) were not complaining of pain. Eleven (64.7 %) complained of pain over the lateral joint line.

Objectively None of these 17 patients showed full range of elbow movement. All had an average limitation of extension of 12.6o which caused no disability. None of the patients had noticed the loss of rotation present. Crepitus could be elicited in all patients during rotation of the elbow joint. Only one patient (5.8 %) showed lateral laxity of the elbow joint, the carrying angle was normal in all patients. 14 patients (82.4 %) returned to their previous work within the average of 7.8 weeks without any disability. Three (17.6 %) had shifted to a light work.

Radiological finding

There was no evidence of osteoarthritic changes in all cases. Some new bone had formed in the region of the radial neck in 7 cases (41.2 %). It did not encroach on the joint space.

Results of treatment

Table 1. Type I fractures

Method of treatment	No	Good %	No	Fair %	No	Poor %	No	Total
Sling	7	77.8	2	22.2	0	0	9	37.5
Aspiration & sling	4	80	0	0	1	20	5	20.8
Plaster cast	6	60	4	40	0	0	10	41.7
Total	17	70.8	6	2.5	1	4.2	24	100

Table 2. Type II fractures:

Method of treatment	No	Good %	No	Fair %	No	Poor %	No	Total
Plaster cast	6	54.5	4	36.4	1	9.1	11	57.9
Excision	2	25.0	4	50.0	2	25.0	8	42.1
Total	8	42.1	8	42.1	3	15.8	19	100.0

Z= 1.29 (Insignificant)

Table 3. Type III fractures

Method of treatment	Good		Fair		Poor		Total	
	No	%	No	%	No	%	No	%
	1	11.1	5	55.6	3	33.3	9	100.0

The over-all result in those fractures treated by conservative methods were better (65.7 %) than those treated operatively. The difference was found statistically significant

Table 4. The over-all result

Method of treatment	No	Good %	No	Fair %	No	Poor %	No	Total
Conservative	23	65.7	10	28.6	2	5.7	35	67.3
Operative	3	17.6	9	52.9	5	29.4	17	32.7
Total	26	50.0	19	36.5	7	13.5	52	100.0

Z= 1.29 (Significant)

4. Discussion and Recommendation

Better results were obtained among patients below 40 years in either operatively or conservatively treated patients. This may be due to the more muscular activity in this group of patients. Males showed worse results than females in either conservatively or operatively treated patients. This may be due to the greater severity of trauma in males.

Radial head excision was done for four heavy workers. The results were poor in two, who shifted to a work of lighter nature, and fair in the other two. In other light jobs Good

results were obtained in 23.1% after radial head excision. No available references have mentioned the possible reason.

The results of treatment were better in the right side than in the left in either conservatively or operatively treated patients. This may be because the right side was dominant one. It was found that the results were better in those patients who sustained direct trauma and treated conservatively. Poulsen et.al. Stated that, if the fracture was caused by direct trauma to the elbow, it might be interpreted as an isolated injury. If, on the other hand, it was the result of an indirect trauma represented by force acting upon the entire elbow, the fracture was not likely to be an isolated injury. On this basis, ligamentous injury caused by indirect trauma could be responsible to the inferior results in patients who was treated conservatively.

Patients treated early within the first week, either by conservative or operative means, achieved better results than those who were delayed. No available references have mentioned the possible cause. Gaston et al suggested that early operative excision \was desirable preferably within twenty-four hours. Miller et al had found that the results of excision did not correlate with the duration of the operative delay. There was no significant change in the result after a follow up period of two years. Miller et al had found there was rarely any deterioration of the result of treatment after one year.

Radin and Riseborough were expecting that early motion might displace an initially undisplaced fracture. They believed that holding these fractures for three weeks would be worthwhile. Bakalim indicated that one week immobilization in a plaster cast was the best method for preventing secondary displacement.

Those who supported early motion as a conservative method for the treatment of type I fractures of the radial head considered that early motion helped moulding the radial head into normal shape which was a prerequisite for a normal function of the elbow joint. In this study, patients treated by sling and early motion achieved better results than those treated by plaster cast fixation. Only one patient of those treated by aspiration and sling showed poor result. This patient was a housewife who had functional limitations severe enough to limit her normal daily activities. The follow-up radiographs revealed mild displacement of

the fracture, which was not compatible with the poor end-result. Severe ligamentous injury was probably the cause of poor function in this patient.

Collectively, it was found in this study that the conservatively treated patients had achieved better results than those who were treated operatively. But it should be borne in mind that the operatively treated fractures were more severe with more displacement and comminution. Nearly 94% of those patients treated by conservative methods had achieved full function of the elbow joint. They were back to their previous work without any disability in an average of 5.7 weeks from the date of the original injury. On the other hand 82.4% of those operatively treated returned to their previous work in an average of 7.8 weeks. In the series of Mason 94.4% of those treated operatively had full use of the elbow joint and were back to their work in an average of 9.5 weeks.

5. Conclusions

The functional end-results in the conservatively treated patients were better than in those operatively treated. Undisplaced fractures were better treated by sling and early motion. Displaced non-Comminuted radial head fractures were better treated by immobilisation in Plaster of Paris cast for three weeks. Operative excision of the radial head is indicated only in Comminuted fractures. Early treatment gave better results in either conservative or operative methods of treatment. Injury to the soft tissues around the elbow could be responsible for a major part of the residual loss of extension following radial head fractures, which did not affect the functional end-result of the elbow. The residual pain was rarely severe enough to impair the elbow function.

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