Original Article

Comparison of Adynmic External Fixator with Dynamic External Fixator in the Management of the Comminuted Fractures of Distal Radius in the Patients Between 40-65 Years Age

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ABSTRACT

Objective: To compare the treatment outcome of comminuted intra-articular fractures distal radius with adynamic external fixator and dynamic external fixator in patients of 40-65 years of age.

Study Design: Experimental Study.

Place and Duration of Study: This study was carried out in the Department of Orthopaedic, Nishtar Hospital, Multan from Jan 2010 to December 2011.

Materials and Methods:- This experimental study was carried out in the Department of Orthopaedic, Nishtar Hospital, Multan. A total of 60 patients in both groups were included in the study.

Results: Out of the 60 patients, 43 (71.7%) were male and 17 (28.3%) were female with the right hand 35 (58.3%) and left hand 25 (41.7%).

Conclusion: It is concluded that dynamic external fixator is a better method of treatment for the comminuted fractures of the distal radius than adynamic external fixator because it allows early motion of tendons, muscles and adjacent joints and later, of the wrist itself while reduction and especially radial length were maintained in bridging external fixation.

Key Words: Distal Radius, Comminuted fracture, Dynamic external fixator.

INTRODUCTION

The distal radius fracture is the most common skeletal injury that affects women, particularly between 50-60 years, 3 times more frequently than men[1]. This is usually caused by fall on outstretched hand though sports and road traffic accidents also sometimes result in such fractures.

Fracture distal radius was used to be managed conservatively. Now the differentiated management has led to a change from a purely conservative treatment method to a more varied treatment methods for fractures distal radius[2]. Fracture of the distal radius traditionally had been managed by closed reduction and forearm plaster[3]. It had been treated as trivial injury with the resulting 40% poor outcome because of redisplacement of fractures in the cast. Many methods designed to prevent redisplacement have been developed including open reduction and internal fixation and kirschner wire fixation[4]. The external fixator is an essential part of differentiated treatment method with reference to the several types of distal radius fractures in older patients[5]. New dynamic external fixator has been evolved to further enhance the good prognosis.

The seeming contradictions in literature serve to illustrate that individual outcomes are not entirely predictable because of different functional demands, expectations and pain tolerance for each patient[6]. There is no consensus regarding the description of the condition, the appropriate treatment or even the anticipated outcome[7]. It is generally accepted that restoration of anatomy, in particular to joint congruence, is essential to ensure a satisfactory functional result[8,9].

MATERIALS AND METHODS

This experimental study was carried out in the Department of Orthopaedic, Nishtar Hospital, Multan from January 2010 to December 2011. A total of 60 patients were included in the study. These patients were divided in two groups (group-A was treated by adynamic external fixator and group-B with dynamic external fixator) under anaesthesia.

RESULTS

The age of the patients was between 40-65 years. In group-A average age was 47.71 $\pm$ 5.55 years in males and 49.89 $\pm$ 3.33 years in females. In groups-B average age was 49.68 + 5.45 years in males and 50.38 $\pm$ 4.58 in females. Most of the injuries occurred due to the trauma i.e. fall on the outstretched hands in road accidents or fall from height like tree. In present study 52.1% of patients sustained injuries in various automobile accidents, 29.4% due to falls from height (tree. Roof, stairs and well), 18.4% from domestic falls.

Involvement of right wrist was shown in 35 (58.3%) and left wrist in 25 (41.7%).

With the application of Frykman's classification, 13 (21.7%) fractures were of type-III, 9 (15%) of type-IV, 25 (41.7%) of type-V and 13 (21.7% of type-VI.

In group-A average radial length on post injury film was 4.3 mm, which was brought to 9 mm on post reduction films. In group-B average length in pre-reduction film was 4 mm, which was brought to 9.2 mm in post reduction films (Table-1).

In group-A, 12 (40%) patients had excellent , 14 (46.7%) patients had good and 4 (13.3%) patients had fair anatomical end results. In group-B, 12 (40%) patients had excellent, 15 (50%) good and 3 (10%) patients had fair anatomical end results (Table-2).

In group-A, 10 (33.3%) patients had excellent, 12 (40%) had good, 5 (16.7%) patients had fair and 3 (10%) patients had poor functional end results. Whereas in group-B 11 (36.7%) patients had excellent, 15 (50%) had good, 3 (10%) had fair and 1 (3.3%) patient had poor functional end results (Table-3).

Pin tract infection developed in 4 (13.3%) patients in group-A and 2 (6.7%) in group-B as shown in table-4.

Table No.1: Average radiological measurements in both groups

	Average pre-reduction	Post-reduction	Final
GROUP-A Radial angle	8.6°	18.5°	17°
Dorsal angle	+ 18°	2.4°	2.2°
Radial length	4.2 mm	9 mm	8 mm
GROUP-B Radial angle	8.2°	19°	17.2°
Dorsal angle	18.4°	3.6°	2.4°
Radial length	4 mm	9.2 mm	8.4 mm

Table No.2: Anatomical end results in both groups

Group	Excellent	Good	Fair
A	12 (40%)	14 (46.7%)	4 (13.3%)
B	12 (40%)	15 (50%)	3 (10%)

Table No.3: Functional end results in both groups

Group	Excellent	Good	Fair	Poor
A	10 (33.3%)	14 (40%)	5 (16.7%)	3 (10%)
B	11 (36.7%)	15 (50%)	3 (10%)	1(3.3%)

Table No.4: Complications of distal radius fracture management

Complication	Group-A	Group-B
Pin tract infection	4	2
Stiff wrist	1	0
Re-displacement	0	1
Radial nerve superficial branch	1	0
Implant failure	0	1
Total	6 (20%)	4 (13.3%)

DISCUSSION

Distal radius fracture is not a trivial injury as used to be wrongly considered earlier. It needs a distinguished treatment depending upon the different types of injuries: intra/extra articular, simple/compound and stable/unstable. There is consensus that the goals of distal radius fracture treatment should be to allow early functional recovery of the upper extremity and to improve the long term function of the wrist.

Sex and age distribution in various series is different. In our study patients were included between 40-65 years of age. In older age groups the results are comparable with other studies mentioned in the literature because bone mineral density of distal forearm decreases with age. In group-A average age of 47.71 $\pm$ 5.55 years was among the males and 49.89 $\pm$ 3.33 was among the females. In group-B the average age of 49.68 $\pm$ 5.45 years in the males and 50.38 $\pm$ 3.58 was among the females.

Some series showed male predominance while others showed female predominance. In females the incidence rises at 40 to 60 years of age due to post menopausal osteoporosis. In our study, 43 (71.7%) patients were male and 17 (28.3%) were female. Male to female ratio is 2.53:1, while in another study, male to female ratio was 1.5:1[10]. It might be due to our different socio-economic setup in which male is the dominant and active member of our society and female has to go outside to earn livelihood for his family, so exposed to more chances of the trauma.

It is observed that right hand is affected in almost all series because it is the dominant hand. It is reported that 55% right radius involvement in a study[11]. In another study is reported 52% involvement of right wrist[12]. In our society where the use of right hand in routine manual activities, is religious obligation, therefore, in our study, the fracture of the right distal radius was found to be 58.3% in prevalence.

External fixator is valuable for unstable, comminuted distal radius fractures because it neutralizes compressive forces generated across the fracture by long extrinsic flexor and extensor muscle. By applying the principles of ligamentotaxis it reduces the comminuted fragments, resotres the articular congruity to acceptable anatomical level and maintains the reduction till union is achieved in good anatomical position. While dynamic external fixator allows early start of movement at the wrist joint within the period of external fixation.

Besides the high rate of better functional outcome, there had been few complications like pain, pint tract infection, implant failure, radial nerve superficial branch paraesthesis and wrist stiffness in our study. In both groups, symptoms of pain reduced with time. Pain was due to multiple reasons e.g. excessive distraction, pin insertion site irritation and sensory disturbance in the thumb. In one orthofix case, on second postoperative day, 1 patient reported back with complains of severe pain. On examination, he had free movement at proximal ball joint due to mechanical

failure of the device. He had lost reduction as well. So the patient was re-maipulated under anaesthesia and a new orthofix frame was mounted on the same pins previously applied.

In our study, pint traction infection occurred in 6 (10%) patients which were about the same as observed in other studies. In a study it is also noted almost the same percentage of pin tract infection in his study[13]. Fortunately in our study the in tract infection was superficial and was treated by short course of antibiotic therapy and blood sugar control in diabetic patients. No joint infection or oteomyelitis occurred in any patient.

Range of movement, recorded at different stages of evaluation showed better results in dynamic external fixator groups[14]. Independently there was no significantly difference in outcome among male and female patients[15].

In our study few patients had their ulnar styloid fractured at the time of injury but is did not have any adverse effect on the final outcome therefore these fractures were not particularly mentioned. This is comparable with the literature. In a study it is noted that fracture of ulnar styloid process, a frequent injury in concominance with fracture of the distal end of the radius. He observed to have no impact upon long term wrist function. In other series associated fractures of scaphoid had also been discussed with fracture distal radius but we have excluded such patients from the study.

CONCLUSION

It is concluded from the study that the best anatomical and functional results can be obtained with dynamic external fixator in comparison to adynamic external fixator.

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