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Original Research Article.

Comparison of Management in Olecranon Fractures by Tension Band Wiring Versus Transcortical Screw Fixation Procedure

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ABSTRACT

Background: Olecranon fractures are common injuries of the upper extremity; majority are treated surgically. A variety of fixation techniques are available to surgeons in modern practice, but there is little comparative clinical research to guide one's decision. Nonetheless, good results over all are to be expected after surgical management. The present study was undertaken for assessing and comparing Functional outcome in Olecranon fracture managed by tension band wiring and transcortical screw fixation.

Materials & Methods: A total of 40 patients who reported to the Department of Orthopaedics, Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh (India) with olecranon fractures were enrolled in the present study. Complete demographic details of all the patients were obtained. Complete clinical examination of all the patients was carried out. All the patients were broadly divided into two study groups as follows: Group 1: Patients who were treated with Tension band wiring; and Group 2: Patients who were treated with Transcortical screw fixation. Post-operative care was taken in all the patients. For the first two days, the limb was kept elevated. All the patients were treated according to their respective groups under the hands of skilled orthopaedic surgeons. All the patients were discharges and follow-up was done. Functional outcome was assessed by Mayo Elbow Performance Score and compared.

Results: Excellent results were seen in 70 percent of the patients of group 1 while they were seen in 65 percent of the patients of group 2. None of the patient of group 1 showed poor results, while 1 patient of group 2 showed poor results. Superficial infection was seen in 2 patients of group 1 and 1 patient of group 2. None of the patient of group 1 showed non-union while 1 patient of group 2 showed non-union.

Conclusion: Tension band wiring is better than transcortical screw fixation, especially in communited fractures.

Key words: Tension Band Wiring, Transcortical Screw.

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INTRODUCTION

The olecranon is the region of the proximal ulna that extends from the tip of the ulna to the coronoid process. Three main anatomic features must be recalled when treating fractures of the olecranon. First, the olecranon is the site of insertion of the triceps—a muscle whose action would tend to displace a fracture. Second, the trochlear notch of the olecranon forms a cavity in which the distal humerus sits, and thus all olecranon fractures, by definition, are intraarticular injuries. Third, the posterior process of the olecranon prevents posterior translation of the humerus (just as the coronoid process prevents anterior translation) and thus displacement can lead to elbow instability.[1-3] Olecranon fractures are common injuries of the upper extremity; majority are treated surgically. A variety of fixation techniques are available to surgeons in modern practice, but there is little comparative clinical research to guide one's decision. Nonetheless, good results over all are to be expected after surgical management.[4-6] Hence; under the light of above mentioned data, the present study was undertaken for assessing and comparing Functional outcome in Olecranon fracture managed by tension band wiring and transcortical screw fixation.

MATERIALS & METHODS

The present study was conducted in the Department of Orthopaedics, Rama Medical College Hospital & Research

Centre, Hapur, Uttar Pradesh (India) and it included assessment and comparison of functional outcome in Olecranon fracture managed by tension band wiring and transcortical screw fixation. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 40 patients who reported to the department with olecranon fractures were enrolled in the present study. Complete demographic details of all the patients were obtained. Complete clinical examination of all the patients was carried out. All the patients were broadly divided into two study groups as follows:

Group 1: Patients who were treated with Tension band wiring.

Group 2: Patients who were treated with Transcortical screw fixation.

Post-operative care was taken in all the patients. For the first two days, the limb was kept elevated. All the patients were treated according to their respective groups under the hands of skilled orthopaedic surgeons. All the patients were discharges and follow-up was done. Functional outcome was assessed by Mayo Elbow Performance Score and compared. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test and student t test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

Table 1: Age-wise distribution of patients

Age group (years)	Group 1		Group 2	
	Number of patients	Percentage	Number of patients	Percentage
18 to 40	4	20	3	15
41 to 50	13	65	12	60
51 to 60	3	15	5	25
Total	20	100	20	100
Mean age (years)	43.4		45.8	

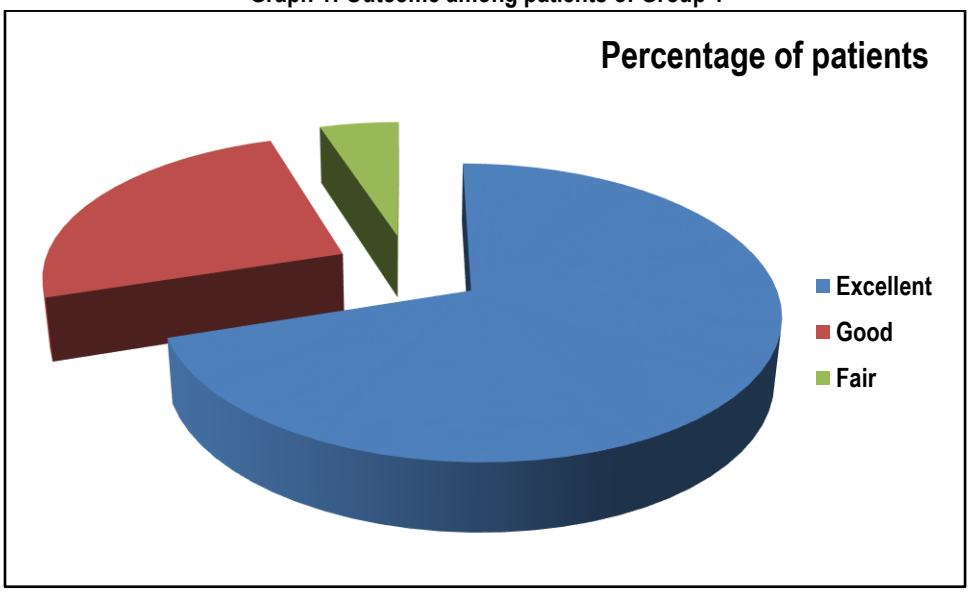
Table 2: Mayo elbow performance score grading

Mayo elbow performance score grading	Group 1		Group 2	
	Number of patients	Percentage	Number of patients	Percentage
Excellent	14	70	13	65
Good	5	25	4	20
Fair	1	5	2	10
Poor	0	0	1	5
Total	20	100	20	100

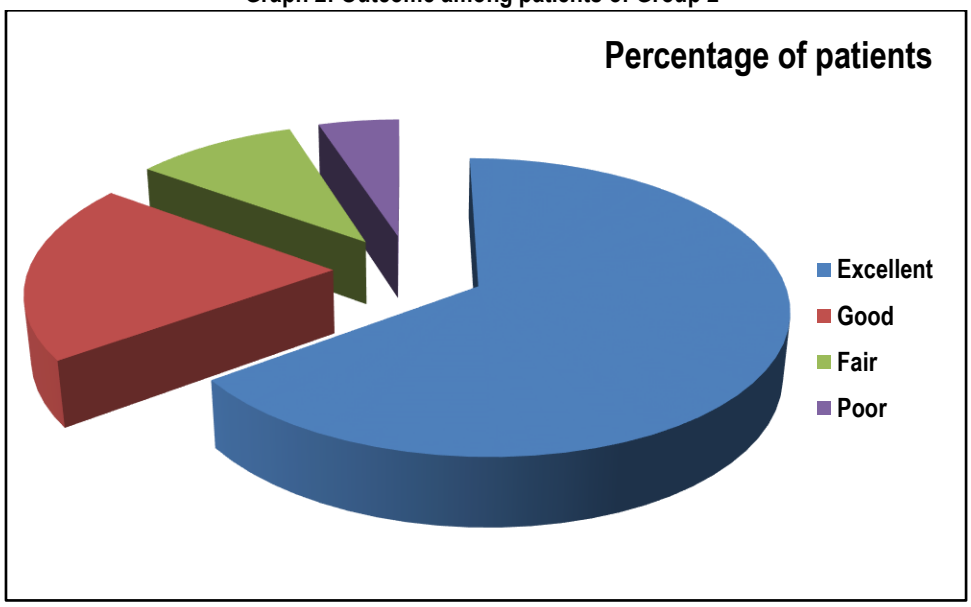
Table 3: Postoperative complications

Postoperative complications	Group 1		Group 2	
	Number of patients	Percentage	Number of patients	Percentage
Superficial infection	2	10	1	5
Non-union	0	0	1	5
Absent	18	90	18	90
Total	20	100	20	100

Graph 1: Outcome among patients of Group 1



Graph 2: Outcome among patients of Group 2



RESULTS

In the present study, mean age of the patients of Group 1 and group 2 was found to be 43.4 years and 45.8 years, respectively. 65 percent of the patients of Group 1 and 60 percent of the patients of group 2 belonged to the age group of 41 to 50 years. Excellent results were seen in 70 percent of the patients of group 1 while they were seen in 65 percent of the patients of group 2.

In the present study, none of the patient of group 1 showed poor results, while 1 patient of group 2 showed poor results. Superficial infection was seen in 2 patients of group 1 and 1 patient of group 2. None of the patient of group 1 showed non-union while 1 patient of group 2 showed non-union.

DISCUSSION

Olecranon fractures are relatively common injuries, accounting for approximately 10% of upper extremity fractures in adults. These fractures may result from a direct blow to the proximal ulna, or indirectly, via the forceful contraction of the triceps against resistance (typically, during a fall onto an outstretched hand). Less commonly, the olecranon may fracture when the elbow is hyperextended, as the bone is impacted against the olecranon fossa of the distal humerus. For unstable injuries, operative fixation typically is required. Even after recovery, loss of ROM is not uncommon.[7-9] Hence; under the light of above mentioned data, the present study was undertaken for assessing and comparing Functional outcome in Olecranon fracture managed by tension band wiring and transcortical screw fixation.

In the present study, mean age of the patients of Group 1 and group 2 was found to be 43.4 years and 45.8 years, respectively. 65 percent of the patients of Group 1 and 60 percent of the patients of group 2 belonged to the age group of 41 to 50 years. Excellent results were seen in 70 percent of the patients of group 1 while they were seen in 65 percent of the patients of group 2. Duckworth AD et al compared the outcomes of tension-band wire (TBW) and plate fixation for simple isolated, displaced fractures of the olecranon. They performed a prospective randomized trial involving 67 patients who were ≥16 to <75 years of age and had an acute isolated, displaced fracture of the olecranon. Patients were randomized to either TBW (n = 34) or plate fixation (n = 33) and were evaluated at 6 weeks, 3 months, 6 months, and 1 year following surgery. The primary outcome measure was the Disabilities of the Arm, Shoulder and Hand (DASH) score at 1 year. The baseline demographic and fracture characteristics of the 2 groups were comparable, except for age, which was lower in the TBW group. The 1-year follow-up rate was 85% (n = 57), with 84% (n = 56) completing the DASH. There was a significant improvement in the DASH score over the 1-year period following surgery. At 1 year, the DASH score for the TBW group (12.8) did not differ significantly from that of the plate group (8.5). The groups also did not differ significantly in terms of range of motion, the Broberg and Morrey score, the Mayo Elbow Score, or the DASH at all assessment points over the 1 year. Complication rates were significantly higher in the TBW group, predominantly because of a significantly higher rate of metalwork removal in symptomatic patients. Four infections occurred, all in the plate group, as did 3 revision surgeries. In conclusion, among active patients with a simple isolated, displaced fracture of the olecranon, no difference was found between TBW and plate fixation in the patient-reported outcome at 1 year following surgery. The complication rate was higher following TBW fixation and was due to a higher rate of implant removal in symptomatic patients. However, the more serious complications of infection and the need for revision surgery occurred exclusively following plate fixation in this trial.[10]

In the present study, none of the patient of group 1 showed poor results, while 1 patient of group 2 showed poor results. Superficial infection was seen in 2 patients of group 1 and 1 patient of group 2. None of the patient of group 1 showed non-union while 1 patient of group 2 showed non-union.

Hsu KL et al conducted retrospective cohort study recruited consecutive patients underwent surgical fixation for patellar fractures using modified tension band technique between January 2010 and December 2015. Regarding length, the tension band was placed closely (within 25% of the patella length) in 124 patients and distantly in 46 patients. The rates of loss of reduction

and implant breakage were significantly higher in the distantly placed tension bands. Regarding depth, 37 patellar fractures were fixed with the Kirschner wires at the superficial one third of the patellae while the K- wires at the middle layer of patella were used in the remaining 133 patellar fractures. A significantly higher rate of minor loss of reduction was obtained using the superficial Kirschner wires. They concluded that the modified tension band technique for transverse patella fractures provides favorable clinical outcomes, with low failure (5%) and infection (2%) rates. Implant irritation is the major complication, and almost half of cases require implant removal. The location of the tension band with respect to the superior and inferior border of the patella plays an important role in clinical outcomes. Placing the wire close to the patella may prevent major loss of reduction and implant breakage. Superficially placed Kirschner wires also affect clinical outcomes by increasing the rate of minor loss of reduction.[11]

CONCLUSION

From the above results, the authors conclude that Tension band wiring is better than transcortical screw fixation, especially in communited fractures. However, further studies are recommended.

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