

ORIGINAL RESEARCH

Comparison of tension band wiring and olecranon hook plate fixation in fracture olecranon

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ABSTRACT

Background: The incidence of olecranon fractures is about 10.8 per 100,000 adult individuals per year. The present study was conducted to compare tension band wiring (TBW) and olecranon hook plate fixation in fracture olecranon. **Materials & Methods:** 40 fracture olecranon of both genders were divided into 2 groups of 20 each. Group I was TBW and group II was olecranon hook plate. Parameters such as side involved, mode of injury, site, duration of injury, radiological union and complications were recorded. Outcome was evaluated with Mayo Elbow Performance score (MEPS). **Results:** There were 11 males and 9 females in group I and 12 males and 8 females in group II. Side involved was right in 13 and 10 and left in 7 and 10. Mode of injury was fall in 11 and 8, RTA in 6 and 8 and direct blow in 3 and 4. Site of fracture was type I (proximal third) in 7 and 6, type II (Middle third) in 5 and 9 and type III (Distal third) in 8 and 5. Duration of injury was <48 hours in 13 and 11 and 48 hours- 7 days in 7 and 9. Radiological union was 9 weeks in 10 and 7, 12 weeks in 7 and 8 and 18 weeks in 3 and 5. Complications were superficial infection in 1 and 0, deep infection in 0 and 1 and delayed union in 1 and 2. MPES was excellent in 14 and 13, good in 5 and 4, fair in 1 and 2 and poor in 0 and 1 in group I and II respectively. The difference was significant ($P < 0.05$). **Conclusion:** Tension band wiring is a simple, inexpensive technique and effective means of fixing fracture based on biomechanical principle with minimum complications.

Key words: Tension band wiring, olecranon fractures, hook plate

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INTRODUCTION

The incidence of olecranon fractures is about 10.8 per 100,000 adult individuals per year, with an incidence of 11.5 per 100,000 adult individuals per year in patients older than 16 years of age.¹ The incidence of associated injuries is unclear, although fractures of the radial head, coronoid and Monteggia fracture-dislocation are documented.² Given the subcutaneous location of the proximal ulna, open olecranon fractures are more common than for fractures of the radial head. Patients with undisplaced olecranon fractures can be routinely managed nonoperatively. The aims of treatment for displaced olecranon fractures are the restoration of function and stability to the elbow joint.⁷ The technique employed should allow preservation and reconstruction of the articular surface with minimal associated complications.³ Tension-band wiring (TBW) is the most recognised and commonly used fixation method, although plate fixation and intramedullary screw fixation are noted

alternatives. Potential problems with the TBW technique are wound breakdown, infection, prominent metalwork, malunion and nonunion and long-term outcome data is lacking.⁴ Plate fixation is considered superior in distal/comminuted/oblique fractures and fracture-dislocations, with superior fracture reduction and fixation results, as well as a lower rate of reoperation.⁵ Plating olecranon has a lower loss of reduction risk compared with tension band wiring in retrospective clinical and radiological trials.⁶ The present study was conducted to compare tension band wiring (TBW) and olecranon hook plate fixation in fracture olecranon.

MATERIALS & METHODS

The present study consisted of 40 fracture olecranon of both genders. All were informed regarding the study and their written consent was obtained. Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 20 each. Group

I was TBW and group II was olecranon hook plate. Parameters such as side involved, mode of injury, site, duration of injury, radiological union and complications was recorded. Outcome was evaluated

with Mayo Elbow Performance score (MEPS). Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Groups	Group I	Group II
Method	TBW	Hook plate
M:F	11:9	12:8

Table I shows that there were 11 males and 9 females in group I and 12 males and 8 females in group II.

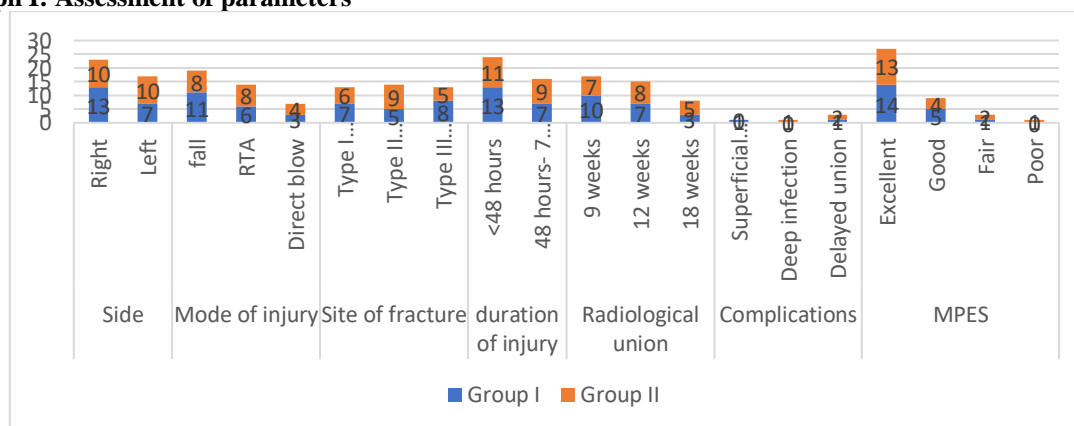
Table II: Assessment of parameters

Parameters	Variables	Group I	Group II	P value
Side	Right	13	10	0.95
	Left	7	10	
Mode of injury	fall	11	8	0.26
	RTA	6	8	
	Direct blow	3	4	
Site of fracture	Type I (proximal third)	7	6	0.17
	Type II (Middle third)	5	9	
	Type III (Distal third)	8	5	
duration of injury	<48 hours	13	11	0.82
	48 hours- 7 days	7	9	
Radiological union	9 weeks	10	7	0.05
	12 weeks	7	8	
	18 weeks	3	5	
Complications	Superficial infection	1	0	0.87
	Deep infection	0	1	
	Delayed union	1	2	
MPES	Excellent	14	13	0.05
	Good	5	4	
	Fair	1	2	
	Poor	0	1	

Table II, graph I shows that side involved was right in 13 and 10 and left in 7 and 10. Mode of injury was fall in 11 and 8, RTA in 6 and 8 and direct blow in 3 and 4. Site of fracture was type I (proximal third) in 7 and 6, type II (Middle third) in 5 and 9 and type III (Distal third) in 8 and 5. Duration of injury was <48 hours in 13 and 11 and 48 hours- 7 days in 7 and 9. Radiological union was 9 weeks in 10 and 7, 12

weeks in 7 and 8 and 18 weeks in 3 and 5. Complications were superficial infection in 1 and 0, deep infection in 0 and 1 and delayed union in 1 and 2. MPES was excellent in 14 and 13, good in 5 and 4, fair in 1 and 2 and poor in 0 and 1 in group I and II respectively. The difference was significant (P< 0.05).

Graph I: Assessment of parameters



DISCUSSION

Fractures of the olecranon are thought to occur when the elbow is flexed to about 90 degrees.^{7,8} Fractures of the radial head +/- coronoid occur at 0-80 degrees, with fractures of the distal humerus occurring when the elbow is flexed more than 110 degrees.^{9,10} The process of the olecranon prevents anterior subluxation of the ulna, with both varus-valgus angulation and ulnohumeral rotation increasing progressively with sequential excision of up to 75% of the olecranon, with gross instability at greater than 87.5%. Fractures of the olecranon can follow either direct or indirect trauma.¹¹ The present study was conducted to compare tension band wiring (TBW) and olecranon hook plate fixation in fracture olecranon.

We found that there were 11 males and 9 females in group I and 12 males and 8 females in group II. Parker et al¹² treated 23 patients (15 men, 7 women), mean age 48 years (range, 13-91), with a displaced olecranon fracture non-operatively using early active motion within 10 days of injury. There were 13 non-comminuted fractures, seven comminuted fractures and three open fractures. Seven patients had fractures to the ipsilateral arm. At a mean follow-up of 26 months 12 patients were rated as good, nine as fair and two as poor. Two cases had a loss of flexion arc greater than 30 degrees and three patients had loss of power (MRC Grading +4). Radiological union was achieved in seven cases, with fibrous union achieved in the rest. The authors concluded these results were comparable to operative treatment.

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We found that radiological union was 9 weeks in 10 and 7, 12 weeks in 7 and 8 and 18 weeks in 3 and 5. Complications were superficial infection in 1 and 0, deep infection in 0 and 1 and delayed union in 1 and 2. MPES was excellent in 14 and 13, good in 5 and 4, fair in 1 and 2 and poor in 0 and 1 in group I and II respectively. Karlsson et al¹⁴ reviewed 73 patients who had sustained a fracture of the olecranon. Ten (13%) were displaced ≤ 2 mm and were managed non-operatively. Eight-four per cent were managed with operative fixation, with a figure-of-eight wire used in

40% and a TBW used in 41%. Of these, 65% were simple fractures displaced >2mm and 22% were comminuted. At a mean follow-up of 19 years, 84% of patients had no complaints and 96% achieved a good or excellent outcome. Joint incongruity was found in 33% patients on long-term radiographs. The removal of metalwork rate was 48% and was performed due to localized pain after clinical fracture healing. One patient in this series developed a non-union.

The limitation the study is small sample size.

CONCLUSION

Authors found that tension band wiring is a simple, inexpensive technique and effective means of fixing fracture based on biomechanical principle with minimum complications.

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