

Original Research

Comparison of outcome of Olecranon fracture treated with tension band wiring

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ABSTRACT:

Background: One of the most common injuries to the proximal ulna, olecranon fractures account for approximately 10% of all upper extremity fractures. The present study determined the functional outcome in Olecranon fracture using tension band wiring. **Materials & Methods:** 70 patients of olecranon fractures of both genders were treated with tension band wiring (TBW). The Mayo score and Visual Analogue Scale (VAS) was recorded. **Results:** Out of 70 patients, males were 38 and females were 32. Mayo score was excellent in 34, good in 20, fair in 12 and poor in 4. Patient satisfaction score was 10 seen in 48, 9 in 12, 8 in 6, 7 in 3 and 6 in 2 patients. The difference was significant ($P < 0.05$). The visual analog scale had value of 6 in 34 patients, 7 in 18, 8 in 11, 9 in 5 and 10 in 2 patients. The difference was significant ($P < 0.05$). **Conclusion:** The gold standard for treating displaced and mildly comminuted olecranon fractures has been determined to be tension band wire. **Key words:** Olecranon, tension band wiring, VAS

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INTRODUCTION

One of the most common injuries to the proximal ulna, olecranon fractures account for approximately 10% of all upper extremity fractures.¹ Although these fractures are independent, complicated and polytrauma events may result in them as an accompanying injury. Every instance should aim for anatomic reduction and early mobilization due to the intra-articular extension of fractures. It is well known that 95% of displaced fractures are treated surgically, while only 5% of undisplaced fractures are treated conservatively.^{2,3}

In order to start an early active motion program, the main goal of treating these fractures is to restore articular congruity and stability. Trauma, both direct and indirect, can result in olecranon and proximal ulna fractures.⁴ A trauma includes a strong impact at the posterior surface of the elbow or falling on the elbow's back. The most common result is an olecranon fracture that is comminuted. The degree of trauma severity determines the degree of comminution.⁵ A fall onto a partially bent elbow can result in indirect trauma, such as a two-part transverse or oblique fracture or an avulsion of a small proximal

piece of the olecranon due to the pull of the triceps muscle. Introduced by Weber and Vasey, tension band wiring (TBW) is still the most widespread method for fracture osteosynthesis.⁶ The present study determined the functional outcome in Olecranon fracture using tension band wiring.

MATERIALS & METHODS

The present study consisted of 70 patients of olecranon fractures of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. A thorough examination of fracture was done in all cases. All were subjected to the tension band wiring (TBW) approach to identify and treat isolated olecranon fractures in the afflicted elbow. The Mayo classification, which takes into account the joint's stability as well as the degree of displacement and comminution, was used to identify the type of fracture. Under general or regional anesthesia, the surgical operations were performed on the patient while they were in a supine or lateral decubitus position. A goniometer was used to evaluate range of

motion (ROM) related to elbow flexion/extension and forearm pronation/supination. The Visual Analogue Scale (VAS) was used to rate the outcomes as

reported by patients. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 70		
Gender	Males	Females
Number	38	32

Table I shows that out of 70 patients, males were 38 and females were 32.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Mayo score	Excellent	34	0.04
	Good	20	
	Fair	12	
	Poor	4	
Patient satisfaction score	score10	48	0.01
	score9	11	
	score8	6	
	score7	3	
	score6	2	

Table II, graph I shows that Mayo score was excellent in 34, good in 20, fair in 12 and poor in 4. Patient satisfaction score was 10 seen in 48, 9 in 11, 8 in 6, 7 in 3 and 6 in 2 patients. The difference was significant (P< 0.05).

Graph I Assessment of parameters

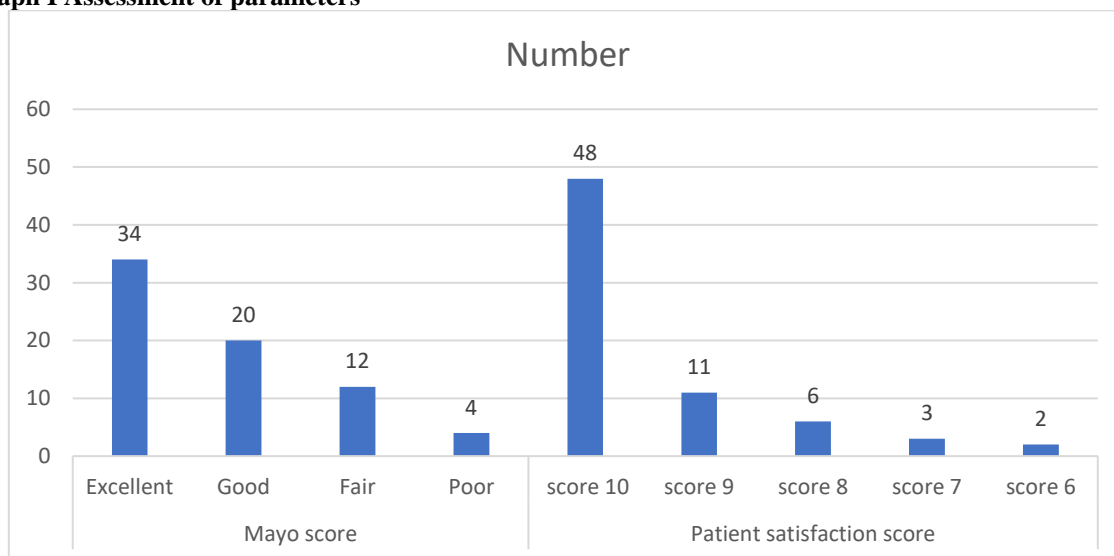


Table III Visual Analogue Scale (VAS)

Visual Analogue Scale	Number	P value
6	34	0.02
7	18	
8	11	
9	5	
10	2	

Table III shows that visual analog scale had value of 6 in 34 patients, 7 in 18, 8 in 11, 9 in 5 and 10 in 2 patients. The difference was significant (P< 0.05).

DISCUSSION

The posterior elbow joint can sustain a direct damage from an olecranon fracture, or the triceps muscle can

sustain an indirect injury from a fall onto a partially flexed elbow.⁷ Conventional radiographs typically show the lesion and any possible related injuries well

enough to portray the clinical picture.⁸ One of the most typical orthopedic injuries seen in the emergency department are fractures of the proximal ulna and olecranon.⁹ About 10% of adult upper extremity fractures and 20% of all proximal forearm fractures are attributed to olecranon fractures.¹⁰ The subcutaneous bone known as the proximal ulna is easily injured.⁸ In each case of proximal ulna and olecranon fractures, the degree of the break, its pattern, any concurrent elbow trauma, and ligamentous instability influence surgical decision making and prognosis.¹¹ The present study determined the functional outcome in Olecranon fracture using tension band wiring.

We observed that out of 70 patients, males were 38 and females were 32. Chalidis et al¹² evaluated the elbow function and the patient-rated outcome after TBW fixation of olecranon fractures. They reviewed 62 patients (33 men and 29 women) with an average age of 48.6 years (range, 18–85 years) who underwent TBW osteosynthesis for isolated olecranon fractures. There was a higher prevalence of fractures among men until the 5th decade of life and among women in elderly ($p = 0.032$). Slip or simple fall onto the arm was the main mechanism of injury for 38 fractures (61.3%) while high energy trauma, such as fall from a height (> 2 m) or road accident, was reported in 24 fractures (38.7%). Hardware removal performed in 51 patients (82.3%) but 34 of them (66.6% of removals) were still complaining for mild pain during daily activities. The incidence of pin migration and loosening was not statistically decreased when penetration of the anterior ulnar cortex was accomplished ($p = 0.304$). Supination was more often affected than pronation ($p = 0.027$). According to MEPS, 53 patients (85.5%) had a good to excellent result, 6 (9.7%) fair and 3 (4.8%) poor result. The average satisfaction rating was 9.3 out of 10 (range, 6–10) with 31 patients (50%) to remain completely satisfied from the final result. Degenerative changes recorded in 30 elbows (48.4%). However, no correlation could be found between radiographic findings and MEPS ($p = 0.073$).

We observed that Mayo score was excellent in 34, good in 20, fair in 12 and poor in 4. Patient satisfaction score was 10 seen in 48, 9 in 12, 8 in 6, 7 in 3 and 6 in 2 patients. Villanueva P et al¹³ in their study thirty-seven consecutive olecranon fractures treated with tension-band wiring were evaluated at a mean follow-up of 4 years. There was no or mild pain in 33 cases, mean elbow extension was 7 degrees, and mean elbow flexion was 131 degrees. According to the Mayo Elbow Performance Score, the results were graded as good or excellent in 32 cases (86%). Most patients had mild residual upper extremity disability (mean Disabilities of the Arm, Shoulder and Hand score, 18 points). In 10 patients, degenerative changes developed. Arthritic changes were significantly associated with elbow instability ($P = .014$) and length of follow-up ($P = .031$) and were more common in the

presence of associated radial head or coronoid fractures ($P = .06$). Hardware removal was required in 17 cases. Tension-band wiring provides satisfactory results in a high percentage of olecranon fractures.

We observed that visual analog scale had value of 6 in 34 patients, 7 in 18, 8 in 11, 9 in 5 and 10 in 2 patients. Hume et al¹⁴ compared tension band wire (TBW) and plate fixation (PF) in 41 adult patients with displaced olecranon fractures. The patients received treatment with open reduction internal fixation. Although it took longer to perform the surgery, plate fixation did not result in a higher rate of complications. Between the two groups, there was no discernible difference in elbow range of motion at six months. After TBW, symptomatic metal prominence was often noted (42%), although only one patient had actual Kirschner wire (K-wire) migration. Following TBW, postoperative loss of reduction was more common (53%) than following PF (5%), resulting in a substantial articular step-off or gap. Compared to PF, which produced 63% good clinical and 47% good roentgenographic results, tension band wiring produced 37% good clinical and 47% good roentgenographic results.

CONCLUSION

Authors found that the gold standard for treating displaced and mildly comminuted olecranon fractures has been determined to be tension band wire.

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