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Assessment of functional outcome in olecranon fracture managed by tension band wiring

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Abstract

Background: Olecranon fractures constitute about 10% of all upper extremity fractures and accounts to be one of the common injuries of the proximal ulna. The present study was conducted to assess functional outcome in Olecranon fracture managed by tension band wiring.

Materials & Methods: 64 patients of olecranon fractures of both genders were included. The type of fracture was documented by using Mayo classification which utilises degree of displacement and comminution as well as the stability of the joint.

Results: Out of 64 patients, males were 40 and females were 24. Results found to be excellent in 30, good in 18, fair in 10 and poor in 6. The difference was significant ($P < 0.05$). Patient satisfaction score was 10 seen in 27, 9 in 15, 8 in 12, 7 in 7 and 6 in 3 patients. The difference was significant ($P < 0.05$).

Conclusion: TBW found to be a “gold standard” for the treatment of displaced and slightly comminuted fractures of olecranon.

Keywords: Olecranon, fractures, mayo classification

Introduction

Olecranon fractures constitute about 10% of all upper extremity fractures and accounts to be one of the common injuries of the proximal ulna. Such fractures are isolated but can occur as an associated injury in complex and polytrauma cases [1]. Due to the intra-articular extension of fractures, anatomic reduction and early mobilization should be achieved in every case. It is known that only undisplaced fractures (5% of total) are treated conservatively while displaced fractures (95% of total) are managed by operative treatment [2].

The guiding principle in treating these fractures is to restore articular congruity and stability in order to begin a program of early active motion. Fracture of olecranon and proximal ulna occurs due to direct and indirect trauma [3]. Direct trauma as falling on the back of elbow or direct forceful impact at the posterior surface of the elbow. This mostly causes comminuted fracture of the olecranon. Degree of comminution depends on the severity of the trauma [4]. Indirect trauma as falling on partially flexed elbow which can cause an indirect force generated by the pull of triceps muscle causing avulsion of small proximal fragment of the olecranon or two- part transverse or oblique fracture. Tension band wiring (TBW) which was introduced by Weber and Vasey remains the most widespread method for fracture osteosynthesis [5]. The present study was conducted to assess functional outcome in Olecranon fracture managed by tension band wiring.

Materials and Methods

The present study comprised of 64 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. Isolated fractures without severe concomitant injuries or complex lesions of the affected elbow were recognized, and treated with TBW technique. The type of fracture was documented by using Mayo classification which utilises degree of displacement and comminution as well as the stability of the joint. The surgical procedures were carried out with the patient in a supine or lateral decubitus position under general or regional anaesthesia. Check x-rays were taken. ROM pertaining to flexion /extension of elbow and pronation / supination of forearm was measured with a goniometer.

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Patient rated outcomes were evaluated with the Visual Analogue Scale (VAS). Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table 1: Distribution of patients

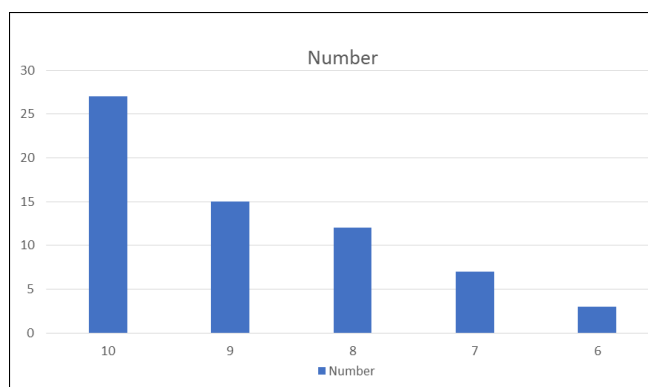
Total- 64		
Gender	Males	Females
Number	40	24

Table I shows that out of 64 patients, males were 40 and females were 24.

Table 2: Assessment of Mayo score

Score	Number	P value
Excellent	30	0.01
Good	18	
Fair	10	
Poor	6	

Table II, graph I shows that results found to be excellent in 30, good in 18, fair in 10 and poor in 6. The difference was significant (P<0.05).

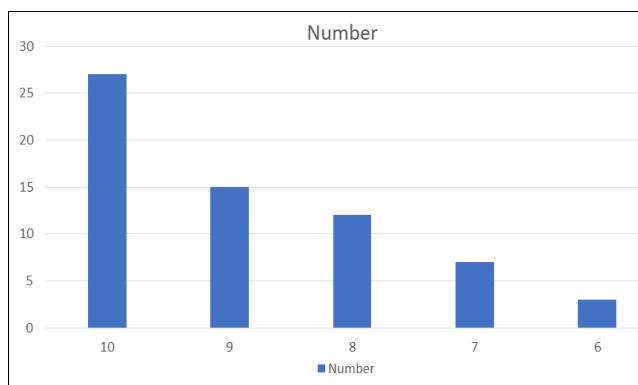


Graph 1: Assessment of Mayo score

Table 3: Visual Analogue Scale (VAS) patient satisfaction score

Satisfaction score	Number	P value
10	27	0.05
9	15	
8	12	
7	7	
6	3	

Table III, graph II shows that patient satisfaction score was 10 seen in 27, 9 in 15, 8 in 12, 7 in 7 and 6 in 3 patients. The difference was significant (P<0.05)



Graph 2: Visual Analogue Scale (VAS) patient satisfaction score

Discussion

Olecranon fractures may be caused by direct injury to the

posterior part of the elbow joint or indirectly by forces generated within the triceps muscle during a fall on a partially flexed elbow [6]. The clinical picture is obvious and conventional radiographs are usually sufficient to depict the lesion and the potential associated injuries. Proximal ulna and olecranon fractures are one of the most commonly seen orthopaedic injuries in the emergency room [7]. Olecranon fractures account for about 20% of all proximal forearm fractures and approximately 10% of upper extremity fractures in adults. The proximal ulna is a subcutaneous bone that is readily susceptible to trauma [8]. In all fractures of the proximal ulna and olecranon, the severity of the fracture, fracture pattern and concomitant elbow trauma, and ligamentous instability influence surgical decision making and prognosis [9, 10]. The present study was conducted to assess functional outcome in Olecranon fracture managed by tension band wiring.

In present study, out of 64 patients, males were 40 and females were 24. We found that results found to be excellent in 30, good in 18, fair in 10 and poor in 6. Kumar *et al* [11] evaluated the elbow function and the outcome as per rating by the patient after olecranon fractures were fixed by Tension Band Wiring. 20 patients were studied (13 men and 7 women) with an average age of 43.2 years (range, 19–75 years) who had undergone TBW for isolated olecranon fractures. Assessment was done by clinical and radiological (X-Rays) evaluation. Visual Analogue Scale (VAS) score was used to know the functional outcome. Follow up was done for 1-2 years.

The incidence of fractures was more in males when compared to females. Simple fall onto the point of elbow was the main mode of injury. Implant removal was done in 13 patients (65%) but 7 of them (53.84%) were still complaining of mild pain during activities of daily life. The average satisfaction level was 9.3 out of 10 (range, 6–10). 12 patients (60%) were fully satisfied with the final result.

We found that patient satisfaction score was 10 seen in 27, 9 in 15, 8 in 12, 7 in 7 and 6 in 3 patients. Chalidis *et al*. [12] 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. All patients were assessed both clinically with measurement of flexion-extension and pronation-supination arcs and radiologically with elbow X-Rays. Functional outcome was estimated using the Mayo Elbow Performance Score (MEPS), Visual Analogue Scale (VAS) subjective pain score and VAS patient satisfaction score. Follow up: 6–13 years (average 8.2 years). 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 ($p = 0.073$).

Conclusion

Authors found that TBW found to be a “gold standard” for the treatment of displaced and slightly comminuted fractures of olecranon.

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