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EVALUATION OF FUNCTIONAL OUTCOMES OF OLECRANON FRACTURES MANAGED WITH OLECRANON HOOK PLATE TO TENSION BAND WIRING WITH CANCELLOUS SCREW.

Orthopaedics

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ABSTRACT

Olecranon fracture comprises of 10% of all upper limb injuries. The incidence of Olecranon fracture is more in adults. Olecranon fracture is the commonest fracture and the general causes of Olecranon fracture are motor vehicle accident, fall and assault. The undisplaced fractures can be treated with immobilization of affected limb for a short period of time followed by gradual increase in range of motion and when the displacement is < 2mm can be treated with conservative therapy. In case of displaced fractures open reduction and internal fixation are done to realign the articular surface and to restore the normal elbow function. The aim of this study is to evaluate the functional outcomes of olecranon fractures managed with olecranon hook plate to tension band wiring with cancellous screw. This prospective study included total of 27 patients of olecranon fractures managed with olecranon hook plate to tension band wiring with cancellous screw. The mean age of the patients was 37.6±16.1 years. 21 patients (77.77%) were males and 6 patients (22.22%) were females. 14 patients of olecranon fracture managed with tension band wire, 10 (71.42%) patients showed excellent score, 3 (21.42%) had good score and 1 (7.14%) patient had fair result and 13 patients of olecranon fracture managed with olecranon hook plate, 7 (53.84%) patients showed excellent score, 4 (30.76%) had good score and 2 (15.38%) patient had fair result according to Mayo Elbow Performance Score. The study concluded that management of olecranon fracture with tension band wiring with cancellous screw was more effective strategy than olecranon hook plate to restore the normal articulation and function of elbow.

KEYWORDS

Olecranon fracture, Clinical outcome, Olecranon hook plating, Cancellous screws and Tension band wiring.

INTRODUCTION

Olecranon fracture comprises of 10% of all upper limb injuries. The complete or incomplete break in the bone due to application of excessive force is fracture. The lateral and anterior posterior x-ray of the elbow can evaluate the extent of the fracture, the degree of comminution, the amount of disruption of articular surface and fracture of the head of radius or neck fracture.[1]

Olecranon fracture is the commonest fracture and the general causes of olecranon fracture are motor vehicle accident, fall and assault. The incidence of olecranon fracture is more in adults.[2]

Olecranon process forms the elbow joint and it is the proximal most expanded part of ulna bone. It articulates with trochlea of distal end of humerus. It also contributes in stability of the elbow joint.[3]

Previously, olecranon fractures were treated by splint in full extension for 4 to 6 weeks and which results in stiffness of elbow with loss of flexion after that mid flexion method was used which resulted in non-union of olecranon due to separation of fragments.[4]

In past olecranon fractures were treated with closed reduction and application of cast which resulted in increased morbidity.[5]

The undisplaced fractures can be treated with immobilization of affected limb for a short period of time followed by gradual increase in range of motion and when the displacement is < 2mm can be treated with conservative therapy. In case of displaced fractures open reduction and internal fixation are done to realign the articular surface and to restore the normal elbow function.[6] The most common methods to fix the displaced fracture are tension band wire and plate fixation. Various studies suggests that tension band wire and plate fixation results in adequate union and functioning.[7,8]

The Olecranon hook plates penetrate deep and prevent rotational, translational movement and minimize the proximal soft tissue damage. Cancellous screws with wire provide the greater fixation by converting the tensile force to compressive force at fracture site.[9]

Aim Of The Study:

The aim of this study is to evaluate the functional outcomes of olecranon fractures managed with olecranon hook plate to tension band wiring with cancellous screw.

MATERIALAND METHODS:

This prospective study was done in Department of Orthopaedics, Government Medical College and Hospital, Jammu, from April 2021 to March 2022 after obtaining the permission from ethical committee. Among 27 patients of Olecranon fractures, 13 patients managed with olecranon hook plate and 14 patients managed with tension band wiring with cancellous screw were included in the study after obtaining the informed consent.

Inclusion Criteria:

- Isolated olecranon fracture.
- Age > 18years.
- Minimal comminuted fractures.
- Patients with history of trauma within 10 days from the date of admission.

Exclusion Criteria:

- Comminuted fractures.
- Infected open fracture.
- Patients with polytrauma.
- Patients with other associated complications (elbow dislocation, multiple fracture, distal humerus fracture).
- Patient who doesn't follow up the treatment.

Before procedure and after procedure a detailed pre-operative and post-operative assessment was done. The patients were managed with olecranon hook plate and tension band wiring with cancellous screw. The clinical and radiological evaluation is done. All the patients were followed up at 6 weeks, 12 weeks and 3 months. During follow up a detailed clinical examination was done.

The functional outcomes were analyzed with Mayo Elbow Performance Score (MEPS) and radiological outcome with standard radiographs.

Data was tabulated, organized, analyzed and interpreted in both descriptive and inferential statistics i.e. frequency and percentage distribution, by using statistical package for social science software (SPSS), version 21. Categorical variables were expressed as number and percentage.

RESULTS

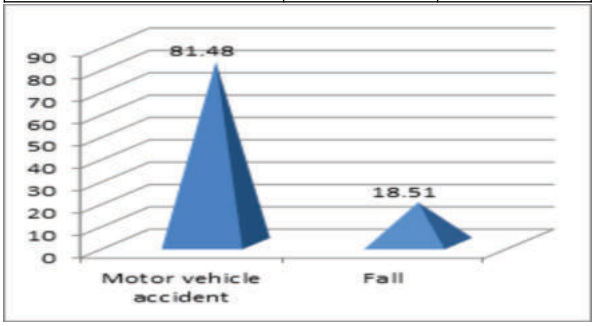
The present study consists of 27 patients. The mean age of the patients was 37.6±16.1 years. 21 patients (77.77%) were males and 6 patients (22.22%) were females.

It was reported that there were 22 patients (81.48%) had motor vehicle accident and 5 patients (18.51%) had fall injury as shown in table 1

mode of injury.

Table 1. Mode Of Injury

Mode of Injury	Number	Percentage
Motor Vehicle accident	22	81.48
Fall	5	18.51

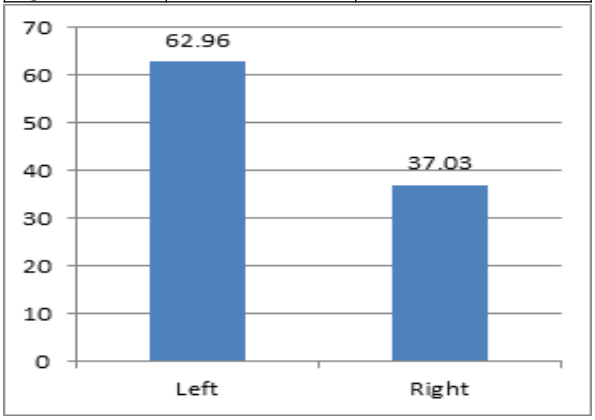


Graph 1. Mode Of Injury

It was observed that 17 (62.96%) participants had left sided injury and 10 (37.03%) participants had right sided injury as depicted in table 2 side of injury.

Table 2Side of Injury

Side	Number	Percentage
Left	17	62.96
Right	10	37.03

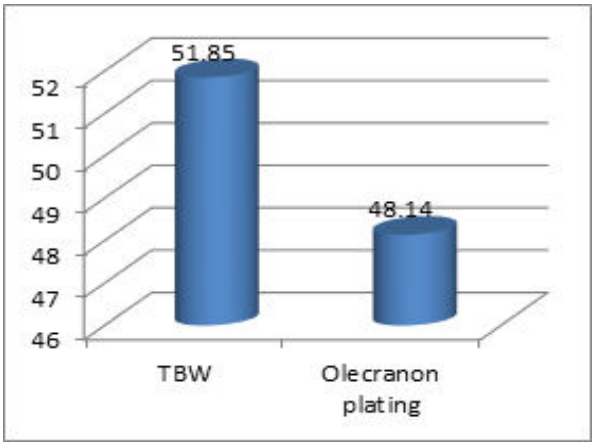


Graph 2. Side Of Injury

In the present study out of 27 patients, 14 patients (51.85%) were treated with tension band wiring and 13 patients (48.14%) were treated with olecranon plating as depicted in table 3.

Table 3 Method Of Fixation

Side	Number	Percentage
TBW	14	51.85
Olecranon plating	13	48.14

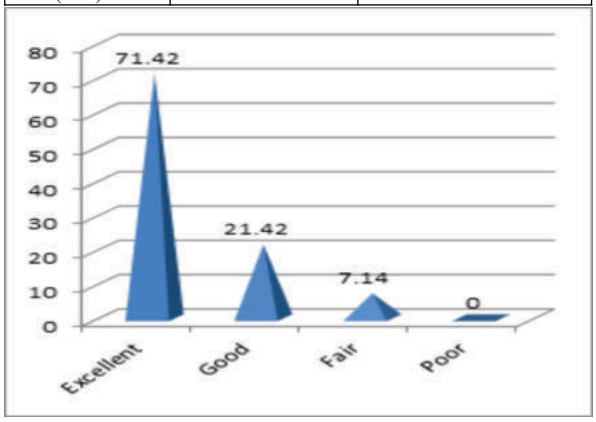


Graph 3. Method Of Fixation

It was found that out of 14 patients of olecranon fracture managed with tension band wire, 10 (71.42%) patients showed excellent score, 3 (21.42%) had good score and 1 (7.14%) patient had fair result according to Mayo Elbow Performance Score as depicted in table 4.

Table 4 Mayo Elbow Performance Score Of Patients Treated With TBW

Score	Number	Percentage
Excellent (>90)	10	71.42
Good (>75-89)	3	21.42
Fair (>60-74)	1	7.14
Poor (<60)	0	0



Graph 4. Mayo Elbow Performance Score Of Patients Treated With TBW

It was found that out of 13 patients of olecranon fracture managed with olecranon hook plate, 7 (53.84%) patients showed excellent score, 4 (30.76%) had good score and 2 (15.38%) patient had fair result according to Mayo Elbow Performance Score as depicted in table 5.

Table 5 Mayo Elbow Performance Score Of Patients Treated With Olecranon Hook Plate

Score	Number	Percentage
Excellent (>90)	7	53.84
Good (>75-89)	4	30.76
Fair (>60-74)	2	15.38
Poor (<60)	0	0

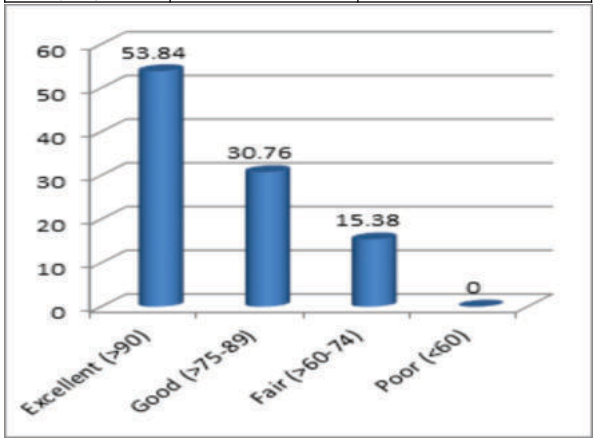


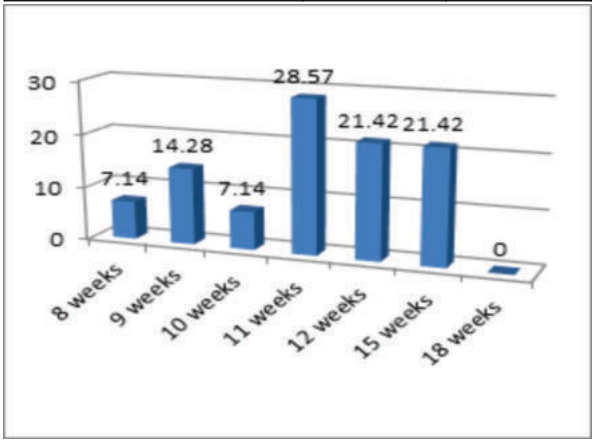
Figure 5. Mayo Elbow Performance Score Of Patients Treated With Olecranon Hook Plate

In the present study it was observed that among patients treated with tension band wire 7.14% patient showed reunion at 8 & 10 weeks respectively, 14.28% showed reunion at 9 weeks, 28.57% showed reunion at 11 weeks, 21.42% showed reunion at 12 & 15 weeks respectively as shown in table 6.

Table 6 Radiological Reunion In Weeks Of Patients Treated With TBW

Radiological reunion in weeks	Number	Percentage
8	1	7.14
9	2	14.28

10	1	7.14
11	4	28.57
12	3	21.42
15	3	21.42
18	0	0

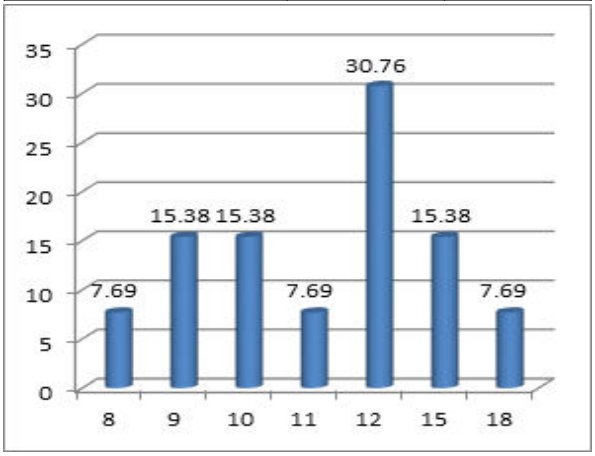


Graph 6. Radiological Reunion In Weeks Of Patients Treated With TBW

In the present study it was observed that among patients treated with olecranon hook plate 7.69 % patients showed reunion at 8, 11 & 18 weeks respectively, 15.38% showed reunion at 9, 10 &15 weeks respectively, 30.76% showed reunion at 12 weeks as shown in table 7.

Table 7 Radiological Reunion In Weeks Of Patients Treated With Olecranon Hook Plate

Radiological reunion in weeks	Number	Percentage
8	1	7.69
9	2	15.38
10	2	15.38
11	1	7.69
12	4	30.76
15	2	15.38
18	1	7.69



Graph 7. Radiological Reunion In Weeks Of Patients Treated With Olecranon Hook Plate

DISCUSSION

In this study 27 patients, who had olecranon fracture and were managed with olecranon hook plate to tension band wiring with cancellous screw were included. Detailed examinations, investigations and pre-operative or post-operative follow up were carried out in all the cases. Data was analyzed and discussed with previous literature.

The present study consists of 27 patients. The mean age of the patients was 37.6±16.1 years. 21 patients (77.77%) were males and 6 patients (22.22%) were females. In similar study conducted by S. H. Krishnaprasad *et al.* (2016), reported that mean age of the patients divided into two groups were 39.2 ±11 years and 37.6 ±16.1 years. 70% were males and 30% were females. [2] In another study conducted by Tankshali K *et al.* (2017) 25 (71.42%) were males and 10 (28.57%) were females (Male: Female ratio being 2.5:1) and majority of the patients ranged from 45-60 years of age with the age range being 32 to 67 years.[3]

It was reported that 17 (62.96%) participants had left sided injury and 10 (37.03%) participants had right sided injury and there were 22 patients (81.48%) had motor vehicle accident and 5 patients (18.51%) had fall injury. In similar study conducted by Sinha S. *et al.* (2020), observed that 37 (61.66%) patients had right sided injury, 23 (38.33%) patients had left sided injury and 14 (36.66%) had injury due to RTA, 7 (11.66%) had injury due to fall from height, 20 (33.33%) had injury due to slip on ground and 7 (11.66%) had injury due to assault.[10] In another study conducted by Suthar YA *et al.* (2020) reported that 16 (64%) patients had right side injury, 9 (36%) patients had left side injury and 13 (52%) patients had injury due to RTA, 11 (44%) patients had injury due to fall from height and 1 (4%) patient had injury due to assault.[11]

In the present study out of out of 14 patients of olecranon fracture managed with tension band wire, 10 (71.42%) patients showed excellent score, 3 (21.42%) had good score and 1 (7.14%) patient had fair result and 13 patients of olecranon fracture managed with olecranon hook plate, 7 (53.84%) patients showed excellent score, 4 (30.76%) had good score and 2 (15.38%) patient had fair result according to Mayo Elbow Performance Score. In similar study conducted by H. Krishnaprasad *et al.* (2016), reported that 13 (65%) patients had excellent score, 4 (20%) patients had good score and 3 (15)% patients had fair score.[2] In another study conducted by Suthar YA *et al.* (2020) observed that 18 (72%) patients had excellent score, 4 (14%) patients had good score and 3 (12%) patients had fair score.[11]

Similarly MS Raju *et al.* (2013), reported that excellent result was obtained in 15 (60%) patients, good in 10 3 (12%) patients and fair in 7 (28%) patients.[12] In another study conducted by Rana H, *et al.* (2020), observed that excellent result was obtained in 18 (72%) patients, good in 4 (16%) patients and fair in 3 (12%) patients.[6]

In the present study it was observed that patients treated with tension band wire 7.14% patient showed reunion at 8 & 10 weeks respectively, 14.28% showed reunion at 9 weeks, 28.57% showed reunion at 11 weeks, 21.42% showed reunion at 12 & 15 weeks respectively and patients treated with olecranon hook plate 7.69 % patients showed reunion at 8, 11 & 18 weeks respectively, 15.38% showed reunion at 9, 10 &15 weeks respectively, 30.76% showed reunion at 12 weeks. In similar study conducted by Rana H, *et al.* (2020), observed that 17 (68%) patients had union in < 4 months, 8 (32%) patients had union in 4-6 months. [6] In another study conducted by Tankshali K *et al.* (2017) reported that average union time was 8 weeks for TBW and K wiring, 12 weeks for CCS fixation and 10 weeks for olecranon plating.[3]

CONCLUSION

In this prospective study it is concluded that management of olecranon fracture with tension band wiring with cancellous screw was more effective strategy than olecranon hook plate to restore the normal articulation and function of elbow.

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