

Prospective Study on Operative Management of Fracture Olecranon with Various Modalities

¹Dr. Govind Sharma , ²Dr. Pravesh Kumar, ³Dr. Kishore Rai Chandani, ⁴Dr. Hemant Jain, ⁵Dr. Vikash Choudhary, ⁶Dr. Nirottam Singh

Department of Orthopaedic Surgery, Dr. S N Medical College, Jodhpur (Raj.)

Corresponding Author: Dr. Pravesh Kumar, Department of Orthopaedic Surgery, Dr. S N Medical College, Jodhpur (Raj.)

Citation this Article: Dr. Govind Sharma , Dr. Pravesh Kumar, Dr. Kishore Rai Chandani, Dr. Hemant Jain, Dr. Vikash Choudhary, Dr. Nirottam Singh,“Prospective Study on Operative Management of Fracture Olecranon with Various Modalities”, IJMSIR- August - 2020, Vol – 5, Issue - 4, P. No. 78 – 84.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Simple olecranon fractures are a common injury in upper extremity lesions. Most olecranon fractures occur through either direct trauma or an indirect tension injury . These fractures present along with a spectrum from simple transverse patterns to complex comminuted injuries.

Methods: Present prospective study was includes 71 cases coming with fracture olecranon and who are being given treatment in Department of Orthopedics’, Dr. S. N. Medical College, jodhpur.

Results: In this study 53 (74.64%) patients had satisfactory union in less than 3 months, 18 (25.35%) had union in 3 to 6 months and no patient had non union.

Conclusion: From this study it is concluded that open reduction and internal fixation by tension band wiring with K-wire for simple transverse and oblique fractures and for comminuted fractures, olecranon plate are effective and gold standard technique

Keywords: K-wire, Olecranon, Tension.

Introduction

Simple olecranon fractures are a common injury in upper extremity lesions.¹ Most olecranon fractures occur through either direct trauma or an indirect tension injury . These fractures present along with a spectrum from simple transverse patterns to complex comminuted injuries. Due to the intra-articular nature of the fracture and the importance of the olecranon in maintaining the extensor mechanism, an attempt at operative anatomic reduction should be undertaken. ¹

The active mobilization after surgery will restore the patient to normal function as early as possible .the early and active movement not only prevents the tissue from fracture disease but greatly influences the quality and rapidity of fracture.²

This dissertation is directed towards the functional outcome of surgical management of olecranon fractures by tension band wiring for simple transverse fractures and plate fixation for comminuted fractures.

Material And Methods

Present prospective study was includes 71 cases coming with fracture olecranon and who are being

given treatment in Department of Orthopedics', Dr. S. N. Medical College, jodhpur.

Inclusion criteria

Patients with close and compound; simple transverse and comminuted fracture of both gender, more than 18 years of age whose giving consent for surgery will include our study.

Exclusion criteria

1. Patient with co-morbid condition and not fit for surgery. Non complaint patient.
2. Extreme osteoporosis.
3. Severe communication or bone loss.

Selection of Cases for Krishner Wires with Tension Band Wiring and Olecranon Plate

Following points will be considered -

- a) Age of the patient
- b) Extent of damage to the articular surface
- c) Degree of comminution.

Follow UP

In our study the patients on discharge will be advised to report for follow up after 2weeks, 6 weeks and 12 weeks and thereafter every 3 months. The result is assessed 3 months after the procedure.

Evaluation of results

Although there are many methods of evaluation of results given by many authers, the treated olecranon fractures by Tension band wiring and olecranon plate

Type of Fractures

Type of Fractures	No. of Cases	Percentages %
I) Un-displaced and stable fractures	-	-
II) Displaced fractures		
A) Avulsion fractures	4	5.6
B) Oblique and transverse fractures	58	81.6
C) Comminuted fractures	9	12.6
Fracture dislocation	-	-

were evaluated in our study with Mayo Elbow Performance score (MEPS) (According to Morrey BF, An KN. Functional evaluation of elbow.)¹⁹for functional outcome and standard radiographs for radiological outcome.

Interpreting the Mayo Elbow Performance Score

Mean Total Score- 100 points

- | | |
|--------------------------|-----------|
| 1. Score greater than 90 | Excellent |
| 2. Score 75-89 | Good |
| 3. Score 60-74 | Fair |
| 4. Score below 60 | Poor |

Results

Study consists of 71 cases of fractures of the olecranon fracture in department of orthopaedics, Dr. S. N. Medical college, jodhpur.

Mode of Injury

Mechanism of injury	No. of cases	Percentages %
Road traffic accidents	46	64.7
Fall from height	16	22.5
Assault	9	12.6

In this study 46 (64.7%) patients had olecranon fracture due to road traffic accidents, 16 cases (22.5%) were due to accidental fall from height and 9(12.6%) patient had injury due to assault.

In the present study 58 (81.6%) olecranon fracture were oblique and transverse fractures, 9 (12.6%) olecranon fractures were comminuted fractures and 4(5.6%) avulsion fracturs . No cases of fracture dislocation and undisplaced stable fractures were studied.

Associated Injury

Associated injuries	No. of cases	Percentage
Radial head fracture	2	2.8%
Lower third ulna fracture	1	1.4%
Medial condyle of humerus fracture	2	2.8%
Monteggia fracture	1	1.4%

Duration of Fracture Union

Patients were examined clinically for tenderness, and radiologically for fracture line and other subjective complaints were asked, in the absence of these, fracture was considered united.

If healing took place in 6 months then it was labeled as delayed union. If healing not seen in 6 months or patients needed another operative procedure then it was considered non united fracture.

Time of union	No. of cases	Percentage %
< 3 months	53	74.54%
3-6 months	18	25.35%
6 months -1 year	-	
Non union	-	
Total	71	100%

In this study 53 (74.64%) patients had satisfactory union in less than 3 months, 18 (25.35%) had union in 3 to 6 months and no patient had non union.

Interpreting the Mayo Elbow Performance Score

Grading	No. of cases	Percentage
Excellent (score greater than 90)	54	76.05%
Good (score 75-89)	12	16.90%
Fair (score 60-74)	5	7.04%
Poor (score below 60)		

In the present study 54 (76.05%) patients were seen with excellent results , 12 (16.90%) patients had good score, and 5 (7.04%) patients were found with fair score according to MEPS system.

Complications in Postoperative Follow UP

Complications	No. of cases	Percentage
Superficial infection	6	8.45%
Symptomatic metal prominence	3	4.22%

The complications in present study seen were superficial infection in 6 (8.45%) patients and symptomatic metal prominence in 3 (4.22%) patients.

Discussion

All olecranon fractures are intra-articular and present a challenge when they are multi-fragmented. The outcome of the surgical treatment always depends directly on the precision of the joint reduction, restoration of mechanical stability that permits prompt mobilisation, respect for the soft tissues, and maintaining an intact extensor mechanism.³

The aim of surgery is to achieve an adequate stability to the fracture and to reconstruct the joint surface to enable range-of motion exercises in the early post-operative period. ⁴ A considerable number of the published literature have described positive results with locking-plate in fragmented olecranon fractures .⁵

Fyfe et al. conducted a biomechanical study on methods of fixation of olecranon fractures and concluded that fragmented osteotomies had best

stability when fixed using the contoured plates.⁶ Following that, Gordon et al. performed a cadaveric study comparing plating methods on comminuted olecranon fractures.⁷ The study concluded that plate fixation along with an intramedullary screw had the most attainable stability when fixing these fractures. Although those with type IIB fractures had slightly better results when compared with type IIIB group, the difference was not statistically significant. They recommended osteosynthesis system for fragmented fractures to guarantee more secured fixation, to provide better joint restoration and to guard against loss of elbow range of motion.⁸

Conclusion

From this study it is concluded that open reduction and internal fixation by tension band wiring with K-wire for simple transverse and oblique fractures and for comminuted fractures, olecranon plate are effective and gold standard technique.

The above technique for fracture of the olecranon has the following advantages-

1. By these surgical procedure post operative immobilization in plaster of Paris slab/cast is greatly minimized. So due to this avoid long time immobilization related complication.
2. Due to rigid and definitive fixation between the fracture components, early mobilization and functional movement can be achieved at the involved joints during fracture healing. This also reduce the risk of joint stiffness at the involved joint.
3. Early active motion at the involved joints also increases the compression between the fracture fragments. This micro movement and compression enhance the fracture healing. This promotes the

early union of fracture and patient is back to work earlier.

Considering the all above advantages of tension band wiring and olecranon plate is treatment of choice for olecranon fractures.

Legends Figure

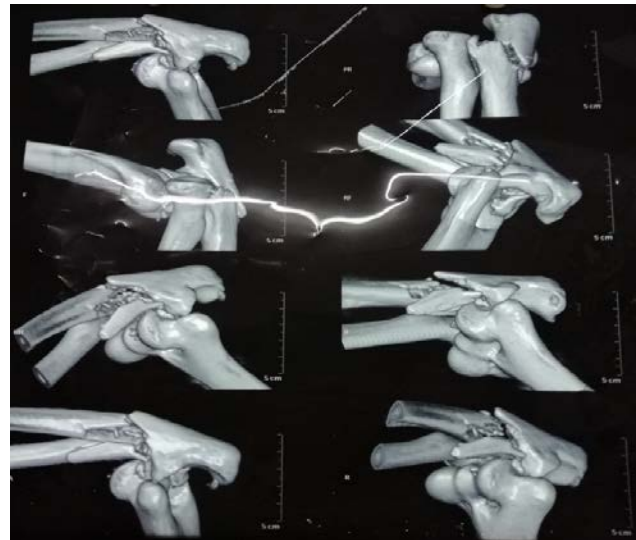


Figure 1: Pre-operative ct-scan



Figure 2: Immediate postoperative X-ray



Figure 3



Figure 4



Figure 5: Extension



Figure 6 : Flexion



Figure 7: Pronation



Figure 8 : Supination

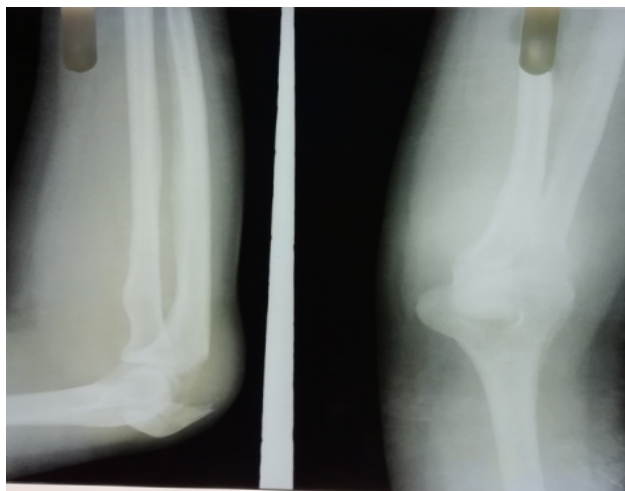


Figure 9: Pre operative X-Ray



Figure 10 : Immediate post-operative X-Ray



Figure 11



Figure 12

References

1. Newman S.D., Mauffrey C., Krikler S. Olecranon fractures. *Injury*. Jun 2009;40(6):575–581.
2. Veillette C.J., Steinmann S.P. Olecranon fractures. *Orthop. Clin. North Am.* 2008;39(2):229–236.
3. Anderson M.L., Larson A.N., Merten S.M., Steinmann S.P. Congruent elbow plate fixation of olecranon fractures. *J. Orthop. Trauma*. 2007;21(6):386–393
4. Niéto H., Billaud A., Rochet S. Proximal ulnar fractures in adults: a review of 163 cases. *Injury*. 2015;46(Suppl. 1):S18–S23.
5. Riaz Agha A., Alexander Fowler J., Rajmohan S., Barai I., Dennis P. Orgill for the PROCESS Group. Preferred reporting of case series in surgery; the PROCESS guidelines. *Int. J. Surg.* 2016
6. Fyfe I.S., Mossad M.M., Holdsworth B.J. Methods of fixation of olecranon fractures. An experimental mechanical study. *J. Bone Joint Surg. Br.* 1985;67:367–372.

7. Gordon M.J., Budoff J.E., Yeh M.L. Comminuted olecranon fractures: a comparison of plating methods. *J. Shoulder Elbow Surg.* 2006;15:94–99.
8. Bernstein J., Monaghan B.A., Silber J.S. Taxonomy and treatment: a classification of fracture classifications. *J. Bone Joint Surg. Br.* 1997;79:706–707