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A STUDY ON FUNCTIONAL OUTCOME OF SURGICAL MANAGEMENT OF INTRA ARTICULAR FRACTURES OF DISTAL HUMERUS IN ADULTS

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Abstract:

Background: Intra-articular distal humerus fractures comprise 1% of all fractures in adults¹. Recent studies have emphasised the importance of surgical approach, rigid fixation and early rehabilitation for good outcome.

Objectives: To assess the anatomical reduction of distal humeral articular surface by radiological examination and stability of the elbow by the functional assessment over a period of 1 year.

Methodology: Thirty consecutive patients with distal humerus fractures were treated from October 2012 to October 2014. The fractures were fixed using AO double column (orthogonal) plating techniques. Physiotherapy started from 3rd day post-op. Patients were followed at 6 weeks, 3 months, 6 months, 1 year interval. Clinical outcome assessed using MEPI (Mayo Elbow Performance Index) score and radiologically assessed for reduction, alignment, fracture union, and complications.

Results: All patients had completed postoperative physical therapy at the time of the study and had achieved maximum function of elbow. The mean duration of follow-up was 12 months. The mean arc of flexion was 106°. Mean pronation was 76° and supination was 77°. The mean MEPI score was 95.1 points (range 0 to 100 points), indicating mild impairment. Radiographic evidence of fracture union was noted in all patients.

Conclusion: We conclude that internal fixation of intra-articular fractures of the distal humerus is an effective procedure with an excellent functional outcome in most patients. Patients have a high level of satisfaction and the majority return to their previous level of activity.

Key Words: Intra-articular distal humerus fracture; olecranon osteotomy; triceps reflecting approach; orthogonal plating; MEPI

Introduction

Intra articular fractures of distal humerus constitute 0.5-7% of all the fractures and 30% of fractures around elbow¹. The primary goal in management of intra articular fractures of distal humerus is to achieve stable and mobile elbow.

The chances of functional impairment and deformities are very high following conservative treatment of such distal intra-articular fractures of humerus. Malunion, stiffness, and osteoarthroses are very common following conservative management. Since 1950s the trend has shifted to open reduction and stable fixation with early mobilization. Good anatomical alignment, stabilization and early

mobilization can provide satisfactory results. The operative treatment poses certain difficulties due to the intricate anatomy of the elbow joint which is composed of three distinct articulations, proximity of neurovascular structures, minimal soft tissues attached to the fragments and long operative period². The standard surgical techniques are used for fixation of both columns, using a combination of reconstruction plates, dynamic compression plates, locking compression plates and screws and k-wires. In rare situations, primary total elbow replacement may be considered

In this study we report the outcome of a series of intercondylar fractures of distal

humerus in adults, treated by open reduction and internal fixation.

Aims and Objectives of the study

1. To assess the functional outcome and to compare the results after surgical management of intra articular fracture of distal humerus using Mayo elbow performance index.
2. To assess the range of movements, pain and union at 1month, 3months and 6 months.

Materials and Methods

During the period of two years starting from October 2012 to October 2014, 30 cases of intra articular fractures of distal humerus satisfying the inclusion/exclusion criteria were admitted and were treated by open reduction and internal fixation with distal humerus locking compression plates.

Inclusion Criteria

1. Patients with intra-articular fractures of the distal humerus
2. Patient aged more than 18 years.
3. Patients who give consent for surgery.

Exclusion Criteria

1. Patient with co-morbid conditions and not fit for surgery.
2. Non-compliant patient
3. Unacceptable surgical risk
4. Extreme osteoporosis
5. Severe comminution or bone loss

Fractures were classified by AO classification. Physiotherapy started from 3 rd day post-op with passive ROM exercises. Patient was followed at 1mth, 2 mnth, 3 mth, 6 mth , 1 year and 2 year. Clinical outcome was assessed using **MEPI (Mayo Elbow Performance Index)** score and radiological union.

Analysis of Results

In our institute 30 cases were operated as discussed. The results were evaluated as per Mayo Elbow Performance Index:

Table 1: Outcomes as per MEPI

Grade	Score	No. Of cases	Percentage
EXCELLENT	>90	24	80%
GOOD	75-89	6	20%
FAIR	60-84	-	-
POOR	<60	-	-

Table 2: complications observed in the study

Transient ulnar nerve palsy	2
Infection (deep)	2
Hypertrophic ossification	-
Nonunion of fracture	-
Nonunion of osteotomy	-
Delayed union of osteotomy	1
Hardware pain	5

Majority had satisfactory functional results.

Discussion

Intra articular fractures of distal humerus constitute 0.5-7% of all the fractures and 30% of fractures around elbow³.The primary goal in management of intra articular fractures of distal humerus is to achieve stable and mobile elbow. In the present study, of the 30 cases taken up for the study, the average age was 35years, and the youngest age was 21years and the oldest age was 55 years. The male/ female ratio was 11:4. Most of the cases were in the productive age group for they are the working population. Males predominated for they are the predominant working group.

In this study, 19 cases sustained right sided injuries, mostly because right side is the most common dominant side. Fractures sustained in road traffic accident(most common) were more comminuted and associated with other injuries like lower limb fractures in 2 and head injury in 1 case.

A variety of approaches have been described for reduction and fixation of distal humeral fractures. A posterior approach with an olecranon osteotomy has been widely used and it offers best fracture exposure⁴. Trans-olecranon and triceps reflecting approaches are similar in their functional outcomes but complication rates are higher in trans-olecranon approach⁵. As more familiarity

is gained with fracture patterns and reduction techniques, a triceps-reflecting approach may be selected to reduce complications⁶.

Post-operative physiotherapy plays an important role in the outcome. With early mobilization of the elbow, the range of supination and pronation movements are usually unaffected. The rate of recovery is rapid in the first 6 months, slows exponentially during the subsequent 6 months and is minimal in the second year⁷. open reduction and internal fixation of intra articular fractures of distal humerus by orthogonal plating technique is an excellent surgical technique, in restoring articular surface, providing a rigid stable construct allowing early rehabilitation, decreasing morbidity and attaining good functional outcome..

Macko et al reported elbow symptoms due to prominent k-wires in 75% of their 20 cases and skin breakdown in 20% of the cases. One of the complications of olecranon osteotomy is denervation of anconeus muscle, which provides dynamic stability to the lateral side of the elbow by preventing varus and posterolateral rotatory instability. Since Bryan and Morrey approach is anconeus preserving, they do not have this disadvantage⁵.

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Conclusion

1. In surgical management of intra articular fractures of distal humerus, anatomical reduction of the articular surface, rigid and stable internal fixation of the distal humerus, medial and lateral columns, accurate reconstruction of the trochlea and capitellum are of prime importance in achieving an excellent outcome.
2. Operative treatment of these fractures is a major procedure and preliminary planning is necessary for success.
3. For open reduction and internal fixation of intra articular fracture of distal humerus, posterior approach with olecranon osteotomy is considered best approach. As more familiarity is gained with fracture patterns and reduction techniques, a triceps-reflecting or triceps-splitting approach may be selected to reduce complications.
4. Orthogonal plating of medial and lateral columns is the preferred technique to have a stable and rigid anatomical construct allowing early mobilization.
5. Post-operative physiotherapy and rehabilitation play a vital role in functional outcome.