COMPARITIVE STUDY OF INTERNALY FIXED DISTAL HUMERUS BICOLUMNAR FRACTURES TREATED WITH OR WITHOUT OLECRANON OSTEOTOMY

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Introduction

Distal humerus bicondylar fractures are complex intra-articular injuries that require precise anatomical reduction and stable fixation to restore elbow function. Internal fixation is the standard approach, but surgical exposure remains a critical factor influencing outcomes. Olecranon osteotomy is a commonly used technique to enhance visualization of the articular surface; however, it is associated with potential complications such as non-union, hardware irritation, and secondary procedures for implant removal. The choice of surgical approach plays a crucial role in fracture management, influencing operative time, complications rate, and functional recovery. While olecranon osteotomy provides excellent joint exposure, alternative approaches have been developed to minimize additional bone injury and soft tissue trauma. This study aims to compare the outcomes of bicondylar distal humerus fractures treated with and without olecranon osteotomy, assessing factors such as healing time, range of motion, and postoperative complications to determine the most effective and least invasive surgical technique.

Aim of the work

The aim of this study was to compare the results of distal humeral bicolumnar fractures in adults internally fixed by double plate approached with or without olecranon osteotomy.

Patients and Methods

This prospective study included 30 adult patients with distal humerus bicolumnar fractures, treated at El Hadra University Hospital and Gamal Abd Elnaser Insurance Hospital. The patients were divided into two groups alternatingly : Group I (15 patients) underwent open reduction and internal fixation (ORIF) with double plating through a posterior approach using olecranon osteotomy, while Group II (15 patients) underwent ORIF with double plating through a posterior approach without olecranon osteotomy. Inclusion criteria consisted of patients over 15 years old with intra-articular fractures affecting both humeral columns, while exclusion criteria included extra-articular fractures, pathological fractures, prior elbow surgeries, inflammatory arthritis, osteoarthritis, and skeletal immaturity. Informed consent was obtained from all participants. The study methodology involved comprehensive preoperative assessments, including patient history, clinical examination, diagnostic imaging (X-ray, CT), and routine laboratory tests. Surgically, both groups underwent a posterior approach to the elbow, with olecranon osteotomy performed only in Group I to enhance exposure.

Fracture fixation was achieved using double anatomical plating for stabilization. Postoperative management included six weeks of immobilization, followed by physiotherapy for rehabilitation. Patients were monitored for six months with radiological and functional assessments, including the Oxford Elbow Score (OES), which evaluates pain, function, and daily life impact. Outcomes were analyzed based on fracture healing, range of motion, and complications rate to determine the efficacy of olecranon osteotomy in achieving optimal surgical results.

Results

In this study anatomical reduction was achieved in 93.3% of cases in Group I and 86.67% in Group II, with no statistically significant difference (p = 0.408) (Figure 1). The union rate was 100% in Group II and 93.3% in Group I, without significant difference. Functional outcomes measured by the OES showed that Group II had a marginally better mean total score of 43 compared to 41 in Group I, though this difference was not statistically significant (Table 1). Both groups showed effective pain reduction, with minimal differences between them. The results demonstrated that both surgical approaches provided reliable outcomes in terms of anatomical reduction, bone healing, and functional recovery.

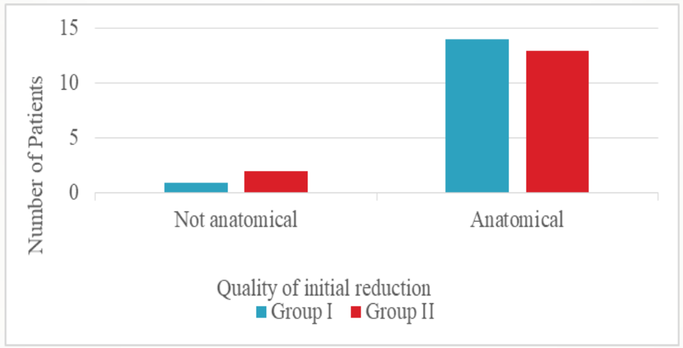

Figure (1): Quality of initial reduction in studied cases.

Table (I): Functional Assessment According to Oxford Elbow Scale (OES).

Domain	Group I (n = 15)	Group II (n = 15)	χ^2	FE	p
Elbow function					
Mean score (SD)	12 (±4)	14 (±1)	4.500	0.041	0.30
Pain					
Mean score (SD)	15 (±1)	14 (±2)	5.400	0.036	0.20
Social-psychological					
Mean score (SD)	14 (±2)	15 (±1)	6.100	0.031	0.10
Total OES Score					
Mean (Overall)	41 (±2)	43 (±2)	8.200	0.025	0.5

Conclusion

- Both olecranon osteotomy and triceps-sparing approaches are effective for treating distal humeral bicolumnar fractures when performing ORIF with double plating.
- While olecranon osteotomy provides better visualization of the fracture site, it does not significantly improve overall outcomes compared to the non-osteotomy approach.
- Avoiding olecranon osteotomy may lead to slightly better early functional outcomes due to reduced surgical trauma and a faster recovery.
- Ultimately, the choice of surgical approach should be guided by the complexity of the fracture and the surgeon's.