Original Article:

Delays in Presentation of Supracondylar Fractures and Their Impacts on Clinical Outcomes

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ABSTRACT

Background:

Supracondylar fractures are one of the most common elbow fractures among children in which delayed presentations are quite common in developing countries. This study evaluates how delay in presentation of supracondylar humeral fracture impacts surgical management and final functional outcomes in pediatric population

Methods:

A prospective cohort study was involving 75 children (2-12 years) with supracondylar fracture Gartland type II–IV patients conducted at JPMC, Karachi, divided into 2 groups, according to time of presentation. Group A (Early, ≤24h) and Group B (Delayed, >24h). Outcomes were assessed in terms of surgical approach (Open vs. Closed) and Flynn's Criteria at 6 months.

Results:

75 patients were enrolled in this study in which 46(61.3%) presented early and 29 (38.7%) were delayed, mean age was 6.44(+_1.832) ranges from 3-10 years, majority of patients were having type 3 of Gartland's classification of supracondylar fractures 66.7%, 28% were having type 2 and 5.3% were having type, 61.3% patients underwent closed reduction and 38.7% underwent open reduction, 69.3%patients develop no complication, 5.3%developed infection and 25.3% were presented with stiffness after surgery , in early presentation group 45 patients underwent closed reduction and only 1 underwent open reduction and in delayed presentation group 28 patients underwent open reduction, highly significant correlation was found between presentation and surgical approach ($P < 0.001$) Functional recovery (Flynn's Criteria) was significantly superior in the early group (100% Excellent/Good) compared to the delayed group (93.1% Fair/Poor, $P < 0.001$)

Conclusion:

Delays in presentation >24hours of supracondylar humeral fracture in paediatric population is most significant predictor of surgical complexity and poor functional recovery as compared to those patients who presented early <24hours of injury

Keywords:

Supracondylar fracture, Delayed presentation, early presentation, flyn's criteria, Gartland's classification.

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INTRODUCTION

Supracondylar humerus fracture in paediatric population are the most common elbow injuries (1, 2, 3)typically due to fall on outstretched hand common in children aged 3 to 7 years and most globally accepted classification for these fractures are Gartland system (type I: undisplaced; type II: displaced with intact cortex; type III: completely displaced; type IV: unstable in multiple planes), close reduction percutaneous is widely accepted and gold standard treatment for timely cases however delays in presentation is quite common in developing countries(4) like Pakistan due to transportation issues , socioeconomic barriers, rely on bone setters, financial instability, lack of awareness and initial conservative management are associated with swelling, neurovascular compromise, and malunion, delayed presentation is associated with severe soft tissue edema , callus formation and many other complication due to multiple factors which results in difficulty in achieving anatomical reduction(5) with closed reduction (6) Although previous studies have reported outcomes from developed countries and most of them depends on early presentation but there is limited data available from developing countries. This prospective cohort study at tertiary care hospital JPMC, Karachi, hypothesizes that delays in presentation is associated with increase need of open reduction and worse functional outcomes in terms of Flynn's criteria(7, 8) but early presentation is associated with better functional outcomes and lesser complications(9, 10)

MATERIALS AND METHODS

A prospective cohort study was conducted at Department of Orthopaedic Surgery, Jinnah Postgraduate Medical Centre (JPMC), Karachi, from November 2025 to February 2026, enrolled 75 children aged 2 to 12 years with confirmed supracondylar fractures of humerus with Gartland type II-IV were included, patients were having open fractures, pathological fractures ipsilateral limb injuries, prior deformities, compromised neurovascular status were excluded from study, Ethical approval was obtained from the JPMC Institutional Review Board (IRB No.F.2-81/2025-genl/783/JPMC), and informed consent was taken from guardians and parents, demographics, type of fracture via plain radiographs and initial neurovascular status, time of injury were recorded and patients were divided into two groups according to their time of presentation, the patient who were presented within the 24 hours after the injury. and the one represented after the 24 hours after injury, all patients were managed surgically under general anaesthesia either with close reduction and k wire or open reduction and k wire depends on type of fracture, swelling, instability and clinical status of patients, evaluation, decision and surgery was done by expert paediatric orthopaedic surgeon, Kwires were removed at 6th week post operatively Post-operative follow-up was conducted at 2 weeks, 6 weeks, 3 months, and 6 months; primary outcomes were surgical approach taken (closed vs open), final outcomes were measured at 6 months using Flynn's Criteria, which assesses carrying angle and elbow range of motion (ROM); excellent (0-5° loss motion, <5° carrying angle change), good (5-15°/5-10°), fair (15-30°/10-15°), poor (>30°/>15°). Secondary outcomes were measured in terms of complications (infection, stiffness, nerve palsy, malunion).

Data were analysed using SPSS version 27. Continuous variables were expressed as

mean ± standard deviation and compared using independent sample t-test. Categorical variables were analysed using chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

Seventy five patients were enrolled in this study who met the inclusion criteria in which 46(61.3%) presented early<24hours of injury and 29 (38.7%) were presented delayed >24hours , mean age was 6.44(+_1.832) ranges from 3-10 years, majority of patients were having type 3 of Gartland's classification of supracondylar fractures 66.7%, 28% were having type 2 and 5.3% were having type, 61.3% patients underwent closed reduction and 38.7% underwent open reduction, 69.3%patients develop no complication, 5.3%developed infection and 25.3% were presented with stiffness after surgery , in early presentation group 45 patients underwent closed reduction and only 1 underwent open reduction and in delayed presentation group 28 patients underwent open reduction, highly significant correlation was found between presentation and surgical approach ($P < 0.001$) Functional recovery was assessed via Flynn's Criteria and it was found significantly superior in the early group (100% Excellent/Good) compared to the delayed group (93.1% Fair/Poor, $P < 0.001$)

DISCUSSION

This prospective cohort study confirms that early presentation of supracondylar humeral fractures are associated with better functional outcomes however delayed presentation >24hours of paediatric supracondylar humeral fractures needs for open reduction due to fibrous tissue formation, callus formation which make close reduction difficult which results in impaired functional recovery and increased stiffness 25.3%, delayed presentation attributed to multiple local factors like traffic challenges, intervention by bone setters, lack of awareness; all of them results in worse outcomes, patients who presents with in 24hours get benefit from closed reduction and percutaneous pinning due less soft tissue swelling and ultimately good functional outcomes in terms of Flynn's criteria decrease risk of complications

LIMITATIONS

Limitations of this study was that, it was Non-randomized design, no nerve conduction test was done, Single-center study, short-term follow-up of patients at 3rd month only, no cost-effectiveness analysis was done

CONCLUSION

In this prospective cohort study, early presentation leads to superior functional outcomes and lesser complications, late presentation leads to inferior functional outcomes and more complications, this study emphasizes the need of community education regarding risk of traditional bone settings and awareness regarding benefits of early orthopaedic intervention to ensure morbidity free recovery for paediatric patients

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Board of Jinnah Postgraduate Medical Centre. Written informed consent was obtained from parents or legal guardians.

CONFLICT OF INTEREST

The authors declared no conflicts of interest with respect to research, authorship or publication.

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