Determine the Outcome of Posterior Approach of Open Reduction and Internal Fixation in Supracondylar Type III Fracture in Children

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ABSTRACT

Background: Supracondylar humeral fractures are the most common fractures seen in children. It is exclusively a fracture of immature skeleton. It has a greater rate of malunion, nerve injury, and poor results than any type of extremity fracture. Supracondylar type III fractures are recorded 54% in Pakistan. In situations where closed reduction fails, open reduction and k-wire fixation is applied.

Objectives: To determine the outcome of posterior approach of open reduction and internal fixation in supracondylar type III fracture in children.

Design: Descriptive case series

Results: Majority of the patients 42%(n=42) were recorded between 6-10 years of age, 35%(n=35) were found with 11-14 years, and 23%(n=23) with 1-5 years. The mean age was recorded as 8.23 with 3.67 S.D. Gender distribution in the population included in our study, male were found in 71% (n=71) while females were found 29% (n=29). Status of loss of motion according to Flylnn's criteria shows 58% (n=58) excellent, Good in 27% (n=27), while fair and poor were found in 15% (n=15). Regarding carrying angle according to Flylnn's 63% (n=63) excellent, 26% (n=26) Good and 11% (n=11) were found with fair and poor outcome.

Conclusion: Posterior approach of open reduction and internal fixation in supracondylar type III fracture in children regarding loss of motion and loss of carrying angle is successful

Key words: Supracondylar type III fracture, open reduction and internal fixation, posterior approach, loss of motion, loss of carrying angle

INTRODUCTION

Supracondylar humeral fractures are the most common fractures seen in children. It is exclusively a fracture of immature skeleton. It has a greater rate of malunion, nerve injury, and poor results than any type of extremity fracture.[1,2] In the past, it was through that cubitus varus or cubitus valgus occurred because of growth arrest of the distal humeral epiphysis.[3] Now it has been established that it is because of malreduction of the fracture.[4]

The age range in which most supracondylar fractures occur is between five and seven years old.[5] It is caused by a fall on out stretched hand (extension type) and fall on the point of the flexed elbow (flexion type). Supracondylar fracture occurs through the weak metaphysic of distal humerus.[6]

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Supracondylar fractures are divided into extension and flexion types. Extension type fractures, which account for approximately 97% to 99% of supracondylar humeral fractures[5] and 2.2% are flexion type. Supracondylar fractures of humerus in children was proposed by Gartland.[6] Gartland classification are most commonly used.[7] In Pakistan supracondylar type III fractures recorded 54%.[8]

This study was conducted with the view to determine the outcome of posterior approach with respect to cosmetic, functional factor (according to Flynn's criteria) and it will helpful for betterment of the patients and medical field as well.

METHODS

Descriptive case series included 100 cases with supracondylar fracture type III age 14 years or less, Gartland type III fracture (diagnosed on radiographic examination), patients presenting-within one week of injury selected from Department of Orthopaedics Surgery, Lahore General Hospital, Lahore from June 2012 to September 2013. All cases with open

supracondylar fractures, infected cases and patients with vascular injury on clinical examination were excluded from the study.

A total of 100 patients fulfilling inclusion and exclusion criteria were included in the study after taking their informed consent from parents for using their data in the research. Patents were fully informed about the side effects/complications of the technique. Their demographic profile (age, sex, address, etc) were also obtained. After general and neurovascular examination in the subjects, the surgery was done under general anesthesia and pneumatic tourniquet control by a single surgeon. They were followed up to 3 months to assess the outcome variables i.e. acceptable loss of motion (excellent and good outcome) by researcher himself. All this information was recorded on a pre-designed proforma.

DATA ANALYSIS PROCEDURE

Data was analyzed using computer software SPSS version 11. Frequency and percentages were calculated for gender, acceptable loss of motion (excellent or good outcome) and loss of carrying angle (excellent or good outcome). Mean and S.D was calculated for age.

RESULTS

A total of 100 supracondylar type III fracture in children fulfilling inclusion/exclusion criteria were studied to determine outcome of posterior approach of open reduction and internal fixation in supracondylar type III fracture in children. The data was collected by a specially designed proforma and then analyzed through SPSS Version 11.

In this study, table No. 1 shows the distribution of the patients according to their age group, majority of the patients 42%(n=42) were recorded between 6-10 years of age, 35%(n=35) were found with 11-14 years, and 23%(n=23) with 1-5 years. The mean age was recorded as 8.23 with 3.67 S.D.

We analyzed gender distribution in the population included in our study, male were found in 71% (n=71) while females were found 29% (n=29). (Table No. 2).

In table No. 3 status of loss of motion according to Flylnn's criteria is tabulated which shows 58% (n=58) excellent, Good in 27% (n=27), while fair and poor were found in 15% (n=15).

Loss of carrying angle according to Flylnn's criteria is presented in table No. 4, where 63% (n=63) excellent, 26% (n=26) Good and 11% (n=11) were found with fair and poor outcome.

Table 1: Age Distribution (n=100)

Age(in years)	No. of patients	%
1-5	23	23
6-10	42	42
11-14	35	35
Total	**100**	**100**
Mean and S.D.	**8.23±3.67**	

Table 2: Gender Distribution (n=100)

Gender	No. of patients	%
Male	71	71
Female	29	29
Total	**100**	**100**

Table 3: Status of Loss of Motion (n=100)

Flynn's criteria	No. of patients	%
Excellent	58	58
Good	27	27
Fair & Poor	15	15
Total	**100**	**100**

Table 4: Status of Loss of Carrying Angle (n=100)

Flynn's criteria	No. of patients	%
Excellent	63	63
Good	26	26
Fair & Poor	11	11
Total	**100**	**100**

DISCUSSION

Supracondylar humeral fractures account for 70% of the elbow fractures in children and 97% of these fractures are extension type[9]. Many authors consider closed reduction and percutaneous pinning is the treatment of choice[10]. In approximately 25% of the cases, closed reduction fails because of muscle interposition with a varus malposition[11]. Open reduction is indicated if closed reduction fails and in cases with vascular or neurological damage [12]. A lateral, medial, even an anterior approach[13] to the fracture can be used.

In the current study we used posterior approach, which should has several advantages and these findings are in agreement with a study conducted by Theerapal T.

We found it is short, direct, safe, simple and easy to perform as the fracture surface are visualized in this approach and perfect reduction can also be obtained.

The goal of surgery is to achieve functionally and cosmetically satisfactory results and to avoid complications.

In the present study, we found 58% excellent results regarding loss of motion and 63% regarding carrying loss according to Flynn's criteria only at 3 months follow up period.

Our results are found in accordance with the results of a study conducted by Bamrungthin N who found 61.5% excellent results in loss of motion and 65.4% according to Flynn's criteria.

Another study conducted by Gennari JM and workers who conducted the study with the view to consider the surgical treatment of supracondylar fractures in children, and to compare the anterior approach with the posterior approach used in two homogeneous groups of 30 cases each by two experienced surgeons. Control procedures were maintained with the children of both groups when the plaster was removed, during the fourth month after surgery, and throughout the follow-up that continued for more than 1 year. A posterior approach to surgery was simpler than an anterior approach.

The limitation of this study was that we did not include the complications of this procedure in our data analysis but as per record we found it very safe and its complications were also not significant which are also confirmed by the Bamrungthin N and workers.

CONCLUSION

Posterior approach of open reduction and internal fixation in supracondylar type III fracture in children regarding loss of motion and loss of carrying angle is successful treatment option.

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