OUTCOME OF CLOSED REDUCTION AND CASTING IN DISPLACED SUPRACONDYLAR FRACTURE OF HUMERUS IN CHILDREN

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Background: Supracondylar fracture of humerus in children is most common in first decade of life and needs proper management to prevent complications like cubitus varus, elbow stiffness and compartment syndrome. There are various treatment modalities i.e. traction, closed reduction and casting, open reduction and internal fixation and percutaneous pinning. Purpose of the study was to know the outcome of closed reduction and casting in displaced supracondylar fracture of humerus in children while comparing the results with published literature. **Methods:** Study was conducted at the Orthopaedics unit of Lady Reading Hospital Peshawar from January 2002 to December 2002 and 25 patients at random, with age range of 04 – 12 years with displaced supracondylar fracture of humerus were treated with closed reduction and casting. **Results:** Based on assessment through Flynn's criteria, results were excellent in 04 patients (16 %), good in 11 (44 %), fair in 03 (12 %) and poor in 07 patients (28 %). **Conclusion**: Good results can be obtained in displaced supracondylar fracture Gartland type II of humerus in children with closed reduction and casting while the results with Gartland type III fracture were not satisfactory.
Keywords: Supracondylar fractures, humerus, Closed reduction

INTRODUCTION

Supracondylar fractures of humerus in children is the most common fracture in first decade of life[1,2], with peak incidence in 06 – 09 years due to various causes mainly ligament laxity and anatomical structure of humerus tube to flat transformation at lower end of humerus. Its incidence decreases with age[3,4]. Elbow fracture in children remained a great challenge for surgeons since Hippocrates[5]. Proper training is needed to adopt recent advances by young surgeons to deal with these challenges[6]. Supracondylar fractures of humerus in children are usually caused during a fall on elbow in hyperextension, abduction or adduction and dorsiflexed hand with flexed elbow[7]. There are two types of fractures that is extension type and flexion type. They constitute 97 % and 3 %[8] respectively. Gartland[9] has described supracondylar fractures in to three types. There are various treatment modalities for the management of these fractures in the form of close reduction and casting, open reduction and internal fixation (ORIF), and close reduction and percutaneous pinning (PCP).

Close reduction and casting in displaced Supracondylar fractures is treatment modality with good out come if performed by trained orthopedic surgeon with in 24 hours of injury preferably under fluoroscope. Re reduction of fracture can be done within first two weeks of fracture[10].

This study was carried out with an objective to evaluate the out come of close reduction and casting in displaced Supracondylar fractures of humerus in children and its comparison with other studies. This modality is commonly performed in our set up where proper facilities are not available.

MATERIAL AND METHODS

Study was conducted in orthopedic unit Lady Reading Hospital Peshawar from Jan 2002 to Dec 2002. This is a 90 bedded unit receiving patients through emergency and out patient department (OPD). Data was collected in prescribed proforma and statistical analysis was done via SPSS 8.0 version computer software.

Children of both sexes, Age 4 to 12 years, presenting within 24 hours of displaced closed fractures of Gartland type II and III were included, while children with Open fractures, Gartland Type I, with vascular compromise or history of previous manipulations were excluded

Close reduction was done under analgesia and sedation or under general anesthesia in emergency operation theater and elbow was immobilized in back slab while forearm in pronation and supination according to posteromedial or posterolateral displacement of distal segment respectively with elbow in 90 degree flexion to prevent loss of fracture reduction and compartment syndrome[4]. Weekly follow up visits were advised for three to four weeks. X-rays of elbow (AP, LAT) were taken with flexed elbow that is Jones view[11]. Back slab was removed after three weeks in patients of 4-8 years of age[8] while this was removed after 4 weeks in remaining age group.

Patients were strictly followed for 6 months, at each monthly visit their results were assessed through established criteria of Flynn[12] that is used to assess degree of loss of carrying angle and elbow motions. These anatomical and functional parameters were rated as excellent, good, fair and poor depicted in tabulated form.

RESULTS

In this study total 25 patients were included. Among them 20 (80 %) were male and 05 (20 %) were female patients. Number of patients with age range of 04 – 08 years were 14 (56 %) and with 09 – 12 years were 11 (44 %). 02 patients (08 %) were having flexion mode of injury while 23 patients (92 %) were of extension type (Table 02). Gartland type II fractures were 14 (56 %), type III 11 (44 %) (Table 03) while type I was not included in the study. In majority of the patients left elbow was involved, 18 patients (72 %) while right elbow was involved in 07 patients (28 %). Outcome of procedure was excellent in 04 patients (16 %), good in 11 (44 %), fair in 03 (12 %) and poor in 07 patients (28 %) (Table 05). Five patients (20 %) developed cubitus varus, 02 patients (08 %) developed elbow stiffness and only one patient i.e. (04 %) developed anterior bony spur. Remaining 17 patients (68 %) developed no complication (Table 06).

Table-1: Distribution of Subjects in the categories of age

	Frequency	Percent
04 – 08 Years	14	56
09 – 12 Years	11	44
Total	25	100

Table-2: Mode of Fracture

	Frequency	Percent
Flexion type	2	8
Extension type	23	92
Total	25	100

Table -4: Type of Gartland Fracture

	Frequency	Percent
Gartland type II	14	56
Gartland type III	11	44
Total	25	100

Table-5: Outcome of procedure

	Frequency	Percent
Excellent	4	16
Good	11	44

Fair	3	12
Poor	7	28
Total	25	100

Table-6: Complications of surgery

	Frequency	Percent
Cubitus Varus	5	20
Elbow Stiffness	2	8
Ant; Bony Spur	1	4
Nil	17	68
Total	25	100

DISCUSSION

Supracondylar fracture of humerus being the most common fracture in children needs proper treatment to prevent complications like compartment syndrome, neurovascular compromise, elbow stiffness and angulation[13]. Gartland type I supracondylar fracture can be early treated with casting alone but displaced (Gartland type II, III) can be treated with casting, ORIF or percutaneous Pinning (PCP). Close reduction and casting is an old treatment modality that is still practiced in developing countries due to limited fascilities. Close reduction and casting has its own merits and demerits. Its merits are no need of metal insertion[14], least costly, safe, time effective, bearing less morbidity. Demerits are loss of reduction, compartment syndrome and cubitus varus. Early and accurate intervention by trained surgeon can bring good results with close reduction and casting, comparable to ORIF and PCP.

Our study revealed extension type of fracture in 23 patients (92 %) and flexion type in 02 patients (08 %). This observation closely resembles the observation made by Celiker O et al[15], revealing 79.5 % extension and 20.5 % of flexion type. A similar study on 93 patients showed 90 (96.7 %) with extension type and 03 (3.3 %) with flexion type in the work conducted by Ckanauskas et al[16]. Gartland type III were 63 patients (70 %) out of 93 patients and type II were 23 (25.5 %), while 04 patients (4.5 %) were type I fracture. Larger number of Type III fractures in this study as compared to our study was due to the large number of patients included in their study[16]. Sex incidence in another Asian study was 74.02 % males and 28.6 % females, almost the same as that of ours revealing 20 (80 %) male and 05 (20 %) females[15].

We evaluated our results according to Flynn criteria[12] and obtained excellent results in 16 %, good in 44 %, fair in 12 % and poor in 28 %, supporting the work of Diri B et al[17] that also shows 28 % poor results. Elbow stiffness is more common complication in case of ORIF[8], but Korein study[18] reveals no major difference regarding complication of either open or close method.

CONCLUSION

Good results can be obtained in displaced supracondylar fracture Gartland type II fracture of humerus in children with closed reduction and casting. Recommendation for Gartland type III fracture can’t be made because of its poor outcome. These patients can better be managed by other methods like percutaneous pinning and ORIF.

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