

**Original research article****Clinical profile of children with supracondylar fractures of humerus admitted to tertiary care hospital****<sup>1</sup>Dr. Sunil Kumar TR, <sup>2</sup>Dr. Harish YS, <sup>3</sup>Dr. Vivekananda BR, <sup>4</sup>Dr. Srinath Sallur Anand, <sup>5</sup>Dr. Nachiketan K Dore**

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**Abstract**

Although the incidence of these fractures generally has been reported to be higher in boys, more recent reports indicate that the frequencies of supracondylar humeral fractures in girls and boys seem to be equalizing, and some series actually have reported higher rates in girls. As soon as the patient was admitted, a detailed history was taken and a meticulous Examination of the patient was done. The required information was recorded in the proforma prepared. The patients radiograph was taken in antero-posterior and lateral views. The diagnosis was established by clinical and radiological examination. Out of 30 extension type, 15 patients had posteriomedial displacement while 10 patients had posteriolateral displacement. 5 patient were of Type II Gartland classification with posterior displacement. We encountered loss of pulse in one patient which recovered as soon as fracture was reduced. Median and radial Nerve injury in one patient each was encountered out of 30 patients which spontaneously recovered by 4-6 weeks' time.

**Keywords:** Clinical profile, children, supracondylar fractures of humerus

**Introduction**

The elbow joint is made up of three articulations contained within a single capsule. The ulno-humeral joint provides flexion and extension, which is stabilized in all positions by the collateral ligaments whose humeral attachments correspond to the pivot of this hinge motion. The radial head rests against the capitulum and the radial notch of the ulna. The orbicular ligament which holds the upper end of radius in position blends with the external collateral ligament, the capsule and the periosteum enveloping the radial shaft <sup>[1]</sup>.

The anterior capsule of the joint is supported by thin ligament to which the brachialis muscle is closely applied but loosely attached. The tendon of the biceps muscle crosses the joint superficial to the brachialis and at the level of the joint line gives off lacertus fibrosis, which swings medialward to blend with the deep fascia of the forearm and forms an arc under which

passes the brachial artery and vein and the median nerve as they enter the forearm. The radial nerve crosses the joint buried deep in the interval between brachialis and brachio-radialis muscles on the lateral aspect of the extremity [2].

It is the fracture which involves the lower end of the humerus usually involving the thin portion of the humerus through the coronoid and olecranon fossae, or just above the fossae or through the metaphysis of the humerus.

These fractures can be divided into extension type, which is common type occurring in 98%. It is also the type with the most serious complications and highest rate of residual cosmetic deformity. The peak age at which supracondylar fractures occur is between 5 and 6 years. The rate of occurrence increases steadily in the first 5 years of life.<sup>3</sup>

Although the incidence of these fractures generally has been reported to be higher in boys, more recent reports indicate that the frequencies of supracondylar humeral fractures in girls and boys seem to be equalizing, and some series actually have reported higher rates in girls.<sup>4</sup> Combining 64 reports supracondylar fractures treating 8361 displaced fractures of the distal humerus yields a consistent pattern. Boys have outnumbered girls with boys being 59.5 and girls 40.5%. The average age at fracture is 6.7 years. The left or non-dominant side predominates in almost all studies. Two thirds of children hospitalized with elbow injuries have supracondylar fracture. Nerve injury occurs in at least 7%. The radial nerve has been the most frequently involved nerve in older studies: however, the median nerve is much more commonly injured, particularly the anterior interosseous nerve, in more recent studies. The ulnar nerve is most commonly injured iatrogenically during pinning or in a flexion type of supracondylar fracture

Almost all supracondylar fractures are caused by accidental trauma. A fall from a height accounts for 70% of all supracondylar fractures. In children under 3 years of age, the fracture generally results from a fall from monkey bars, swings, or other playground equipment.

The most commonly associated fractures are distal radial fractures, but fractures of the scaphoid and proximal humerus do occur. Pulse is absent at presentation in 10% to 20% of patients, but vascular insufficiency requiring operative intervention is relatively rare (2%-4%). Volkmann ischemic contracture is rare, occurring in about 0.5% of patients.<sup>5,6</sup>

## Methodology

As soon as the patient was admitted, a detailed history was taken and a meticulous Examination of the patient was done. The required information was recorded in the proforma prepared. The patients radiograph was taken in antero-posterior and lateral views. The diagnosis was established by clinical and radiological examination.

In this study, supracondylar fracture of humerus was classified according to Gartland's classification

**Type 1:** Undisplaced Supracondylar fracture of humerus.

**Type 2:** Displaced Supracondylar fracture with intact posterior cortex.

**Type 3:** Displaced Supracondylar fracture with no cortical contact.

a) Postero-medial.

b) Postero-lateral.

Temporary closed reduction was done on admission and above elbow posterior pop slab was applied in 90° of flexion at elbow. The limb was elevated to reduce swelling of the elbow.

All patients were taken for surgery as soon as possible after necessary blood, urine and radiographic pre-operative work-up. Patients' attenders were explained about the nature of injury and its possible complications. Patients' attenders were also explained about the need for the surgery and complications of surgery.

Written and informed consent was obtained from the parents of the children before surgery.

All patients were started on prophylactic antibiotic therapy. Intra-venous cephalosporins were used. It was administered according to body weight of the children, prior to induction of anesthesia and continued at 12 hourly interval post-operatively for 2 days. Only those cases which showed signs of infection, IV antibiotics were continued. Following iv antibiotic, patients Were discharged with oral antibiotic given for next five days. Suture removal was done on the 12<sup>th</sup> Post op day.

### Inclusion criteria

1. Gartland's type 2 and type 3 fracture.
2. Age less than 16 years.
3. Supracondylar fractures with or without neurovascular complication.

### Exclusion criteria

1. Type 1 Gartland's fracture.
2. Fractures more than 2 week old.
3. Patient not fit and willing for surgery.

### Results

Age of the patients in the study group ranged from 2 years to 13 years with 56.7% of Patient ranged from 5 to 10 years of age with mean age of 7.53.

**Table 1:** Age distribution

Age in years	Number of patients	%
1-5	7	23.3
5-10	17	56.7
>10	6	20.0
Total	30	100.0

Mean  $\pm$  SD: 7.53 $\pm$ 3.04

Out of 30 patients, 21 were male and 9 were female.

**Table 2:** Gender Distribution

Gender	Number of patients	%
Female	9	30.0
Male	21	70.0
Total	30	100.0

In this study of 30 patients, 24 patients had left sided humerus fracture. While 6 were right sided.

**Table 3:** Side involved

Side involved	Number of patients	%
Left	24	80.0
Right	6	20.0
Total	30	100.0

Among thirty patients we did not encounter any flexion type of fracture. All 30 were of extension type.

**Table 4:** Type

Type	Number of patients	%
Extension Type	30	100.0
Total	30	100.0

Out of 30 extension type, 15 patients had posteromedial displacement While 10 patients had posteriolateral displacement. 5 patient were of Type II Gartland classification with posterior displacement.

**Table 5:** Displacement

Displacement	Number of patients	%
P	5	16.7
PL	10	33.3
PM	15	50.0
Total	30	100.0

We encountered loss of pulse in one patient which recovered as soon as fracture was reduced. Median and radial Nerve injury in one patient each was encountered out of 30 patients which spontaneously recovered by 4-6 weeks' time.

**Table 6:** Associated injury

Associated Injury	Number of patients (n=30)	%
No	27	90.0
Yes	3	10.0
• LOP	1	3.3
• MNI	1	3.3
• RNI	1	3.3

## Discussion

In the present study, the mean age for supracondylar fracture of humerus was 7.53 years ranging from 2 years to 13 years.

**Table 7:** The average age incidence in other series

Series	Mean age
D. Ambrosia <sup>[7]</sup>	7.0
RAMSEY <i>et al.</i> <sup>[8]</sup>	7.0
Fowles & Kassab <sup>[9]</sup>	7.2
IPPOLITO <i>et al.</i> <sup>[10]</sup>	7.3
Present Study	7.53

Age incidence in this study is comparable with other series.

In the present study, twenty one patients (70%) were male and nine patients (30%) were female. Supracondylar fracture of humerus is more common in boys compared to girls. The male to female ratio in this study was 2.3:1

**Table 8:** The average male and female incidences in other studies

Series	No of male in percentage	No of female in percentage
D. Ambrosia <sup>[7]</sup>	69%	31%
Aronson & Prager <sup>[11]</sup>	75%	25%
Wilkins <i>et al.</i> <sup>[12]</sup>	62.8%	37.2%
Saad <i>et al.</i> <sup>[13]</sup>	68%	32%
Present study	70%	30%

Our study is comparable with previous series.

Left sided supracondylar fracture of humerus has outnumbered right sided fracture in this study. Among thirty patients left humerus was injured in twenty four patients and right humerus was involved in six patients.

Left sided injuries occur more compared to right sided because left upper limb is used more commonly to break the force of the fall.

**Table 9:** Side involvement in other studies

Series	Number of Patients injured with right humerus	Number of Patients injured with left humerus
Aronson & Prager <sup>[11]</sup>	7 (35%)	13 (65%)
Pirone <i>et al.</i> <sup>[14]</sup>	85 (37%)	145 (63%)
Saad <i>et al.</i> <sup>[13]</sup>	21 (42%)	29 (58%)
Present series	6 (20%)	24 (80%)

Among thirty patients in this study, all thirty were of extension type and we did not encounter any flexion type of fracture.

Traditionally, extension type of supracondylar fractures account for 95% to 98% of supracondylar fractures.

**Table 10:** Incidences of extension and flexion type of supracondylar fractures in various series

Series	Extension type in percentage	Flexion type in percentage
Fowles and Kassab <sup>[11]</sup>	90%	10%
Saad <i>et al.</i> <sup>[13]</sup>	100%	-
Present Series	100%	-

Incidence of flexion type and extension type of fracture in our study is comparable with other series.

In our study, fifteen patients had posteromedial displacement, ten patients had posterolateral displacement. Gartland type II fracture with posterior displacement were found in five patients.

## Conclusion

- Supracondylar fractures of humerus are common in children due to anatomical characteristics of distal end of humerus and elbow in this age group.
- Supracondylar fractures of humerus are more common in boys than girls due to more activity in boys.
- The mode of injury for supracondylar fractures of humerus is fall on an outstretched hand, which results in frequent extension type of fractures.

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