

## Epidemiology of Pediatric Supracondylar Fractures In a Tertiary Care Hospital

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### Abstract

**Purpose:** This retrospective study aimed to investigate the epidemiologic parameters of supracondylar humeral fractures in children admitted to a tertiary hospital.

**Methods:** Records of all cases of pediatric supracondylar humeral fractures reporting to this hospital were analysed for various epidemiologic parameters including age, sex, laterality, time of presentation, associated injuries, neurovascular complications and classification over a period of four years.

**Results:** We analysed a total of 600 patients and most of the fractures were seen in 5to9-year age group with a mean of 7.4 years. A total of 390 cases were males and non-dominant extremity was involved in 72% of fractures in our series. Fall on outstretched hand was the predominant cause of injury. In all patients, 5.12% reported to our hospital 3 days afterinjury, 70.92% presented to hospital within 24 h after trauma and the remaining 23.95% presented 24 h to 3 days after trauma. None had a bilateral injury. Gartland type 3 fractures constituted 65.37% of patients, followed by type 2 (20.68%) and type 1 (12.95%).

**Conclusion:** pediatric supracondylar fracture is a common injury caused by fall on an outstretched hand. Gartland type 3 fracture was the most common type and the possibility of neurovascular compromise has always to be remembered.

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### I. Introduction

Supracondylar Fractures of humerus are most common elbow fractures in children.<sup>1,2</sup>They are most common in the age group of 5 to 6 years.<sup>4</sup> The incidence has been reported to be higher in boys than in girls.<sup>3</sup> The left side is more frequently injured than the right side. Early diagnosis and treatment is essential in achieving a good functional outcome.<sup>3</sup> However, in rural areas of developing countries like India, the prevalence of local bonesetter and lack of awareness are responsible for neglect of such injuries and delay in treatment, resulting in an increased incidence of complications like compartment syndrome, Volkmann ischemic contracture, malunion, even gangrene. The Objective of this study was to analyse the various epidemiological parameters like age, gender, mechanism of injury and associated complications.

### II. Materials And Methods

This retrospective study was done in Government Bone and Joint Hospital, which is a tertiary care centre and an associated hospital of GMC Srinagar. Records of children reporting to the hospital with Supracondylar Fractures were collected from the Hospital Records from January 2017 to July 2022. The following epidemiological parameters were analysed: age, sex, injured side, fracture type (flexion/extension), fracture classification (Gartland), presentation (time after injury), nerve injury, vascular injury, open/closed injury, and associated injuries.

The patients who were over 12 years old were excluded from the study. A total of 600 patients with supracondylar fractures were enrolled during the study period.

**Table 1: Epidemiologic parameters of 600 patients with supracondylar fractures**

Parameters	Percentage	
<b>Gender</b>	Male	59.69
	Female	40.31
<b>Laterality</b>	Right	34.99
	Left	65.01
<b>Type</b>	Extension	1.90
	Flexion	98.10
<b>Nerve injury</b>	Radial nerve	38.46
	Median nerve	53.85
	Ulnar nerve	7.69
<b>Open fracture</b>		3.42
<b>Gartland classification</b>	Type I	12.95
	Type II	20.68
	Type III	65.37
<b>Vascular injury</b>		1.1
<b>Presentation</b>	Within 24 hours	70.92
	24 hours- 3 days	23.95
	3 days- 1 week	5.12

### III. Results

All 600 patients were 1 to 12 years old and most of the fractures were seen in age group of 5 to 9 years. The mean age was 7.4 years. A total of 390 (59.70%) cases were males and 210 (40.30%) cases were females. Non-dominant extremity was more commonly involved, constituting 72% of fractures in our series. The demographic parameters are listed in Table 1. Fall on outstretched hand was the predominant mechanism of injury.

31 patients (5.12%) reported fractures 3 days after injury due to lack of awareness among rural population and the prevalent local quacks or bonesetters, including three suffering gangrene of forearm up to elbow caused by tight bandage and requiring Fasciotomy. Totally 420 patients (70.92%) were admitted into hospital within 24 h after trauma and the remaining 23.95% within 24h to 3days after trauma. None in our series had bilateral injury. Gartland type 3 fractures constituted the majority of patients (65.37%), followed by type 2 (20.68%) and type 1 (12.95%).

There were 12 patients with flexion type fracture (2%). Fourty two patients had nerve injury and median nerve was most commonly affected, followed by radial nerve. Vascular injury confirmed by Doppler ultrasound was seen in seven patients. These patients were subjected to immediate exploration and vascular repair by a vascular surgeon.

### IV. Discussion

Supracondylar fracture of humerus is the most common paediatric elbow fracture, constituting about 15% of all paediatric fractures and more than half of paediatric elbow fractures. These fractures have a peak incidence at the age of 5 to 7 years, with boys more affected. However, many new epidemiology series have reported an equal incidence in boys and girls and even a higher incidence in girls.<sup>5,6</sup> The non-dominant extremity was involved 1.5 times more commonly than the dominant.<sup>7,8</sup> The peak incidence in our series was at the age of 5 to 9 years. The incidence in males was 1.5 times higher than that in females and the incidence of non-dominant extremity fracture was 1.8 times higher than that of dominant extremity. The results were consistent with the previous studies. The commonest mechanism of supracondylar fractures is fall on outstretched hand with elbow extended, leading to extension injury, while flexion injury results from fall on flexed elbow.<sup>7,9</sup> Extension type of supracondylar fracture

was the most common type seen in our series accounting for 98% and only five cases of flexion fractures were reported, which was consistent with previous studies (97%e99%).<sup>10</sup>

In our series, 70.92% of patients presented to hospital within 24 h after injury without any contact with local bonesetters and 5.12% of patients reported to our institute 3 days after injury, out of which 74.68% had a contact with a traditional bonesetter and some intervention was already done, and gravest complication was gangrene of forearm and hand. It was apparent that the patients who reported to hospital later than 3 days were more commonly dealt initially by quacks and thence presented with neglected and mismanaged injuries. Open fractures in our series constituted 6.4%, which was comparable to the previous studies reporting an incidence of 1% to 3.4%.<sup>11</sup> Gartland type III was the predominant type in our series (67.37%) and type I was the least common (12.95%), which was comparable to most series. Supracondylar humeral fractures complicated by nerve injury comprised of 3% to 22% in different studies.<sup>12</sup> In our series, the incidence of nerve injuries was 6.94%, median nerve was most commonly injured, accounting for 53.84%, including two patients with associated brachial artery injury requiring repair. There was only one case of ulnar nerve injury associated with flexion fracture. Associated injuries included fractures of ipsilateral forearm, proximal humerus and clavicle, with an

incidence of less than 5% in different studies.<sup>4,11,13</sup> In our study, 39 had associated injuries accounting for 6.5%, including 23 ipsilateral forearm fractures, 3 ipsilateral clavicular fractures, 3 proximal humeral fracture and 10 distal radial physeal injury. Complications such as compartment syndrome, myositis, malunion, Volkmann ischemic contracture and gangrene of limb were seen in patients that were managed initially by traditional bonesetters and admitted to hospital later.

## V. Conclusion

In conclusion, pediatric supracondylar fracture is a common injury caused by fall on an outstretched hand. Gartland type 3 fracture was the most common type and the possibility of neurovascular compromise has always to be remembered.

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