

## ORIGINAL ARTICLE

### Assessment of outcome of fracture supracondylar humerus managed with percutaneous lateral pinning in children

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#### ABSTRACT:

**Background:** Supracondylar fractures of the humerus comprise 17% of all childhood fractures and also are the commonest elbow injuries in children. The present study was conducted to assess outcome of fracture supracondylar humerus managed with percutaneous lateral pinning in children. **Materials & Methods:** 42 cases of displaced fracture supracondylar humerus without vascular compromise in children of both genders underwent adequate reduction percutaneous lateral pinning with k wire (1.5/2mm). Loss of elbow motion and carrying angle was measured using Flynn's criteria. **Results:** Out of 42 patients, males were 23 and females were 19. Gartland type II was seen in 26 and type III in 16, carrying angle (degree) 0-5 was seen in 30, 5-10 in 6, 10-15 in 4 and >15 in 2 patients. Outcome was excellent in 32, good in 8, fair in 2 and poor in 0. The difference was significant ( $P < 0.05$ ). **Conclusion:** In children, close reduction and internal fixation with K-wire fixation in supracondylar fractures of the humerus through percutaneous lateral pinning is a safe procedure that give stable fixation.

**Key words:** humerus, supracondylar fractures, Children

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**This article may be cited as:** Chauhan BS, Verma AK. Assessment of outcome of fracture supracondylar humerus managed with percutaneous lateral pinning in children. *J Adv Med Dent Scie Res* 2017;5(2):210-212.

#### INTRODUCTION

Supracondylar fractures of the humerus comprise 17% of all childhood fractures and also are the commonest elbow injuries in children. These fractures are often complicated by neural and vascular injuries and malunion leading to cubitus varus deformity.<sup>1</sup>

Conservative management with pop casting leads to various complication like loss of reduction, malunion, cubitus varus deformity.<sup>2</sup> ORIF with k wire gives anatomical reduction but it has some disadvantages like more blood loss, chances of infection, elbow stiffness, longer hospital stay.<sup>3</sup> Closed reduction and percutaneous pinning under fluoroscopic guidance is the procedure of choice for the treatment of these fractures whenever possible and the original Swenson technique of cross pinning continues to be used today with excellent results and low morbidity. Delay in surgical intervention may result from delay in the presentation of the patient to the emergency department or delay on the part of health facility in form of unavailability of operation theatre or trained personnel.<sup>4</sup> In the developing world, proportion of delayed presentation is much higher because of poorly developed health delivery system and patients reaching the tertiary care centers from long distance. Fractures which present late are difficult to treat because of excessive swelling and may be associated with complications, such as neurovascular injury,

compartment syndrome.<sup>5</sup> The present study was conducted to assess outcome of fracture supracondylar humerus managed with percutaneous lateral pinning in children.

#### MATERIALS & METHODS

The present study comprised of 42 cases of displaced fracture supracondylar humerus without vascular compromise in children of both genders. All parents gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. After thorough clinical examination, radiological examination was carried out. Under general anaesthesia the patient is placed supine with an arm table. Ensure adequate AP and lateral images can be obtained without the arm being moved. Closed reduction done by traction, medial/lateral correction, reduction of extension reduction is confirmed by image intensifier by taking AP and lateral view. After adequate reduction achieved percutaneous lateral pinning with k wire (1.5/2mm) is performed under image intensifier by keeping the elbow in flexion and forearm in pronation to prevent displacement. Loss of elbow motion and carrying angle was measured using Flynn's criteria.

Data thus obtained were subjected to statistical analysis. P value  $< 0.05$  was considered significant.

**RESULTS**

**Table I Distribution of patients**

Total- 42		
Gender	Males	Females
Number	23	19

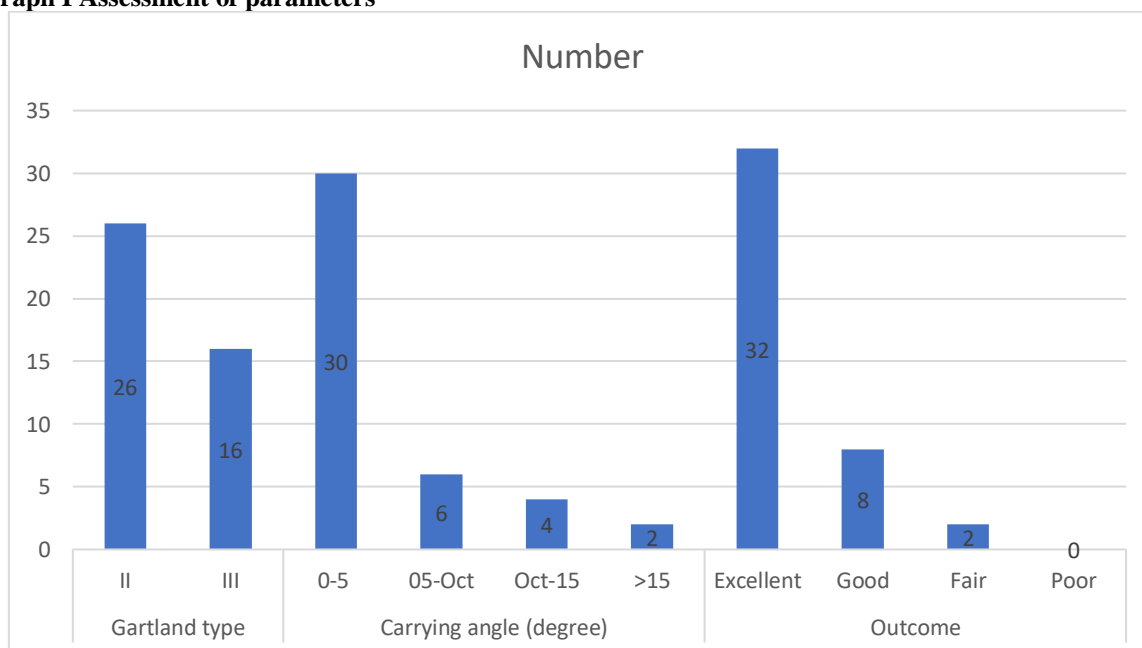
Table I shows that out of 42 patients, males were 23 and females were 19.

**Table II Assessment of parameters**

Parameters	Variables	Number	P value
Gartland type	II	26	0.05
	III	16	
Carrying angle (degree)	0-5	30	0.01
	5-10	6	
	10-15	4	
	>15	2	
Outcome	Excellent	32	0.02
	Good	8	
	Fair	2	
	Poor	0	

Table II, graph I shows that Gartland type II was seen in 26 and type III in 16, carrying angle (degree) 0-5 was seen in 30, 5-10 in 6, 10-15 in 4 and >15 in 2 patients. Outcome was excellent in 32, good in 8, fair in 2 and poor in 0. The difference was significant ( $P < 0.05$ ).

**Graph I Assessment of parameters**



**DISCUSSION**

Supracondylar fractures of the humerus account for 60% of all the fractures around the pediatric elbow.<sup>6</sup> Closed reduction and percutaneous pinning under fluoroscopic guidance is the procedure of choice for the treatment of these fractures whenever possible and the original Swenson technique of cross pinning continues to be used today with excellent results and low morbidity. The management guidelines are not clear for these patients who present late.<sup>7</sup> Several methods have been used for treating such patients including closed reduction and use of splint, traction with or without delayed internal fixation, closed

reduction and percutaneous pinning, open reduction and internal fixation.<sup>8</sup> The present study was conducted to assess outcome of fracture supracondylar humerus managed with percutaneous lateral pinning in children.

We found that out of 42 patients, males were 23 and females were 19. Aman et al<sup>9</sup> evaluated the clinical, radiological and functional outcome following closed reduction and percutaneous pinning of widely displaced supracondylar fractures of the humerus presenting 12 hours or more after injury. They reviewed the functional and radiological results of closed reduction and percutaneous pinning using

crossed K-wires in 40 patients with displaced extension type supracondylar fracture of the humerus (Gartland type III) with a delay of more than 12 hours in presentation. The average age of patients was 4.5 years and the mean delay in presentation was 17.55 hours. Closed reduction and percutaneous pinning was successful in 90% of patients. The mean follow up period was 15 months. The Baumann's angle was restored within 4 degrees of the unaffected side in all patients. Use of a small medial incision in patients with severe swelling helped us avoid ulnar nerve injury. Using Flynn's criteria, 38 patients (95%) had an excellent result. Two patients had mild myositis and both had a poor result. None of the patients developed cubitus varus.

We observed that Gartland type II was seen in 26 and type III in 16, carrying angle (degree) 0-5 was seen in 30, 5-10 in 6, 10-15 in 4 and >15 in 2 patients. Outcome was excellent in 32, good in 8, fair in 2 and poor in 0. Gupta et al<sup>10</sup> reported a 6% rate of open reduction when only Gartland type III fractures were considered with a delay of more than 12 hours. Mehlman et al<sup>11</sup> reported a conversion rate of 3% for delayed treatment group.

Cramer et al<sup>12</sup> in their study 101 supracondylar humerus fractures in children between the ages of 0 and 11 years identified 15 patients with neural lesions. All were associated with displaced fractures, and 10 (66%) required open reduction for definitive fracture management. Six of these lesions were isolated anterior interosseous nerve palsies and four other patients had an anterior interosseous nerve injury in combination with another nerve injury, producing a sensory deficit. Two patients had a complete median nerve palsy. Only three patients had nerve lesions that did not involve the anterior interosseous nerve. Walmsley et al<sup>13</sup> examined whether the timing of surgery affected peri-operative complications, or the need for open reduction. There were 171 children with a closed type-III supracondylar fracture of the humerus and no vascular compromise in our study. They were divided into two groups: those treated less than eight hours from presentation to the Accident and Emergency Department (126 children), and those treated more than eight hours from presentation (45 children). There were no differences in the rate of complications between the groups, but children waiting more than eight hours for reduction were more likely to undergo an open reduction (33.3% vs 11.2%) and there was a weak correlation between delay in surgery and length of operating time. The limitation the study is small sample size.

## CONCLUSION

Authors found that in children, close reduction and internal fixation with K-wire fixation in Supracondylar fractures of the humerus through percutaneous lateral pinning is a safe procedure that give stable fixation.

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