



OUR EXPERIENCE WITH SUPRACONDYLAR HUMERUS FRACTURE IN A TERTIARY CARE TRAUMA CENTER- A CASE SERIES OF 65 PATIENTS!

Orthopaedics

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ABSTRACT

Background: One of the most common childhood injuries include supracondylar humerus fracture (SCH). The aim of this study was to investigate and find out whether the SCH fracture pattern affect the clinical outcome of patients? and does restoration of baumann's angle and anterior humeral line improve clinical outcome in patients of SCH fracture? **Materials And Methods:** We have used Wilkins modified Gartland classification for SCH fracture in this study. 65 patients were included in the study and followed up over a period of 2 years. The clinical outcomes were assessed using Flynn criteria, postoperative position of anterior humeral line and baumann's angle restoration. **Results:** The clinical outcome was favorable in most of the patients at the end of 2 years followup. More than 60 percent patients treated with CRPP showed good to excellent outcomes. Poor outcomes were seen in patients with higher grade Gartland fractures. **Conclusion:** Fracture pattern has linear co-relation with clinical outcome of patients. Restoration of baumann's angle, carrying angle and anterior humeral line improve clinical outcome in patients with supracondylar humerus fracture.

KEYWORDS

supracondylar humerus fractures, Flynn's score, Baumann's angle, carrying angle.

INTRODUCTION

One of the most common childhood injuries include supracondylar humerus fracture (SCH). They occur most commonly due to fall on outstretched hand, with extension type of SCH fracture being the most common variety. In India the existence of local bonesetters and deficiency of awareness are responsible for delay in treatment or neglect of SCH fractures, which lead to increase in complication like compartment syndrome, malunion, cubitus varus or sometimes in extreme cases to gangrene. Cubitus varus deformity is a very well-known complication of SCH fractures. According to general consensus, cubitus varus after SCH fracture occurs due to malunion of fracture and not due to growth disturbances(1).

Aim And Objectives

The aim of this study was to investigate and find out whether the SCH fracture pattern affect the clinical outcome of patients? and does restoration of baumann's angle and anterior humeral line improve clinical outcome in patients of SCH fracture?

MATERIALS AND METHODS

We have used Wilkins modified Gartland classification for SCH fracture in this study. 65 patients were included in the study and followed up over a period of 2 years with Wilkins modified Gartland type 2-4 supracondylar humerus fractures (Fig 1).



Fig: supracondylar Humerus Fracture - Gartland type-2

Written informed consent was obtained from patient's parents. Inclusion criteria were isolated SCH fracture in children less than or equal to 12 years. Exclusion criteria were patients with Gartland type-1 SCH fractures, bilateral SCH fractures, neuro-vascular injury, refusal to participate in study, cases of polytrauma. This study was done in line with the principles of declaration of Helsinki.

Study included 45 males and 20 females with average age of 6 years in males and 4 years in females. Left sided SCH fracture were 48 (75%)

and right sided SCH fractures were 17 (25%). According to Wilkins modified Gartland classification, 22 were Gartland type-2; 38 were Gartland type-3 and 5 were Gartland type-4. Type 2 to 4 SCH fracture were managed with closed reduction with percutaneous pinning (CRPP) (Fig2).



Fig: Lateral divergent pins for fixation of SCH fractures

All patients were operated by senior orthopedic surgeons. The clinical outcomes were assessed using Flynn criteria, postoperative position of anterior humeral line and baumann's angle restoration (Fig 3).



Fig: Showing postoperative restoration of Baumann's angle

RESULTS

The average duration of followup was 2 years. The Flynn's score showed satisfactory outcomes (excellent, good and fair results) for most of our patients. Males were more commonly affected than females. Left sided fractures were more common than right sided, these findings were in coherence with the available literature(2). The

following insights were found on analysing the clinical outcomes and the fracture morphology.

1)The carrying angle and baumann's angle: The carrying angle and baumann's angle showed a reverse correlation in the study, which means as baumann's angle increased, carrying angle decreased.

Gartland Type 2

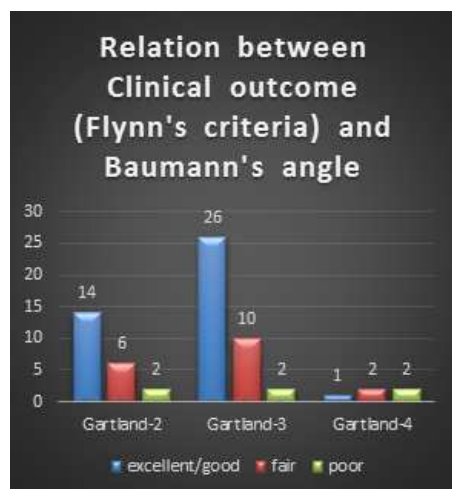
14 patients (63%) attained a good/excellent outcome, while 6 patients (27%) experienced fair outcomes and 2 patients (10%) showed poor results.

Gartland Type 3

26 patients (68%) attained a good/excellent outcome, while 10 patients (26%) experienced fair outcomes and 2 patients (5%) showed poor results.

Gartland Type 4

1 patient (20%) attained a good/excellent outcome, while 2 patients (40%) experienced fair outcomes and 2 patients (40%) showed poor results. In 2 cases, Cubitus varus with negative carrying angles were seen.



2)The elbow range of motion (ROM)

Gartland type 2

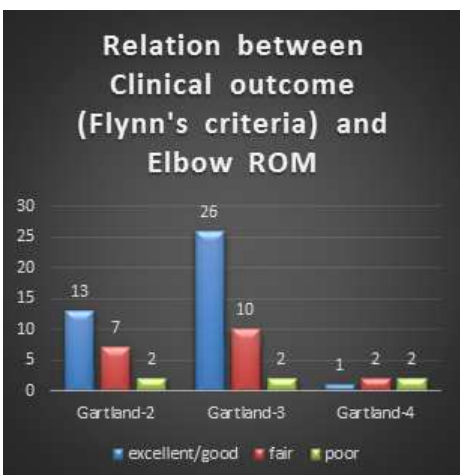
13 patients (59%) attained a good/excellent outcome, while 7 patients (31%) experienced fair outcomes and 2 patients (9%) showed poor results.

Gartland type 3

26 patients (68%) attained a good/excellent outcome, while 10 patients (26%) experienced fair outcomes and 2 patients (5%) showed poor results.

Gartland type 4

1 patient (20%) attained a good/excellent outcome, while 2 patients (40%) experienced fair outcomes and 2 patients (40%) showed poor results.



3)Anterior humeral line was acceptable position for most of patients, but it was missing the capitulum in 2 cases of Gartland type 4 SCH fractures post operatively.

DISCUSSION

In this case series, the clinical outcome was favorable in most of the patients at the end of 2 years followup. Almost more than 60 percent patients treated with CRPP showed good to excellent outcomes (Fig4). Poor outcomes were seen in patients with higher grade Gartland fracture (type 4 - 20%).

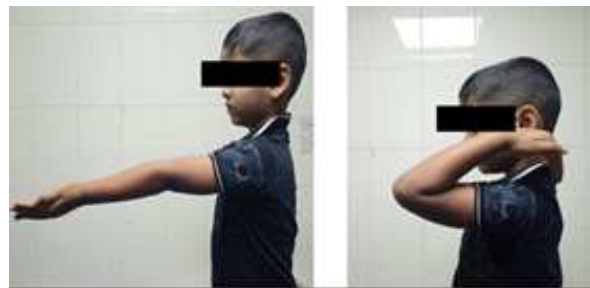


Fig: Showing excellent ROM of elbow Postoperatively at 2 years follow-up.

The reasons of poor outcome in type 4 fractures could be attributed to parameters like highly unstable nature of these fractures, complexity of fracture pattern, challenge of managing the rehabilitation in pediatric patients, as parental influence can significantly impact the behavior and clinical outcome of children. On detailed evaluation of the literature, there is a general consensus regarding the surgical management of Gartland type 3 SCHF(3,4). Percutaneous pinning is considered the standard treatment for displaced SCH fractures due to its reliability and reduced risk of cubitus varus deformity(5).

As far as type 2 Gartland fractures are concerned, a debate exists regarding the optimal management of these fractures. In a study of 69 children, Skaggs et al. demonstrated the effectiveness of stabilizing Gartland type 2 fractures through lateral pinning. Significantly, no iatrogenic ulnar nerve injuries or loss of reduction was observed(6). In another case-control study by Pandey et al similar findings were observed(7). The authors also are in agreement with the idea that surgically managed patients showed superior functional outcomes as well as better preservation of range of movement of elbow.

The limitations of our study were that it has a smaller sample of patients and the absence of long-term follow-up. In the study there were no complications related to the positioning of the K-wires, ulnar nerve injuries or infections.

The authors after analyzing the clinical results are of an opinion that fracture pattern does have an impact on clinical outcome of patient and that better restoration of geometry around the elbow using baumann's angle, carrying angle should be of paramount importance in all patients with supracondylar humerus fractures.

CONCLUSION

Fracture pattern has linear relation clinical outcome of patients, which means more sever the injury, worse is the outcome. Restoration of baumann's angle, carrying angle and anterior humeral line improve clinical outcome in patients with supracondylar humerus fracture.

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