Gartland Type III Supracondylar Fractures of Humerus with Closed Reduction and Percutaneous Fixation with K-Wires Children

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Abstract

Background: Supracondylar fractures are common skeletal injury in pediatric group at it comprises 50 to 70 % of elbow injury and are very potential for neurovascular injury between 5 to 10 years.

Objective: To evaluate the results of Close Reduction with Percutaneous Fixation with k-wires in Gartland type III fractures.

Design: Prospective study

Methods: 50 Patients Gartland type III selected through OPD and emergency department. Results were compared according Flynn criteria.

Results: In our Study 35 Patients were male and 15 were Female Children 48 Patient were of extension type, 3 flexion type left side was involved in 45 Patients 5 in left. General age was 5 to 10 years. Maximum 5 to 8 years as the comparing the Flynn Criteria 40 were found excellent 5 Good, 3 were fair and 2 remain poor. Results in our study were excellent in terms of carrying angle and functional factors with loss motion. 3 were fair because of due to lost of their follow up Patient came late for observation in early days. During their visits in early stage 2 Patients came with elbow stiffness, 5 with pin tract infection 1 Patient was observed Cubitus varus with late presentation due to history of fall on operated limb treated with slab support. None have neuro vascular compromise. Union was achieved without any series complication.

Conclusion: Close reduction and precutaneous fixation with cross K-wire in Gartland III fracture in children is effective way to prevent second procedure. K-wire fixation is preferred method because fracture configuration remains stable.

Introduction

Supracondylar is very common skeletal injury in pediatric group. It consists of 50 to 70% of elbow[1]. Are very potential for neurovascular injury between 5 to 10 years age[2]. These are caused by fall on out stretched hand .For up to 70% non-dominant limb is commonly involved usually these fracture in younger children are caused by playing games are of high energy trauma[3, 4]. Are of two types' flexion and extension.

This located area of distal part of humerus comprises of thin weak bone bounded by Olecranon and Coronoid posterior and anterior fossae respectively. Due to outstretched hand the elbow become in extension, the forces are transmitted through this weak portion of bone leads to fracture. Severity of fracture causes displacement of distal fragment and may cause the proximal segment towards anteriorly[5,6,7]. Fracture line traverse distal humerus towards olecranon fossae. About 96% are extension types remaining are flexion type so Gartland divided these according to degree of displacement of distal humerus. Type I is displaced, type II is on un displaced but posterior cortex is intact, type III completely displaced, no contact between bone fragments[8, 9]. These should be treated properly to prevent complication like restriction elbow movements, valgus, varus deformity, compartment syndrome, and neurovascular compromise and myositis ossificans[10]. Various combination of treatment procedure has been advocated for these type of injury i-e closed reduction slab support, closed reduction and casting, pin traction till reduction of swelling, closed reduction and percutaneous pining under fluoroscopic guidance, Swenson technique of cross pining are being used today with excellent results and less morbidity[11, 12]. In our society delay presentation is much higher because of poverty, ignorance and poor health delivery system and patient reaching to the tertiary care center. Type three supracondylar fractures in children are usually reduced by close reduction

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and percutaneous k-wire fixation though open reduction and internal fixation is performed when closed is not achieved, two wire fixations are inserted through medial and lateral cortex is key to success. Provide best stabilization Close Reduction and percutaneous fixation as compared to ORIF has less chances of displacement though it needs open surgery but patient is cured safely. In our study Flynn criteria for reduction assessment was used[13, 14].

Table 1:

Results	Cosmetic factor- loss of carrying angle (degree)	Functional factor– loss of motion (degree)
Excellent	0 – 5	0 – 5
Good	6 – 10	6 – 10
Fair	11 – 15	11 – 15
Poor	>15	> 15

Material and Methods

This prospective descriptive study conducted during 2010-2011. 50 patients were included admitted through OPD and emergency department. Gartland type III supracondylar fractures were included and open fracture, infected wound; associated with neurovascular injury and previous elbow fracture were excluded.

After comprehensive detailed history and clinical examination (Age, Gender, injury side early or late presentation) was performed investigated properly, Pre operative radio graph Anterio Posterio, lateral view were taken after counseling, consent, under general anesthesia, scrubbing under C Arm control fracture reduced confirmed with AP and lateral view both pillars identified k. wire introduced reduction stabilized. Slab support applied limb kept in neutral position. Children were discharged from hospital after second postoperative day. Regular follow up weekly for one months and after 03 weeks follow up was made at every 03 months radiographs taken. Clinical examination included according to Flynn criteria radiology examination was made by assessing the Baumanns angle in 1st and final X-rays. Displacement was declared greater than 12^0as major 06 to 12^0 as mild and less than 6^0 as no displacement taken.

Results

In our Study 35 Patients were male and 15 were Female Children 47 Patient were of extension type, 3 flexion type left side was involved in 45 Patients 5 in left. Age was 5 to 10 years. Maximum 5 to 8 years as the comparing the Flynn Criteria 40 were found excellent 5 Good, 3 were fair and 2 remain poor. Results in our study were excellent in terms of carrying angle and functional factors with loss motion. 3 were fair because of due to lost of their follow up Patient came late for observation in early days. During their visits in early stage 2 Patients came with elbow stiffness, 5 with pin tract infection 1 Patient was observed Cubitus varus with late presentation due to history of fall on operated limb treated with slab support. None have neurovascular compromise. Union was achieved without any series complication.

Discussion

Success of treatment of displaced supracondylar in children depends on achieving and maintaining good acceptable reduction until and unless fracture are united clinically and radio logically with no compromise of other complications .Our study focus on the type III fracture which are more instable displacement and rotation may cause cubitus varus. In our study extension type fracture were 47 is no dominant limb are similar to study conducted by Cekanuska[15]. Percutaneous pining (PCP) has been used for these fracture in type III either parallel or separate near and far cortex. But separate pining is better choice of stabilization though parallel pins do not allow full extension at elbow during follow up assessment carrying angle[13]. There was no any loss of reduction during follow up both clinical and research data as shown that these separate pins provide the strong stability to prevent the displacement with open reduction. There is great risk of nerve injury in close reduction complication rate ranges from 0 to 5 % incidence of iatrogenic ulnar nerve injury cause by medial pin from 1.4% to 15.6% in our case was reported. In our study there is no any nerve injury, which is quite excellent to other studies[16, 17, 18]. Ring D et all found two patient with compartment syndrome with closed reduction and cast immobilization[19]. Similarly Williamson DM et al manage the supracondylar fracture by traction, manipulation, reduction and PCP[20]. Harrington P et al observed 83% good to or excellent results[21]. Deep pin infections and osteomyelitis rate are very low but in our study 5 patients observed superficial Pin tract infection[22, 23, 24]. Comparing the national and international data our results of fruitful we achieve the excellent objectives with internal Close Reduction and percutaneous fixation with less

availability of modern techniques where image and fluoroscopy are not available and people are reluctant about their children treatment. The duration of this study was small period because our society cannot tolerate the expenses for longer period and other complication tack time to develop as observed in other studies.

Conclusion

Supracondylar fractures are of high-energy trauma associate with high rate of neurovascular injury. Close reduction and percutaneous fixation with cross K-wire in Gartland III fracture in children effective way to prevent second procedure. K-wire fixation is preferred method because fracture configuration remains stable but new option with the development of modern theater percutaneous pining (PCP) under fluoroscope guidance is the best option of treatment minimizes the preoperative complication, hospitalization decrease the financial and Psychological burden.

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