Original Article

The clinical and radiological outcome of Percutaneous Pinning in displaced Supracondylar Fracture of the humerus of children

Subhendu Das[1], Sabyasachi Santra[2], Mahboobur Rahman[3], Rajesh Kar[3]

Supracondylar humerus fracture is the most common fracture in the paediatric age group of 4-8 years. It has been treated successfully with closed reduction and internal fixation with K-Wire. These fractures are classified acroding to Gartland classification. Type III and IV fractures were selected for this study. In type III fracture, there is displacement with a posterior hinge, and in type IV fracture, there is a complete loss of anterior and posterior cortical contact. All patients were treated within five days of the injury. The patients were treated by closed reduction and pining with 2 (two) pins laterally or 3 (three) pins laterally or crossed medial and lateral pins randomly. There was no significant difference in fracture stability with three different configurations. Pins were removed after 3 to 4 weeks after surgery following radiological assessment of union. All patients having a full range of movement with any significant deformity of the elbow after six months of follow up. Only two patients were having pin tract infection and three patients having elbow stiffness and one patient developed medial nerve injury. Closed reduction and pining in type III and IV supracondylar fracture is recommended in a paediatric age group to prevent deformity and to restore normal movement of the elbow.

[*J Indian Med Assoc* 2019; **117(10):** 36-7]

Key words **: Supracondylar fracture, Percutaneous Pinning.**

Supracondylar fracture is typically seen in the paediatric age group, of which 90 % of patients are less than nine years[1]. Most commonly boys are affected[2]. This fracture is 3% of all paedriatic fracture[3]. In type IV fracture, there is a complete loss of anterior and posterior cortical contact of fracture fragment, and it occurs due to high-velocity Trauma. Extension type of fracture is the most common variety. Gartland classified the supracondylar fractures in four types. Type I and Type II are usually treated conservatively. Type III and type IV fractures are inherently unstable variety. These are treated usually with closed reduction and pinning.

Most common displacement of supracondylar fracture that leads to cubitus varus deformity is medial tilt and medial rotation of fracture fragment. So, during closed reduction, these two plane deformity should be corrected and then only pinning can be done.

[1]MS(Ortho), Senior Resident, Department of Orthopaedics, ICARE Institute of Medical Science & BC Roy Medical College & Hospital, Haldia 721645

[2]MS(Ortho), Associate Professor, Department of Orthopaedics, College of Medicine and Sagore Dutta Hospital, Kolkata 700058 and Corrosponding Author

[3]MBBS, Junior Resident, NRS Medical College & Hospital, Kolkata 700014

Materials and Method

The study was carried at NRS Medical College & Hospital between December 2017 to June 2018. It was a prospective randomized study, where 50 patients with Gartland type III and IV supracondylar fracture were included in this group. All the patients were treated within five days of injury[4]. Patients with head injury or ipsilateral distal radius fracture or any other fracture in the same upper limb were excluded from the study. Patients were assessed at emergency for any vascular or neurological injury of that limb. Patients with the vascular or neurological injury of the fractured limb also excluded from the study. Most of the patients were operated in emergency operation theater.

After anaesthesia, patients were kept in supine position and reduction was done with special emphasis on correcting medial tilt and medial rotation of the fragment. Reduction was checked by C- ARM image intensifier in AP and lateral position. We never rotate the elbow to check the correction after manipulation but always rotate the C-Arm for AP and lateral view.

After correction of displaced fracture fragment, K-wire pinning was done in one of the three configurations randomly. This configuration was two lateral pins, three lateral pins and crossed lateral and medial pin. The arm was immobilized with the posterior POP cast and elbow

fixed at 90°. Posterior cast immobilization of elbow was done for 3-4 weeks. K-wires were removed after 3-4 weeks following radiological evaluation. Elbow movement started just after removal of K-wire. Active elbow movement was encouraged. After 6-8 weeks, patients usually have a full range of movement of the elbow. The patient was then followed up at one monthly interval up to six months clinically, and X-ray was done at three months, four-months and six-months interval.

Fig 1 — Type IV Supracondylar Fracture

Fig 2 — Type III Supracondylar Fracture

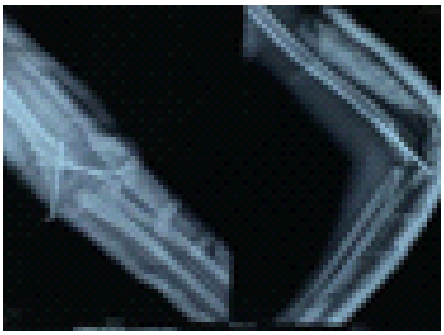

Fig. 3 — Crossed Pin Configuration

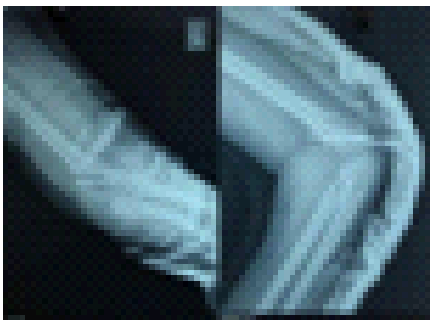

Fig 4 — Lateral two pin configaration

Analysis and Result

Total fifty patients were included, of which 32 were boys and 18 were girls between 4-8 years age group. All patients were treated with K-wire fixation after closed reduction. Forty-six patients were treated at emergency. Patients were treated within five days of the injury. Mean day of interventions from the day of injury was 1.6 days. Twenty-eight patients were treated with two lateral pin configuration, fourteen patients with crossed lateral and medial pin and eight patients with three lateral pins. Thirty-nine patients immobilized for three weeks, nine patients were for four weeks, and two patients were for five weeks. Two patients developed pin tract infection which healed after removal of the pin. One patient was developed median nerve palsy with loss of sensation over the volar aspect of the index finger, and it recovers spontaneously after three months. Elbow stiffness with the range of movement of 10 to 110 degree was seen in three patients and patient did not turn up after six months of follow up (Figs 1-4).

Discussions

Type III and type IV supracondylar fracture should be treated early as our mean day of operative intervention from the day of injury is 1.6 days for a good outcome. The reduction of fracture fragment, especially medial tilt and medial rotation to be corrected accurately to prevent elbow deformity. During reduction, C-arm image intensifier should be rotated, not the limb of the patient. Because, after reduction of fracture fragment if the limb is rotated, at the end of the shoulder rotation fracture fragment will be rotated. This will lead to the displacement of the fragment. To prevent the displacement, C- arm should be rotated to check the reduction. Cubitus varus deformity can be avoided by correcting the medial tilt and medial rotation. Though ideal pin placement is controversial but crossed medial and lateral pin configuration is more stable than the other two configurations.

Conclusion

Supracondylar fracture is more common in boys and is best treated with early reduction and pining in type III and type IV Gratland classification. Most of the fractures had a radiological sign of union within 3-4 weeks of injury. The accurate reduction is the key to prevent the deformity of elbow. Early active movement of the elbow should be encouraged to regain normal elbow movement. So, type III and type IV fractures should be best treated with accurate closed reduction and pinning in paediatric age group patients.

References

1 Benson M, Fixsen J, MacNicol M — Children's orthopaedics and Fractures. Springer Verlag. (2010)ISBM: 1848826109.
2 Fajiah P — Surgical Radiology: Clinical Cases. PasTest Ltd 2007; ISBN: 1905635214.
3 Frederick M Azar, James H Beaty, S Terry Canale — Campbell's Operative Orthopaedics, Thirteenth Edition.
4 Abbott MD, Buchler L, Loder RT, Caltoum CB — Gartland type III supracondylar humerus fractures: outcome and complications as related to operative timing and pin configuration. *J Child Orthop* 2014; **8:** 473.