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OUTCOME OF GARTLAND TYPE – II SUPRACONDYLAR FRACTURES OF HUMERUS TREATED BY CONSERVATIVE METHOD

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ABSTRACT: BACKGROUND: The current literatures recommend operative method (closed reduction and pinning) for type II supracondylar fractures of humerus. But some surgeons still prefer conservative method for type II supracondylar fractures of humerus. We present results of 14 cases of type II supracondylar fractures treated with CR and AE POP immobilization. The purpose of this study is to evaluate the outcome of conservative treatment in management of type II supracondylar fracture of humerus. **MATERIALS AND METHODS:** Fourteen children treated by conservative methods (CR & AE POP) between January 2013 and December 2014 is included in this study. The mean age group is 6.8 years (3 years-11years). The patient follow up is done for a minimum of 10-12 weeks. Treatment outcome is based on final clinical and radiological assessments and grading of results was done using Flynn's criteria. **RESULTS:** Gartland type II fracture gives 82% excellent results and 28 % good results as per Flynn's criteria. Of the 14 patients only two cases required re manipulation. Surgical intervention was not needed for any of the patients. No patients in this study developed compartment syndrome / cubitus varus deformity. **CONCLUSION:** Satisfactory results can be obtained with conservative treatment (closed reduction and above elbow POP) if proper selection of the patient and careful clinical and radiological follow up is done.

KEYWORDS: conservative treatment, Flynn's criteria, Type II supracondylar fractures.

INTRODUCTION: Supracondylar fractures are the most common elbow fractures seen in children.^(1,2) The current recommendation for type II supracondylar fracture is closed reduction and percutaneous pinning.^(1,3,4)

Previously type II supracondylar fractures were used to be treated conservatively. Some orthopaedic surgeons still prefer conservative treatment. According to recent literatures closed reduction and above elbow POP (AE POP) immobilization is associated with vascular compromise and / compartment syndrome and loss of reduction leading to cubitus varus deformity.^(3,5) In the present study we were evaluating the results of conservative treatment of type II supracondylar fractures with closed reduction and above elbow POP immobilization.

MATERIALS AND METHODS: During the period between January 2013 and December 2014, fourteen children who were treated conservatively with closed reduction and AE POP slab at Mount Zion Medical College Adoor, Kerala, India for type II supracondylar fracture humerus were included in this study. Inclusion criteria included Gartland type II supracondylar fractures hinged posteriorly and anterior humeral line (AHL) anterior to capitellum on the true lateral view. Exclusion criteria included associated open fractures, associated elbow fractures/ dislocation,

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fractures with medial comminution and fractures with malrotation on radiographs. There was no case of distal neurovascular deficit in type II supracondylar fractures in our study. Out of 14 cases 9 were boys and 5 were girls. The age group ranges from 3 to 11 years.

In all cases closed reduction and above elbow POP slab application was done under GA within 12 hours following the injury.

Traction is applied with elbow in 30° flexion and supination. Anterior force is applied to olecranon along with gradual flexion of elbow to push the distal fragment into place. Final position was checked under image intensifier. Radial pulse and capillary filling was assessed after reduction. Above elbow POP slab with elbow in 100°-120° flexion and pronation was applied. The patients were admitted and observed overnight for neurological and vascular involvement / compartment syndrome.

Routine follow up AP and lateral x-rays were taken in the next day and after 7-10 days. In the AP view measurement of Baumann's angle was done. In the true lateral view AHL crossing the capitulum was noted

Cast completion also was done at the follow up (7-10 days). Immobilization was continued for 3-4 weeks. The patient follow up was done for a minimum of 10-12 weeks for clinical and radiological evaluation after removal of the plaster.

Flynn's criteria⁽⁶⁾ was used for grading the outcome of supracondylar fractures at 10-12 weeks. The loss of elbow motion and change in carrying angle was compared to opposite elbow.

Rating	Function loss of motion	Loss of carrying angle
Excellent*	0-5	0-5
Good*	5-10	5-10
Fair**	10-15	10-15
Poor**	> 15	>15

Table 1

*- Satisfactory outcome **- Unsatisfactory outcome

RESULTS: The patients were analysed at 10-12 weeks follow up as per Flynn's criteria. According to the present study out of 14 patients only 3 patients (21.4%) had loss of elbow motions (terminal flexion of 6-10°). One patient (7%) had loss of carrying angle of 6° compared to opposite side. But it was not noted by the patient / parents. No patient in this study developed cubitus varus deformity. Two patients in this study showed significant posterior tilt (AHL not crossing the capitulum in the follow up x-ray (7-10 days). These two patients were treated with remanipulation and fresh above-elbow cast was given. Follow-up x-ray taken one week after remanipulation showed no redisplacement in these two cases. Mild displacement in the follow up x-ray (7-10 days) with anterior humeral line touching the capitulum was left alone.

Two patients in this study had minimal hyperextension of 5°-10° compared to opposite side. None of the patient in this study developed compartment syndrome, myositis ossificans or distal neurovascular deficit.

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DISCUSSION: Closed reduction and above elbow POP immobilization is the common conservative method for treatment of Gartland type II supracondylar fractures of humerus.⁽⁷⁾ In this study closed reduction and above elbow posterior slab was given with elbow in 100°-120° flexion and pronation. Cast completion was done after 7-10 days. The position of increased flexion and pronation gives stability to the fracture.^(8,9) But it leads to decreased flow in brachial artery.⁽¹⁰⁾ Type II supracondylar fractures usually do not have neurovascular complications or severe swelling and can be managed in flexion. But careful monitoring of radial pulse after fracture reduction and observing the patient overnight for compartment syndrome is needed.

In type II supracondylar fractures the current recommended treatment is closed reduction and fixation with two lateral pins.^(11,12) The main advantage of pinning is elbow can be extended and supinated and less incidence of redisplacement of fracture after pinning. Redisplacement of fracture can occur with two lateral pins, but it is mainly due to faulty technique.⁽¹³⁾ Pin track infection can also occur.

X-rays were also evaluated for medial comminution T-condylar fractures associated elbow fractures and dislocation and fractures with malrotation on x-rays. These cases were also excluded from this study. One patient with associated Torus fracture was included in this study.

According to our study conservative treatment with closed reduction and above elbow POP gives satisfactory results for Gartland Type II supracondylar fractures of humerus as per Flynn's criteria. Proper selection of the patient and careful clinical and radiological follow up is needed to achieve satisfactory results. The limitation of this study includes small sample of study and no comparative study was done with surgical treatment.

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