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A STUDY OF SUPRACONDYLAR FRACTURES OF HUMERUS IN CHILDREN BY OPEN REDUCTION AND INTERNAL FIXATION WITH KIRSCHNER WIRES WITHOUT C –ARM MACHINE.

Orthopedics

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ABSTRACT

Background: Supracondylar fractures of humerus is the commonest injury, constitutes about 65.4% of all fractures about the elbow in children. Displaced supracondylar fracture of humerus requires accurate anatomical reduction and internal fixation to prevent complications. In our country many government setup doesn't have c arm machines So, in this study, we reported the results of open reduction and internal fixation with K-wires in the displaced (Gartland's type III) supracondylar fracture humerus in children.

Material and Methods: Thirty cases of displaced (Gartland's type III) supracondylar fractures treated by open reduction and internal fixation with K-wires were studied between September 2016 to August 2018 at our institution and followed for an average of 12 months.

Conclusions: Open reduction and internal fixation with K-wires is the most commonly accepted treatment of displaced supracondylar fracture humerus in children when done at appropriate time. It gives more stable fixation, better anatomical reduction with negligible complication.

KEYWORDS

Supracondylar fracture humerus, K-wire, internal fixation, Gartland's

INTRODUCTION

Supracondylar fracture of humerus is the commonest injury around elbow in children.various modalities of treatment have been proposed for the treatment of displaced supracondylar fractures of the humerus in children, such as closed reduction and plaster of paris slab application, skin traction, overhead skeletal traction, closed reduction and percutaneous pin fixation and open reduction with internal fixation.4 Because there is no c arm machines at our many health centers Thus, we have advanced from the conservative approach to open reduction and internal fixation in fractures as an acceptable mode of treatment.6 Our objectives were to study age, sex and side incidence of supracondylar fracture of humerus and average time duration for union of these fractures after surgical treatment of supracondylar fracture of humerus by open reduction and internal fixation with K-wires along with any complications they may arise.

MATERIAL AND METHODS

Thirty closed extension type of supracondylar fractures (Gartland's type III) of the humerus were treated by open reduction and internal fixation with K-wires between September 2014 to August 2016.

Inclusion Criteria

- Age <15 years.
- Irreducible fracture by closed reduction.
- Closed supracondylar fractures with vascular compromise.
- Open fractures.

Exclusion Criteria

- Age >15 years.
- Patients medically unfit for surgery.

The ethical clearance for this study was taken from the institution. X-rays were taken in two planes. A trial closed reduction was done in 27 patients and three patients who had gross swelling, were taken for elective surgery at the earliest without closed reduction. All fractures were classified according to Gartland's classification.

Operative Technique

Under general anesthesia, patients were put in lateral position with fractured elbow facing the surgeon. The standard lateral approach was used in all patients expose fractured site. Hematoma was evacuated and saline wash was given to clearly visualize fractured site2. Fracture was reduced by leaving the distal end of proximal fragment posteriorly. Reduction was assessed and fixed with 2 lateral k wires.and the elbow extended and carrying angle was measured and compared to that on the nonaffected side. The pins were bent and cut-off outside the skin to allow removal in the outpatient clinics without anesthesia. Wound was closed in layers and sterile dressing was applied. Tourniquet was released.

Postoperatively, the extremity was placed in well-padded posterior splint with elbow flexed to 90° and patient was shifted to the ward after recovery from anesthesia. Patients were called for follow-up after 3 weeks and the POP slab was removed. Active range of motion exercises were encouraged and a special mention and warning was given after the removal of splint about avoiding massage and passive stretching of elbow joint. The K-wires were removed after 4-6 weeks with further follow ups done at 12 weeks and 24 weeks. The patients were examined clinically and radiologically, assessed for range of motion and carrying angle. The final results obtained were evaluated by Flynn's criteria.

The results were graded as excellent, good, fair and poor according to loss of range of motion and loss of carrying angle.

RESULTS

Observation and analysis of results were done in 30 patients who were operated in our hospital in relationship to age, sex, type of injury, laterality of fracture, fracture pattern, associated injuries, time of surgery, duration of hospital stay, complications of treatment and functional outcome.

In our series, majority of patients, 18 (60%) were found to be between age group of 4-6 years. The least number of cases are found in the age group between 13-15 years. The average age of the patient was 7 years. Majority of the patients were males i.e., 18 (60%) and 12 (40%) patients were females.

The most commonest cause of injury was fall while playing 15 patients, followed by fall from bicycle in12 patients and in three patients it was due to fall from tree.

There was a left-sided predominance (23 patients, 76.6%) compared to the right side (7 patients, 23.4%).

In our clinical study, we had 20 patients with posteromedial displacement and 10 patients with posterolateral displacements.

Majority of the patient underwent surgery on second day of hospitalization out of which 19 patients were discharged on the second postoperative day. Postoperative complications ranging from traumatic median nerve palsy, superficial pin tract infection, iatrogenic ulnar nerve palsy, migration of K-wires and malunion were encountered . Twenty-one patients had loss of range of motion between 0-5°, one patient had >15° loss of range of motion. Eighteen patients had carrying angle loss of 0-5°, two had >15° and remaining patients 6-15° carrying angle loss. Functional results based on Flynn's grading system showed that we had 93% (28 patients) satisfactory results and two patients with unsatisfactory results.

Functional Results based on Flynn's Grading

results	rating	No.of patients	%
satisfactory	excellent	18	60

	good	7	23.3
	fair	3	10
unsatisfactory	poor	2	6.7

DISCUSSION

In Edward et al5 Fransworth et al,6in her series 70% of cases sustained fracture due to fall series in our study 50 % due to fall.

In our study of 30 patients 20 (66.7%) had posteromedial displacement, 10 (33.3%) had posterolateral displacement which was consistent with other studies. In our study two patients had fractures of distal end of radius on same side. In Mazda et al7 series of 116 patients seven patients had ipsilateral forearm bone fracture. Millis,8 et al noted 8.33% of associated fractures. Ninteen (63.4%) patients were operated on second day of hospitalization in our study. In Ramsey, et al9 study of 15 cases all cases were operated within 24 hours of injury.

In our series of 30 patients, about 80% of the patients were discharged within 2-3 days of operation and five patients discharged at 5 days due to presence of swelling. So, these patients were kept for observation in our study. Regarding complications,

We had three iatrogenic ulnar nerve palsies. thought it may be due to over stretching of nerve during operation especially may be also due to compression of nerve by the K-wire postoperatively, but all patients recovered in a matter of 3-6 months. In Kumar et al,10 series of 44 patients five patients had postoperative temporary nerve palsy and they recovered full function.

In a Weiland et al1 series of 52 cases he came across five preoperative neurological deficits. We had four cases of superficial pin tract infection. Three out of 4 subsided with antibiotics in 10 days, but in one patient infection disappeared after removal of the K-wire, but there was no deep or bone infection. In Srivastava11 study group of 42 patients about 14% had superficial pin tract infection. In Ramsey et al9 study of 15 cases, one patient had pin tract infection that had healed after 2 weeks of treatment.

In our study, we had four cases of cubitus varus deformity, one case of proximal migration of K-wire, this may be due to failure to pierce in the opposite cortex during insertion. Later the K-wire was removed under general anesthesia

Loss of Range of Motion

In our study of 30 patients, 21 patients (70%) had loss of range of motion of 0-5°, six had 6-10°, two had 11-15° and only one patient had >15° loss of range of motion. In Weiland et al1 series of 52 patients, five patients suffered a moderate loss in range of motion. One patient had extension loss of <10° and three had flexion loss of <10° and last patient had flexion and extension loss of >10°.

Loss of Carrying Angle

In the present study at final follow-up 0-5° of carrying angle loss were seen in 18 patients (60%), two (6.7%) patient had >15° loss of carrying angle.

In Ramsey, et al9 series of 15 patients, 12 were considered essentially normal with carrying angle loss of <3-4°, but three patient had 5-15° of varus deformity without significant motion at elbow. In Weiland et al,1 study of 52 patients, five patients had varus angulation of <10°, six had 10-20° and two had varus deformity of >20°.

The results of our study showed favorably excellent results when compared together studies of open reduction and internal fixation with 93% satisfactory results according to Flynn's criteria of treatment of type III supracondylar fracture of humerus in children.

To conclude, open reduction and internal fixation with K-wires gives more stable fixation, better anatomical reduction with negligible complication. So, open reduction and internal fixation with K-wires is the most commonly accepted treatment of displaced supracondylar fracture humerus in children when done at appropriate time

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