SUPRACONDYLAR HUMERUS FRACTURES- EXPERIENCE AT A FORWARD TREATMENT CENTRE IN KASHMIR

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ABSTRACT

Objective: To assess the results of open reduction and internal fixation with K-wires for displaced Supracondylar humerus fractures in children in an isolated forward treatment centre (FTC) in Neelum valley.

Study Design: Cross-sectional descriptive series.

Place and Duration of Study: This study was carried out at a FTC which is located in Tehsil Headquarters Hospital Kel valley from Dec 2013 to Feb 2015.

Material and Methods: It was a cross sectional descriptive study. Data was collected form 24 patients who came to FTC Kel with displaced supracondylar fracture from Dec 2013 to Feb 2015. They were assessed for age, sex, etiology, time of surgery, pattern of fracture, hospital stay, infection and range of motion.

Results: In our study majority of patients were found to be between 5-6 years of age (66%). The majority of the patients were males (83%). The commonest cause was fall from mountain tracks (62%). In our study we had twenty (83%) patients who had grade III displaced fracture. Ninety one percent underwent operation on the same day as the occurrence of injury (91%) patients were discharged on 3rd post op day. Twelve percent Patients had pin track infection and (4%) patients had iatrogenic nerve palsy which recovered spontaneously. Four percent patients developed superficial wound infection. There was loss of range of motion in six patients ranging from 0-5 degrees. Functional results based upon Flynn's grading system showed that we had 75% satisfactory result.

Conclusion: We concluded that open reduction and internal fixation with k-wires at a remote station without the facility of image intensifier was safe and effective provided that the surgeon is confident in this procedure.

Keywords: Gartland, Internal fixation, K-wires, Supracondylar fracture.

INTRODUCTION

Supracondylar fracture of the humerus is one of the most common fractures of childhood[1]. This fracture is associated with marked swelling which is a formidable challenge for reduction and immobilization[2]. It is known as the most "Misunderstood fracture" in medical history[3]. It constitute about 65% of all the fractures around the elbow in children[4]. This fracture can result in Volkmann's ischemic contracture[5]. The majority of these fractures occur between 5-7 years of age[6]. The supracondylar fracture of humerus can result in multiple complications such as neurovascular complications and malunion[7]. Traditionally this fracture is treated by various methods such as POP applications, skin traction, overhead skeletal traction, closed reduction and percutaneous pin fixation and open reduction with internal fixation[8]. Closed reduction and POP splint has traditionaly been recommended for such fractures but this often results in malunion and life long disability[9]. Reluctant in internal fixation has reduced due to better understaning of orthopedic trauma[10]. Radical deveolpments in understanding of asepsis and recent advances in implants have also resulted in the tilt towards open reduction and internal fixation[11]. Our objectives was to study the results of open reduction and internal fixation in an isolated FTC without the facility of image intensifier.

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MATERIAL AND METHODS

It was a cross sectional descriptive series. The study was conducted at Forward treatment center KEL.

Inclusion Criteria

- Age <15 years.
- Gartland type-III.
- Gartland type-II (Irreducible by closed reduction).
- Cases of supracondylar fractures of not more than 4 days duration.

Exclusion Criteria

- Age >15 years.
- Patients medically unfit for surgery at the time of presentation.
- Bilateral fracture.
- Compartment syndrome or skin blisters.
- Late cases of more than 5 days duration.
- Open fractures.
- Grade 1 and grade 2 fractures which can be managed by close reduction.
- Multiple injuries.

Twenty four displaced supracondylar fractures of the humerus were treated by open reduction and internal fixation with K-wires between Dec 2013 to Feb 2015.

All the data collected in the study was analyzed using SPSS version 10.0. Relevant descriptive statistics like frequency percentage and gender were analyzed. Non probability convenience sampling technique was used.

Patients were examined according to our protocol and for associated Injuries. X-rays were taken in two Planes. A trial of closed reduction was done in all patients and four patients who had gross swelling were taken for surgery at the earliest without a trial of closed reduction. All fractures were classified according to:

Garland's Classification

- Type-I, Non displaced.
- Type-III, Displaced (with intact posterior cortex).
- Type-III, Displaced (no cortical contact).
- Posteromedial.
- Posterolateral.

Operative Technique

Under general anesthesia patients were placed in a lateral position with fractured elbow facing the surgeon. The standard posterior approach was used in all the patients because the operator was confident and trained in this approach. Ulnar nerve was slinged. The fracture was secured with both medial and lateral K-wires. The pins were bent outside the skin.Wound was closed in layers.

Tourniquet was released postoperatively. Post op check X-rays were taken. Patients were called up for follow-up after one week for removal of stitches and for check X-rays. Patients were again called at 4 weeks for removal of pins and a light POP back slab was provided. Patients were warned about avoiding massage and passive stretching. Flynn's criteria was used to grade. The results were graded as excellent, good, fair and poor.

RESULTS

Observation and analysis of the results were done with relation to age, sex, cause of injury, time of surgery, pattern, duration of hospital stay, seasonal variation and post-operative complications. In our series majority of the patients were found to be between 5-6 year of age (66%) (table-I). The majority of the patients were males (83%) and (16%) were females (table-II). The commonest cause was fall from mountain tracks 15 (62%) and six (25%) patients had fall from trees while cutting wood and picking walnuts and (12%) patients had fall from mountain jeeps. In our study, we had 20 (83%) patients with posteriomedial displacement and 4 (16%) patients with posterolateral displacement. Twenty two (91%) patients were discharged on 3rd post Op day. Three (12%) patients developed pin track infection and one (4%) patient developed iatrogenic nerve palsy which recovered spontaneously. One (4%) patient developed superficial wound infection functional results based upon Flynn's grading system showed that we had 75% satisfactory

result and one patient with unsatisfactory result (table-III). In our study majority of fractures (83%) occurred during summers. In our study of twenty four patients, six patients (25%) had loss of range of motion of 0-5, six had 6-10, two had 11-15 loss of range of motion.

DISCUSSION

KEL is situated in upper Neelum valley in Azad Kahmir. It is situated at a distance of 140 km from Muzaffarbad. This FTC is the only medical setup which is providing specialize medical care ranging from surgery to gynecological procedures to local population. There are around 150000 people of Kel valley. Road conditions are very tough and most of the time the roads are closed making it impossible to evacuate the patients to orthopedic or gynecological Units at Muzaffarabad. People make their livelihood by goat keeping and wood cutting and in these two pursuits there are many incidences of falling from heights. It may be noted that there are no civilian specialists in the whole Neelum valley which is about 200 km long and all surgeries are being performed by army surgeons and anesthetists.

Supracondylar fracture of humerus is very difficult to accuratelly reduce without internal fixation[2]. The diagnosis of supracondylar fracture (Gartland Type-I) is made on the basis of the history and local tenderness. Type-I fractures often require no more than simple immobilization for comfort and further protection. After three weeks it is possible to start active movements. Gartland Type-II fractures requires closed reduction which is satisfactory in most of the cases. Gartland Type-III fractures is a totally displaced type with no contact between the ends[11].

Displaced fractures reduction is difficult because of interposition of soft tissues between the fracture ends[12]. Extension-type supracondylar humerus fractures are more common than flexion type of fractures (98% vs. 2%)[13].

In our series of twenty four patients, 66% of the patients were between 5-6 years age. Majority of our patients (62%) sustained fractures due to accidents from mountain tracks. In Edward et al series of 78 patients with supracondylar fractures 69 patients sustained injury due to fall while playing[14]. Fransworth et al in her series 70% of cases sustained fracture due to falls[15].

In our study three patients had fractures of distal end of radius on same side and one patient had fracture of tibia. In Mazda et al series of 116 patient's seven patients had ipsilateral forearm bone fracture[16]. Pirone et al in their series of 230 patients had twenty patients with injuries of the ipsilateral forearm[17]. Millis et al noted 8.33% patients had associated fractures[18].

Table-I: Age distribution.

Age	Number of patients	Percentage (%)
5-6	16	66
7-11	5	20
12-15	3	12

Table-II: Sex distribution.

Sex	Number of patients	Percentage (%)
Male	20	83
Female	4	17

Table-III: Postoperative Complications in the Patients.

Complications	Number of patients	Percentage (%)
Pin track infection	3	12.5
Ulnar nerve palsy	1	4
Wound infection	1	4

Twenty two (91%) patients were operated on the day of hospitalization in our study. In Ramsey et al study of 15 cases all cases were operated with in 24 hours[19]. Skaggs et al in their study of 204 patients found that average interval between time of injury and operation was 1.4 days[20]. In Weiland et al study of 58 cases 51 patients underwent surgery within 24 hours[21].

In our series about 91% of the patients were discharged on third post op day.We had one iatrogenic ulnar nerve palsy. The patient recovered in a matter of 4-5 weeks. In Kumaret et al series of 44 patients five patients had postoperative temporary nerve palsy and they recovered full function[22].

In our study there was no preoperative nerve injury. In Fox et al series of 52 cases they came across five preoperative neurological deficits[23]. In Srivatsava study group 5% of the patient had median nerve injury[24].

We had four cases of superficial pin tract infection. One patient infection disappeared only after removal of K-wire. There was no deep or bone infection. In Srivastava study group about 14% had superficial pin tract infection[24]. In Ramsey et al study of 15 cases, one patient had pin tract infection that healed after 2 weeks of treatment[19].

Loss of Range of Motion

In our study of 24 patients, 6 patients (25%) had loss of range of motion of 0-5°, six had 6-10°, two had 11-15° which was quiet satisfactory. In Weiland, et al series of 52 patients, five patients suffered a moderate loss in range of motion that is one patient had loss of <10° four patients had flexion and extension loss of >10°[21].

RECOMMENDATION

Keeping in view our experiences in managing quiet a number of cases of displaced supracondylar fractures in an isolated setup such as FTC Kel it is recommended that all General Surgeon should be trained and encouraged to manage emergencies at their setups instead of following the ever increasing tendency to refer the cases to specialize centers which at times is not possible due to weather or operational reasons.

CONCLUSION

Open reduction and internal fixation with K-wires in the management of displaced supracondylar humerus fractures in children is safe and effective provided it is carried out by surgeons who are trained in this procedure. This treatment is relatively economical regarding hospitalization and in places like far off Kel valley it should be the treatment of choice.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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