

Case Series

Supracondylar humerus fracture in children: K wire pinning with minimal sterile technique

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ABSTRACT

A minimal sterile technique to assess the outcome of K wire pinning of Supracondylar fracture of humerus in children. A prospective case series between 2018 to 2020 was conducted on 10 supracondylar fracture of humerus operated at a tertiary care centre. Gartland type 2 and 3 were included and all the patients were treated with minimal sterile K-wire pinning technique. After 18 weeks follow up with mean age of 7.3 years, all patients were found to have excellent results. In our study no patients received antibiotic except in one patient where 5 days of oral antibiotic cefixime was given. Less complications, reduced time of surgery of average 24.3 minutes, reduction in cost factor and patient compliance was better. Supracondylar fracture of humerus can be fixed by K-wire fixation with minimal sterile technique either by cross pinning or lateral pinning which has same outcome as sterile technique and minimal sterile technique is cost effective and time sparing.

Keywords: Supracondylar humerus fracture, K-wire pinning, Minimal sterile technique, Outcomes

INTRODUCTION

Supracondylar fracture of humerus is around 60 to 70 per 100,000 children with 54% of them occurring in children 4 to 6 years of age. 98% are fall on outstretched hand injuries. Appropriate neuro-vascular examinations should be carried out in all patients and should be recorded promptly. classified according to modified Gartland classification Type I is undisplaced fracture with fat pad present acutely, Type II is hinged posteriorly with anterior humerus line anterior to capitellum Type III is displaced with no meaningful cortical continuity. Closed reduction and crossed or lateral K- wire pinning is most accepted fixation for these fractures.² Both pinning fixation methods has risks and complications such as pin track infections, vascular injury, iatrogenic nerve injury, cubitus malunion. Pin tract infection is the most common complication and is associated with percutaneous pinning of fractures in children which ranges from 1 to 21 %. The other infection

such as septic arthritis and osteomyelitis are rare to occur. The purpose of this study is to find out whether there is any higher infection rates and reduced socio-economic burden to the patient and reduced time of surgery by using minimal sterile technique using minimal resources to treat supracondylar humerus fracture in children.

CASE SERIES

We have conducted a prospective study of 10 patients who had K-wire pinning of supracondylar fracture of humerus with minimal sterile technique at Saphthagiri institute of medical sciences and research centre, Bangalore. Minimal draping (Figure 2) with minimal sterile technique used.

The following patients were included 3 to 12 years in age. Closed Gartland type 2 and 3 supracondylar fracture of humerus. Duration of injury- Less than 5 days. Intact neurological and vascular status of affected limb.

The following patients were excluded type 1 undisplaced fracture. Open fractures. Associated ipsilateral limb fracture. Previous ipsilateral elbow injury.



Figure 1: Preoperative and post-operative radiographs.



Figure 2: Materials used.

Patient after arriving at causality were assessed for age, sex, type of injury and mechanism of injury, time of injury and side of injury with neuro vascular status of limb. Patients were taken to minor OT where closed reduction was performed under fluoroscopic guidance. Sterile drape

was placed around the patients affected extremity. We used 1 pair of sterile gloves, 1 sterile towel and performed a Betadine preparation of the elbow in the marked area of pin placement. The pins are placed percutaneously using fluoroscopic guidance with automatic hand drill. Post pinning fracture reduction and alignment were reviewed in fluoroscopy. Pins were bent to 90 degrees and cut short at the surface of skin. Sterile dressing applied and padding was given with plaster splint as part of standard immobilisation protocol. Patient was discharged after 8 hours of post-operative observation.

Regular follow-up of cases was done at 2 weeks, 4 weeks, 6 weeks and at 3 months interval. percutaneous pins were removed at 6 weeks follow-up after radiographic assessment (Figure 1 and 2). Elbow range of movements were started at 6 weeks.

DISCUSSION

The mean age of cases included is 7.3 out of which males were 6 and female were 4 with most of the population sustained self-fall. Sports and RTA related injuries accounts for about 20% of each.

In our series Gartland type 2 and 3 were present in a ratio of 8:2 with 8 cases managed by lateral pinning and 2 cases by cross pinning technique. The results are summarised in Table 2.

Supracondylar humerus fractures in children are very common injuries encountered in causality. The management depends upon degree of displacement of fracture fragments, open or closed injuries, type of fracture and other associated injuries and conditions. A study by Kasser et al showed that Type 2 and 3 injuries commonly encountered which needs prompt treatment.⁴ Our study also revealed that Type 2 and 3 are most commonly seen.

Table 1: Patient details.

Pt No.	Age /Sex	Mechanism of injury	Fracture type (Gartland)	Type of fixation	Time of surgery (minutes)	Follow up (weeks)	Clinical symptoms of infection	Lab evaluation (ESR/CRP/ WBC count)	Radiologic findings
1	5/M	Self fall	II	Lateral pinning	20	2,4,6	Absent	Not done	United
2	6/M	Self fall	II	Lateral pinning	28	2,4,6	Absent	Not done	United
3	9/F	RTA	II	Lateral pinning	32	2,4,6	Absent	Not done	United
4	4/M	Self fall	II	Lateral pinning	22	2,4,6	Absent	Not done	United
5	9/F	Sports	III	Cross pinning	25	2,4,6	Absent	Not done	United
6	12/M	Sports	II	Lateral pinning	16	2,4,6	Present	Within normal limits	United

Continued.

Pt No.	Age /Sex	Mechanism of injury	Fracture type (Gartland)	Type of fixation	Time of surgery (minutes)	Follow up (weeks)	Clinical symptoms of infection	Lab evaluation (ESR/CRP/WBC count)	Radiological findings
7	10/F	Self fall	II	Lateral pinning	24	2,4,6	Absent	Not done	United
8	7/M	RTA	III	Cross pinning	26	2,4,6	Present	↑WBC count, ↑ESR	United
9	6/M	Self fall	II	Lateral pinning	28	2,4,6	Absent	Not done	United
10	5/F	Self fall	II	Lateral pinning	22	2,4,6	Absent	Not done	United

These injuries need timely reduction and pinning to avoid neurovascular compromise. Hence minimal sterile technique may suffice to reduce the complications, time of surgery, cost factor and patient compliance. One of the possible complications of supracondylar fracture treated by percutaneous pinning is infection. Previously reported studies inferred that superficial pin tract infection from 0% to 7%.⁵⁻⁷

In our study no patients received pre-operative, intra-operative or post-operative antibiotic except in one patient where 5 days of oral antibiotic cefixime was given after appropriate laboratory investigation (increased WBC count, increased ESR) due to infection. This shows that antibiotic usage can be avoided unless and until required. Post-surgical monitoring to discharge time has not been clearly defined. We have discharged the patients 8 hours after surgery with no reported complications. Various studies revealed that average time for discharge ranges from less than 24 hours to 2.9 days following surgery.⁸⁻¹⁰ We examined the patients post operatively to assess complication in terms of compartment syndrome, neurovascular injuries. The results were not significant since none of the patient suffered from above complications. Regular long-term follow-up also concluded that there was no development of Volkmann's ischaemic contracture. Radiographs at 6 weeks interval shown good signs of union. All the fractures were united which was confirmed by X-Rays taken at end of 3 months post-surgery.

CONCLUSION

We have found that the supracondylar fracture of humerus in paediatric population could be managed effectively by percutaneous pinning without the risk of post-operative infection, limited usage of materials, labour, economic burden by minimal sterile technique although the usage of antibiotics, patient discharge depends upon individual method of handling and convenience.

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