

Is Follow-up Essential For Pediatric Clavicular Fractures?

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Abstract : **[Purpose]** To assess whether simple management options like cuff and collar sling are effective in paediatric clavicle fractures and to determine whether regular follow up is required.

[Methods] A study of 54 consecutive fractures of the clavicle in children less than 10 years of age was conducted at Institute of Medical Sciences(IMS), Banaras Hindu University(BHU), Varanasi and All India Institute of Medical Sciences(AIIMS), New Delhi, India between December 2005 and June 2008.

[Results] There was male predominance with injury to the right side being more common. A 100% union rate was achieved with conservative treatment with no significant complications. However a visible deformity persisted in up to 80% of the children. The compliance with treatment protocol was lesser in the younger age group and better with older children.

[Conclusion] Simple methods like cuff & collar sling is sufficient for the management of clavicle fractures in children. Immobilization for more than 2 weeks is not necessary and regular follow up is not essential.

Introduction

Pediatric injuries are always a challenge and unique because of the growing musculoskeletal system³⁾. Also these injuries cause much mental agony to the parents. The clinical examination of these injuries is difficult due to the apprehension of the child and the poor tolerance level to pain by children. Although pediatric shoulder trauma is uncommon, the clavicle is the most commonly fractured bone in the pediatric age group¹⁾. Most

of these fractures occur in the middle third and are mostly as a result of low velocity injuries. Contrary to earlier beliefs, all pediatric clavicle fractures including those of the lateral third can be managed conservatively and surgical option should be explored only if the child is more than 10 years old.

We have tried to analyze the requirement of surgical management and the importance of follow up on the outcomes with respect to fracture union and functional outcome of the

Key words : pediatric fractures, clavicle fracture, cuff and collar sling immobilization

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children. Also the modes of injury were analyzed and the compliance to treatment was taken into consideration.

Materials & Methods

Between December 2005 and June, 2008, 86 children of age less than 10 years with an acute fracture of the clavicle were managed in Department of Orthopaedics at IMS, BHU, Varanasi and All India Institute of Medical Sciences, New Delhi, India.

The indication for inclusion in the study was isolated clavicular fractures in children with an age less than or equal to 10 years. 86 children met this criterion and were evaluated and managed according to the protocols laid down. Of the 86 children who met the criteria, thirty-two were not evaluated because of inadequate follow-up. Thus, 54 patients were available for assessment. 37 of the patients were male and 17 were female. The mean age was 2.8 years (range, new born to 10 years). All fractures were classified according to the Allman's classification system. 49 children had fracture of middle third of clavicle, 3 children had fracture of lateral third and 2 children had medial third fracture of the clavicle.

The mechanism of injury was mostly household injuries in children aged less than 4 years with fall from bed being most common in children aged less than 2 years. In older children of more than 4 years the predominant mechanism of injury was recreational injuries. These were low velocity injuries in most cases (53 children) and had no associated injuries.

A standard anteroposterior radiograph of the clavicle and shoulder was made for all patients and the fractures were grouped according to the radiographic classification of Allman. No other additional radiographic views or computed to-

mography scans were done in any patient.

The protocol followed for the treatment was as follows :

- i. In children <4 years with undisplaced fractures—Cuff and collar sling
- ii. In children <4 years with displaced fractures—Strapping with cuff and collar sling
- iii. In children >4 years—Figure of 8 bandage

All patients underwent a standard radiograph of clavicle and physical examination at one, three, six, and twelve weeks. The final follow-up evaluation consisted of determination of the radiological union and clinical union as well as a physical examination that included shoulder movements. In addition, the parents completed a subjective questionnaire to rate the outcome as excellent, good, moderate, or poor. A radiological assessment was also done at the final follow-up visit to assess the union and any residual deformity.

The average duration of follow-up was six months (range, one to ten months).

Results

The union rate achieved was 100% with an average time for clinical union of 2.5 weeks.

There was male predominance with 68% of children being males. The age distribution showed an increased incidence in children aged less than 4 years with the distribution being 15, 19, 11 and 9 in age groups of 0-2 years, 2-4 years, 4-7 years and 7-10 years respectively.

Most fractures i.e. 92% occurred at middle third with the incidence of fractures of lateral and medial third being 5% and 3% respectively.

The time for clinical union ranged from 1 week in children aged less than 1 year to 3 weeks in children aged 10 years with an average of 2.5 weeks. The radiological union was seen about 1 to

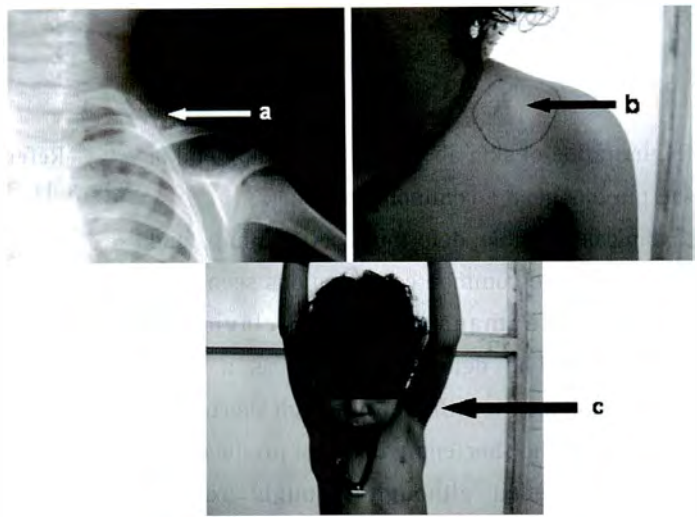


Fig. 1.

- a : Malunion of fracture clavicle middle third
- b : Clinically visible deformity
- c : Full functional range of movements

2 weeks later with an average time for radiological union of 3.7 weeks.

The average duration of immobilization was 2 weeks with a range of 5 days to 3 weeks. There was an unexpectedly high rate of self-discontinuation of treatment with more than 50% of children aged less than 3 years discontinuing treatment without the physician's consent.

Although the union rate achieved was 100%, there was a clinically visible deformity in up to 40% of the children with about 15% of them having shortening of up to 2 centimeters. However this was not correlative to the functional status with all the patients having full and painless range of shoulder motion (Fig. 1).

Discussion

The clavicle is the commonest bone to be fractured in children and accounts for 5-15% of all fractures. Complications arising from simple, isolated clavicle fractures in children are rare and operative intervention is seldom indicated.

The predominant mechanism of injury was household injuries in younger children and recreational injuries in older children. Unlike the study by Taitz et al, there was no incidence of child abuse in our study¹⁰⁾. But it is necessary to have a detailed and proper history and examina-

tion to rule out child abuse, as abuse cannot usually be determined by fracture type alone¹⁰⁾. Road traffic injuries or high velocity injuries usually lead to polytrauma and compound fractures.

Most of the fractures (92%) occurred in the middle third of the clavicle, which correlates with other studies¹⁾³⁾⁸⁾.

Few authors have recorded that there is risk of callus formation in the absence of surgical reduction of the lateral third and they also insist on the value of investigation by CT scan¹⁾. But in our series, there has been no such associated risk and so we do not recommend routine CT scans for lateral third clavicle fractures.

The powerful re-modelling characteristics of fractures in children means that even those fractures that are displaced or involve the lateral end of the clavicle appear to unite without complication⁷⁾.

Kubiak R & Slongo T recommended that surgery is usually necessary only in children above 10 years of age⁶⁾. Our study also shows that children under 10 years do not require surgical intervention. In children treated operatively for clavicular fractures, and fixed with K wires, although there is an additional benefit that no further immobilization is required after fixation,

the irritation of skin above the protruding end of the pin has been a common problem⁵⁾.

Clinically visible deformity, as a hump, and shortening are common complications seen with conservative management of clavicular fractures¹¹⁾. The deformity visible as a lump usually disappears with time although shortening may occur. The shortening does not produce any functional deficit although it might remain permanent⁹⁾.

The follow up visits of the child along with parents can be minimized or almost stopped as it is seen that clinical union occurs is as less as 1-3 weeks, depending on the age of the child. Radiographic evaluation at periodic intervals afforded no benefit and could be wisely discontinued. Our findings that follow up of paediatric clavicular fractures are not essential and other authors have documented that the risk of complications is exceptionally rare as well²⁾.

WHAT THIS STUDY ADDS

1. Immobilization for more than 2 weeks is not necessary
2. Simple methods like cuff & collar sling is sufficient
3. Follow up is not essential
4. Advanced investigations such as Computed Topography (CT) is not required
5. Surgical intervention is not required even for fractures of lateral third of clavicle
6. Shortening is not associated with loss of movements

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