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Fractures in the Medial Epicondyle in Children : A Plea for Conservatism

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Abstract : Introduction : Controversy still exists over conservative or surgical treatment for a displaced medial epicondyle fracture. This study retrospectively reviews the prognoses after conservative treatment using a cast immobilization, and the prognoses after surgery, according to the degree of the fracture displacement in children.

Methods : 112 consecutive cases of a medial humeral epicondyle fracture in children were studied. The Patients were divided into three groups. Group 1 consisted of 84 patients with an isolated medial epicondyle injury treated with cast immobilization. Group 2 consisted of 16 patients with medial epicondyle fragments that were displaced more than 5 mm and treated with open reduction and internal fixation. Group 3 consisted of 12 patients who had associated injuries such as elbow dislocation and radial neck fracture. Cases were followed for a minimum of 9 months. At final review, each patient underwent a clinical evaluation.

Results : The 84 patients in Group 1 were subdivided into Group 1 A and Group 1B. In Group 1 A, there were 63 patients with less than 5 mm displacement ; 60 of them had good results and 3 had fair results. In Group 1B ; there were 21 patients with 5 mm or more displacement ; 17 of them had good results while the remaincler had fair or poor results. In Group 2, 13 of the 16 patients had good results, and the others had fair or poor results. In Group 3, 7 of the 12 had good results, and the others had fair and poor results.

Conclusion : There was no statistical difference in the outcomes of isolated medial epicondyle fractures which had more than 5 mm displacement whether it was treated surgically or conservatively. Fractures that were associated with an elbow dislocation or other fracture tended to have a poorer outcome. To achieve optimum clinical outcome, efforts should be focused on the restoration of terminal elbow extension.

Introduction

Medial humeral epicondyle injury is much less common than a supracondylar fracture or lateral condyle fracture in the distal humerus. They account for about 11% of all elbow injuries in children. The medial epicondyle can be avulsed directly from a valgus force to the elbow, or it can be avulsed or fractured in an elbow dislocation. A direct blow to the posteromedial aspect of the elbow can also result in a fracture in the medial epicondyle.

The surgical management for a medial epicondyle fracture is only absolutely indicated in two clinical situations ; —the first is for an incarcerated medial epicondyle fragment following an elbow dislocation, and the second is a complete lesion in the ulnar nerve[2]. Relative indications for surgical reduction and fixation include a dislocation in the apophysis (greater than 4 mm) in

Group	Subgroup	GOOD	FAIR/POOR	Total
1	A	60(95.2%)	3(4.8%)	63(100%)
*1	B	17(81.0%)	4(19.0%)	21(100%)
*2	—	13(81.3%)	3(18.7%)	16(100%)
3	—	7(58.3%)	5(41.7%)	12(100%)
TOTAL		97(86.6%)	15(13.4%)	112(100%)

Table 1.
When Group 1B was compared with Group 2 a chi-squared test, the p value was greater than 0.05, demonstrating no significant difference between the groups.

children older than 5 years of age, with the need for intervention increasing as the degree of dislocation, age, and athletic activity increase[2].

The following are myths with regard to non-operative treatment ; growth deformity, painful non-union, weakened forearm flexors, and late ulnar nerve symptoms. In the literature there are studies that support both operative[3)5)] as well as non-operative[4)] methods for a simple fracture in the medial epicondyle.

The purpose of this study was to assess the treatment outcomes for both conservative and operative treatments, as well as to review the concept that the degree of displacement is a principal factor in the management decision.

Method

We have retrospectively reviewed all pediatric patients who sustained a medial epicondyle fracture between January 1998 and December 2002. They were managed at either KK Women's and Children's Hospital or the National University Hospital in Singapore. For analysis, they were divided into 3 groups. Patients that were managed conservatively were assigned to Group 1 ; within this group, Group 1 A consisted of patients in whom the displacement of the apophysis was less than 5 mm and Group 1B consisted of those with a displacement of 5 mm or more. Group 2 consisted of those patients with a displacement of 5 mm or more who were treated operatively, and Group 3 consisted of those patients that had a medial epicondyle fracture associated with other injury.

In this study, 'conservative treatment' refers to cast immobilization for two to three weeks. All patients who had 'operative treatment' underwent reduction in the medial epicondyle fragment and fixation with either K-wires or a single cannulated screw.

At follow up, patient demographics, gender, and the affected side were recorded. The outcome was measured using the criteria described by Farsetti[1]. The duration of follow up was also recorded.

Results

A total of 120 patients were treated for a fracture in the medial epicondyle in this period. Six were lost from follow up, and two patients were excluded because of late presentation (more than one month after injury). Consequently, a total of 112 patients were included in this analysis.

The patients ranged from 3 to 16 years old (mean of 10.7). 74 (66%) were male. The right and left arms were equally affected. The duration of follow up was 9-60 months (mean : 34.5).

The distribution of patients according to the Groups 1, 2 and 3 was as follows.

The clinical outcome according to Farsetti's criteria are summarized in Table 1.

Discussion

Our findings showed that there was some consistency in the management for an isolated medial humeral epicondyle fracture in those that were displaced less than 5 mm. In the group where displacement was greater than 5 mm, those who were conservatively managed formed

a slightly larger group than those who were managed operatively. In the review of patient records, there was no obvious reason why some were treated conservatively and others operatively : the surgeon's own preference based on personal experience was the most likely factor. In Singapore, many parents are still reluctant for their child to undergo surgery unless they are advised it was absolutely necessary, preferring rather to explore non-operative options. With the recent surge in enthusiasm in competitive sports, the number of boys and girls aspiring to be professional sportsmen and sportswomen is on the rise, but this number is still quite small today. In this series, we did not have a large group of patients who were active sportspersons for whom a more aggressive approach was taken. The subjects who sustained associated injury formed the smallest group, and the commonest associated injuries were an elbow dislocation and radial neck fracture.

On analysis of the results in Table 2, the percentage of subjects with a good outcome declines steadily from Group 1 to Group 3. From a different perspective, the percentage of subjects who had a fair or poor outcome rose from 4.8% in Group 1 A (displacement <5 mm), to about 20% in Groups 1B and 2 (displacement ≥ 5 mm). In cases with an associated injury such as an elbow dislocation or a radial neck fracture, the injury is always of a higher energy level ; indeed more than 40% of patients in Group 3 did not have a good outcome. It thus follows that the energy level (and hence severity) of the injury had a direct bearing on clinical outcome. The more severe the injury, then the greater the probability of a poor outcome. The poor outcome in most cases was limitation in terminal elbow extension.

An interesting comparison can be made between Group 1B and Group 2. In both these groups, there was an isolated medial epicondyle fracture that was displaced more than 5 mm. Our results showed that there was no significant difference between the groups. The case to treat a significantly displaced (≥ 5 mm) medial epicondyle fracture should therefore be reconsidered. The clinical outcome seemed to be more related to injury than to management. We feel that this fracture is firstly an avulsion injury in apophysis similar to that in the anterior superior or inferior iliac spine, and secondly, that it is extra-articular and therefore does not require anatomical fixation. Radiological changes following a medial epicondyle fracture also did not show any correlation to clinical outcome[4].

We acknowledge that this study had several limitations. Plain radiographs from which measurements were made can be notoriously difficult to obtain reliably in a fretful child with a painful, swollen elbow. We cannot be entirely certain that true antero-posterior X-rays had been taken in each case. Measurements were performed by a single reader from each participating hospital. Intra-observer and inter-observer reliability were not measured. Finally, because the number of subjects in Group 3 was small, this group was not subdivided into those treated conservatively and those treated operatively.

Conclusion

In a medial humeral epicondyle fracture, the severity of the injury has a direct bearing on the clinical outcome : the higher the energy involved, then the poorer the outcome.

In patients with a fracture involving a displacement of 5 mm or more, this study found that there was no significant difference in the outcome between the group that was treated conserva-

tively and the group that was treated operatively.

The management for a significantly displaced medial humeral epicondyle fracture has always been controversial. We wish to plead conservatism here on the basis of our results.

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