Closed Manipulation of Supracondylar Fracture Humerus

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ABSTRACT: One hundred supracondylar fractures of humerus were treated in Dr. Soetomo Hospital; 18 cases grade I, 42 cases grade II, and 40 cases grade III. The problems were found mainly in grade III, where the failure of closed manipulation depended on the time of delay and grading of tissue swelling.

Supracondylar fracture of the humerus is the most common elbow fracture in children, comprising nearly 60 per cent of the elbow fractures;[1] and it is also one of the difficult fracture to treat.[2]

Two types of supracondylar fractures are designated according to the position of the forearm in relation to the arm at the time of the injury and the displacement of the distal fragment; the extension where the distal fragment is posteriorly displaced, comprising 95 per cent and flexion type, the distal fragment is anteriorly displaced,[3] comprising 5 per cent. Three conditions must exist to secure a good result; an exact reduction, a safe fixation, careful and adequate follow up.[4]

No general agreement on the treatment of supracondylar fracture of the humerus is evident; but various forms of conservative treatment are recommended by some authors, while surgical treatment is recommended by others.[5]

In this paper we report the result of the closed manipulation of the supracondylar fracture of the humerus under general anaesthesia. We noted the factors which influenced the state of reduction.

MATERIALS AND METHODS

One hundred supracondylar fractures of the humerus were treated at the Dr. Soetomo Hospital, Department of Orthopaedic Surgery of the Airlangga University, between January 1986 to August 1986. There were 86 male and 14 female patients. The ages ranged from 2 and a half year to 15 years, almost 50 per cent of the cases were between 6-10 years. (Table 1) Left elbow was effected in 67 cases (67%) and the right one was found in 33 cases (33%).

TABLE 1
Age distribution.

Age in year	Cases	Per cent
< 1 – 5	35	35
6 – 10	47	47
11 – 15	18	18
Total	100	100

TABLE 2
Type of severity.

Grade	Cases	Per cent
Grade I	18	18
Grade II	42	42
Grade III	40	40
Total	100	100

Eighteen cases were grade I (non displaced) fractures, were treated only by collar and cuff. Forty two cases were in grade II (moderately displaced) and forty cases were in grade III (severe displaced). (Table 2) All fractures were treated with closed reduction under general anaesthesia and immobilized with collar and cuff.

All closed manipulations were done by the authors and the result of reduction were recorded.

RESULT OF REDUCTION

It was found that the result of reduction of Grade II supracondylar fractures was quite satisfactory. All fractures were reduced into perfect alignment. Twenty nine patients in grade III fracture were found to have acceptable alignment following the reduction where as 11 cases in this category was fail to reach an acceptable alignment. (Table 3) We found that there was good correlation between the result of treatment and the time in the delay of reduction. Acceptable alignment was obtained in

TABLE 3
Result of reduction

Grade II	Acceptable	42 cases	100 %
Grade III	Acceptable	29 cases	72.5%
	Fail	11 cases	27.5%

TABLE 4
Relationship between time of delay and result of reduction.

	0 – 6 Hours	6 Hours	Total
Acceptable	24	5	29
Fail	1	10	11
Total	25	15	40

x♀®x^2 0.005

TABLE 5
Relationship between local condition (swelling) and result of reduction.

Swelling (+)		Swelling (–)	Total
Acceptable	1	28	29
Fail	6	5	11
Total	7	33	40

$x^2 > x^2$ 0.005

the patients when the reduction was accomplished within 6 hours after the injury after which time the result would be unsatisfactory. ($x^2 > x^2$ 0.005) it was also noted that local soft tissue swelling gave an essential result of the reduction. The more soft tissue swollen the more unacceptable out come after the reduction would be evident. ($x^2 > x^2$ 0.005) (Table 5)

Complication

Three patients were found to develope impending signs of Volkman's ischaemia. However, after the casts were released and the elbows were placed in less flexion those symptom disappeared eventually.

DISCUSSION

Supracondylar fractures of the humerus in childhood can be difficult injury to treat. In this paper we discuss the extension type only. The aim of the treatment for the supracondylar fracture of the humerus is an excellent functional result with a normal appearance of the elbow.[2]

Three conditions must exist to secure a good result: an exact reduction, adequate immobilization, careful and prolonged after care.[4] To obtain a perfect result, besides an accurate anatomical reduction is needed, it is also essential to mininize additional trauma to the already traumatized joint and periarticular tissues. Repeated attempts at closed reduction add trauma. In long term observation there were deformities following supracondylar fracture of the humerus in some cases. The most common deformity is cubitus varus. Jensinius in 1984 reported a series of 75 cases underwent closed manipulation, he found 22.67 per cent of bad result. Halenberg in 1942 reported 54 cases underwent open reduction and found 31.48 per cent with bad result. Gruber in 1964 found 3.00 per cent either limitation of movement or cubitus varus among 23 cases.[4]

Varus deformity is caused by internal rotation and medial displacement of distal fragment.[6] It is difficult to explain whether the deformity was caused by pure growth disturbance. In our series, we did closed manipulation for the treatment of grade II and III supracondylar fracture of the humerus, under general anaesthesia and put the elbow in acute flexion with collar and cuff after reduction.

We condisered the reduction was acceptable when there was no rotaiton and fracture fragments were in good alignment.[6] Blount, Attunbarough, Laurence emphasized the extensive remodelling will occur in this fractures.[1,7]

It is imperative to obtain perfect reduction in order to avoid elbow deformity in the long term result. Time elapses after the injury and the amount of soft tissue swollen around the elbow play an important role in the efficacy of reduction. ($x^2 > x^2$ 0,005) It is quite important to institute urgent closed reduction prior to soft tissue swelling becomes obvious which will be the hindrance of accurate reduction.

We observed 3 patients with the evidence of impending Volkman ischaemia of whom the arms were elevated, the casts were released and placed in more extension. The condition was improved as subjected by reestablishment of radial pulse and skin colour.

CONCLUSION

The supracondylar fracture in children can be a

difficult trauma to be treated. Accurate reduction, safe immobilization, careful and closed post reduction management are quite essential in order to achieve excellent result. The delay in the reduction together with local soft tissue swollen will influence the result of the treatment. It is advisable then that urgent reduction should be instituted before the swollen becomes apparent.

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