

SURGICAL MANAGEMENT OF FRACTURE OF THE CAPITULUM HUMERI

SVEN COLLERT

Department of Orthopaedic Surgery, St. Göran's Hospital, Stockholm, Sweden.

A follow-up study of 20 patients operated upon for fracture of the capitulum humeri is reported. In 8 cases the fracture fragment was removed while in 12 others open reduction was performed. Open reduction gave the best results and is therefore recommended as the treatment of choice.

Key words: capitellum; capitulum humeri; fracture; treatment

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Fracture of the capitulum humeri (capitellum) occurs as an alternative injury to fracture of the caput radii as a result of a fall on the outstretched arm. It is, however, considerably less common. The relative frequencies are reported to be 1:6 (MacDonald & MacGoey 1959, Palmer 1961). Opinions on the preferred surgical management of this injury differ. Some (Gejrot 1932, Rhodin 1942, Watson-Jones 1955) recommend reduction of the dislocated fragment. Others (Smith 1954, Böhler 1956, Judet & Raynal 1957, Fowles & Kassab 1974, Alvarez et al. 1975) believe removal of the fragment to be the best treatment. The present report evaluates and compares the results of these two alternative methods of treatment.

MATERIAL AND METHODS

The material consists of 20 consecutive patients operated upon for fracture of the capitellum at St. Göran's Hospital or Södersjukhuset, Stockholm, during the period 1966-1972. Of these 15 were women and 5 men, who at the time of accident could be divided into the following age groups: 20-29 years, one patient; 30-39, three; 40-

49, five; 50-59, three; and 60-69, eight patients. In seven cases only the capitellum or a portion of it was fractured (Type 1) (Figure 1). In the remaining 13 cases the fracture also involved the lateral portion of the trochlea (Type 2). The dislocated fragment always showed a volar and proximal displacement and sometimes a rotation amounting to as much as 90° (Figure 2). Chisel fracture of the capitulum radii occurred as a concomitant injury in three cases. All patients were examined by the author personally, and the examination was completed by x-rays of the elbow. The observation period was 1-2 years in three cases, 3-4 years in seven, 5-6 years in seven and more than 6 years in three cases.

Treatment

In eight cases treatment consisted of removal of the fragment and in twelve cases open reduction was performed. In seven of these cases the fragment was fixed with a Palmer pin and in the other five there was no internal fixation (Table 1). All operations were performed at the acute stage (within 10 days after accident) except in one case, which was first operated upon 1 year after injury, with extirpation of the fragment.

In those cases in which the fracture fragment was removed, active physiotherapy was begun immediately. The remainder were immobilized in plaster casts for 1-4 weeks postoperatively after which physiotherapy was begun.

Table 1. Treatment related to type of fracture.

	Type 1	Type 2	Total
Removal of fragment	1	7	8
Open reduction + internal fix.	2	5	7
Open reduct. without int. fix.	4	1	5
Total	7	13	20

RESULTS

The majority of patients were pain-free or had only insignificant pain and evaluation of the results was therefore based on limitation of movement. The results were classified as follows. *Excellent*: completely normal mobility without any subjective discomfort. *Good*: limitation of extension not exceeding 30° and/or a range of flexion of at least 120°; normal pronation and supination. *Poor*: limitation of mobility exceeding the above and/or restriction of pronation and supination.

The results are summarized in Table 2. Six out of seven type 1 fractures were treated with open reduction. They all

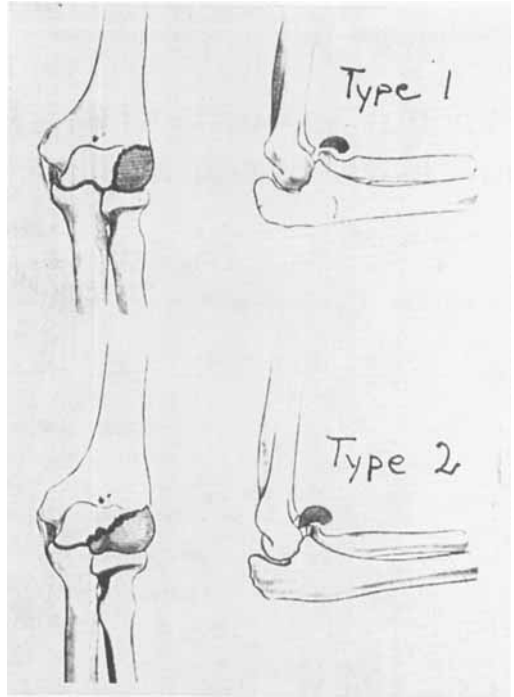


Figure 1. Types of fracture of capitulum humeri. Type 1 involves the capitulum only. Type 2 includes also part of the trochlea.

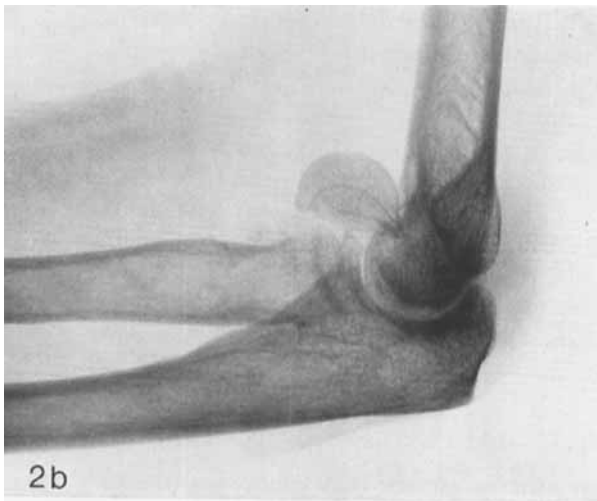


Figure 2. Fracture of capitulum humeri with typical dislocation. Concomitant fracture of capitulum radii.

a. Anteroposterior view.
b. Lateral view.

showed excellent or good results. In six type 2 fractures treated with open reduction results were excellent in two cases, good in two and poor in two cases. In all cases of excellent results exact anatomical position was achieved. In seven type 2 fractures treated with removal of the fragment results were good in four and poor in three cases.

Table 2. Results related to treatment and type of fracture.

		Excel- lent	Good	Poor	Total
Removal of fragment	Type 1	0	1	0	1
	Type 2	0	4	3	7
Open reduction	Type 1	3	3	0	6
	Type 2	2	2	2	6
Total		5	10	5	20

Three patients were reoperated with excision of the radial head $\frac{1}{2}$ -1 year after the first operation because of severely impaired mobility. Two of these were originally treated by removal of the loose fragment and one by reduction. After reoperation the range of movement improved but all three remained in the 'poor result' group. X-ray examination showed that in the majority of cases, regardless of treatment, there was some deformation of the capitellum. In none of the cases, however, was there any loose body in the joint or signs of secondary osteoarthritis.

DISCUSSION

This investigation shows that reduction of the fracture gives good results provided that a good anatomical position is achieved. This was the case in all five patients in the 'excellent' group. It was suggested by Smith (1954) and Judet & Raynal (1957) that reduction of the fracture may result in avascular necrosis

and secondary osteoarthritis. No signs of complications of this type were seen in any of the cases in this study.

In nearly half of the cases the fracture was so stable after reduction that internal fixation proved unnecessary. No post-operative redislocation occurred.

Some authors (Rhodin 1942, Watson-Jones 1955, Böhler 1956) claim that closed reduction should always be tried first. An attempt at closed reduction was made in three cases in this series, but without success. If a good functional result depends on exact reduction, then open reduction would seem to be a better and safer method.

After extirpation of the fracture fragment a raw bone surface remains, which according to Watson-Jones (1955) tends to lead to capsular adhesions and restricted mobility. In this investigation all eight patients treated in this manner had restricted mobility. However, Alvarez et al. (1975) and others reported good results with this method. In those cases where an exact reduction is not achieved or where the fracture is comminuted, it is better to remove the fragment or fragments. Smith (1954) and others claim that there is a risk of lateral instability and a tendency to subluxation following removal of the fragment in fractures of type 2. In the present series all elbow joints were stable at follow-up, so that this risk seems to be small.

Johansson (1962) found rupture of the ulnar collateral ligament in 8 out of 13 cases of fracture of the capitellum. In the present material the ulnar collateral ligament was explored in one case because of instability and swelling and a total rupture was found and sutured. It is probable that restricted mobility following fracture of the capitellum is partly dependent on the extent of concomitant capsule and ligament injuries.

The results of the present investigation clearly indicate that open reduction of fracture of the capitulum humeri is a

better method of treatment than removal of the loose fragment.

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Correspondence to: Sven Collert, Department of Orthopaedic Surgery, Sct Göran's Hospital, Box 12500, 112 81 Stockholm, Sweden.