Fractures of the Medial Humeral Condyle in Adults

O N Nagi, M S Dhillon, A Aggarwal, S S Gill

ABSTRACT

Background/Aim of Study: Fractures of the medial condyle of humerus are uncommon in adults. The aims of this study were (i) to highlight the rarity of this injury, (ii) to focus on the problems in management of cases which present late, and (iii) to compare the results of surgical excision of medial condyle with those of internal fixation.

Methods: Seven adult medial humeral condyle fractures were seen over a 10-year period. Four cases were surgically fixed within three weeks of the injury; one case refused operation. Two cases which presented late, one with an isolated trochlear fracture, and another Milch type I fracture comminution and compounding, were treated by excision of the condyle and supervised post excision physiotherapy.

Results: All six operated cases regained good function. The two patients with excised condyle had no significant instability and had good range of movements. The results were comparable to those managed by open reduction and internal fixation.

Conclusions: Medial condyle fractures presenting early (within 3 weeks), should be managed by accurate open reduction and rigid fixation: non operative management leads to relatively poor results. In late/neglected cases, or those with extensive comminution, open reduction and fixation may lead to stiff and painful elbow, whereas excision of the condylar fragment does not lead to instability.

Keywords: Medial condyle, Humerus, Fracture, Adults

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INTRODUCTION

Fractures of medial condyle of the humerus are rare injuries of the elbow. According to Cotton[1], they "almost never occur", and Judet[2] used the word "exceptionelle" with reference to their frequency; It has even been described by some as a fracture which is seen "once in a lifetime"[3]. Most reports focus on this fracture in the paediatric age group, where it occurs more frequently[4]. Only a few reports are available where this injury is seen after closure of the condylar and medial epicondylar apophyses[5,6] and the problem in adults is not highlighted in the literature. For a successful treatment outcome it is mandatory to achieve anatomic reduction with restoration of an axis of rotation that passes through the centre of the arcs formed by the capitellum and the trochelar sulcus[7]. All attempts should be made to achieve this goal by anatomic reduction and the early mobilization. However, in underdeveloped countries like ours, not all of these fractures are seen primarily by the orthopaedic surgeons. Various forms of management ranging from splints to massage are attempted prior to presentation at specialized centres, making the problems more complicated and treatment options limited. Additionally, comminuted fractures with compounding are unique to adults involved in high velocity trauma, and treatment protocols are different from those in children. The purpose of the present study is to highlight the rarity of this injury and the dilemma faced in management of some of these cases.

MATERIALS AND METHODS

During the period November 1986 to August 1996. Seven cases of fractures of the medial condyle of the humerus after epiphyseal closure were seen in the department of Orthopaedics, Postgraduate Institute of Medical Education and Research, Chandigarh. Four of these cases reported with significant periods of delay.

All the cases were Milch type I fractures[8], with one case having a neglected fracture of the trochlear fragment only. Two cases were compound. Six patients were males and one female with ages ranging from 20 to 40 years (mean 27.1 years). The right side was involved in three cases and the left side in four cases. The mode of injury was a fall in five cases, a road traffic accident in one case and gunshot injury in one case.

The duration between injury and reporting to our centre ranged from 2 days to 11 weeks (mean 3.2 weeks).

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Table I. Study group characteristics and results.

S. No.	Name	Age/Sex	Side	Type of Fracture	Mechanism of Trauma	Associated Injuries	Period of Delay	Treatment Protocol	Range of Movement	Complication	Follow up (months)
Internally Fixed Cases											
1	R	27/M	L	Milch I Compound	RSA	Head injury	2 days	Debridement & fixation with K wires	35º - 105º	Superficial infection	43
2	TK	23/F	R	Milch I	Fall	Nil	2 days	ORIF with 3.5mm plate reconstruction	5º - 120º	Nil	15
3	DS	26/M	R	Milch I	Fall	Nil	2.5 weeks	ORIF with 3.5mm DCP	30º - 110º	Nil	54
4	YK	20/M	L	Milch I	Fall	Nil	8 days	ORIF with 2 screws	15º - 120º	Nil	31
Cases with Excised Fragment											
5	RK	22/M	R	Trochlear comminuted	Fall	Nil	11 weeks	Excision of Trochlear Fragment	15º - 110º	Nil	40
6	AS	40/M	L	Milch I compound comminuted	Gunshot injury	Ulnar nerve injury	2 days	Debridement excision of condylar fragment	5º - 120º	Minimal instability	35
Non-operatively Treated											
7	ML	32/M	L	Milch I	Fall	Nil	7 weeks	Non-operative (refused surgery)	30º - 60º	Gross instability	15

Wound debridement, open reduction and internal fixation with two k wires and POP slab was performed in case 1 while in cases 2, 3 and 4, open reduction and internal fixation with 3.5 cm DCP, two cancellous screws and 3.5 mm reconstruction plate respectively was done. In two cases the fractured fragment was excised, keeping in mind the significant period of delay in case 5 and high degree of comminution with compounding in case 6. Case No. 7 refused any operation (Table I).

POSTOPERATIVE MANAGEMENT

Isometric exercises of biceps and triceps were started as soon as the pain subsided. POP slab was used for 3 weeks in cases in whom open reduction and internal fixation was done; active movements of the elbow was started 3 weeks post operatively. In cases where excision of the fractured medial condyle was done, post operative POP slab was continued for three weeks after excision, followed by guarded mobilization for another six weeks, along with the use of night splints.

Table II. Clinical criteria of evaluation.

Results	Instability	ROM (% of normal)	Pain
Acceptable			
- Excellent	Nil	90-100%	Nil
- Good	Mild	70-90%	Occasional
Unacceptable			
- Fair	Moderate	50-70%	Mild: may need analgesics
- Poor	Gross	<50%	Significant

RESULTS

The follow up ranged from 15 months to 47 months (mean 29.2 months) (Table I). The results were evaluated on the basis of clinical criteria and were classified as excellent, good, fair or poor (Table II).

There were two compound cases, while two cases had significant degree of comminution as seen on radiographs. One case had associated head injury; case 6, with gunshot injury had associated ulnar nerve injury. One patient (case 4) in whom open reduction and internal fixation with two cancellous screws was done (Fig. 1a & b), showed union of fracture three months after surgery, with range of motion of 15° - 110°. Another three cases (cases 1, 2 and 3) treated surgically with open reduction and internal fixation united after 4 months, 3 months and 3.5 months respectively with good range of movement. In two cases (case 5 and 6) where excision of the fragment was done (Fig 2a &b and Fig. 3a & b), there was minimal loss of range of motion on the affected side (i.e. 5º - 120º and 15º - 110º respectively). Case 6 had minimal inability with increased side to side motion of the elbow in extension. This patient was working as a police constable without any appreciable problem (Fig. 2c). Case 7 who had refused surgical intervention was advised active movements of elbow after removal of cast. At six months post injury, he had a range of motion of only 30° - 60° with gross instability and occasional pain. Case 1 with compound grade II fracture developed superficial infection which healed with antibiotics debridement and

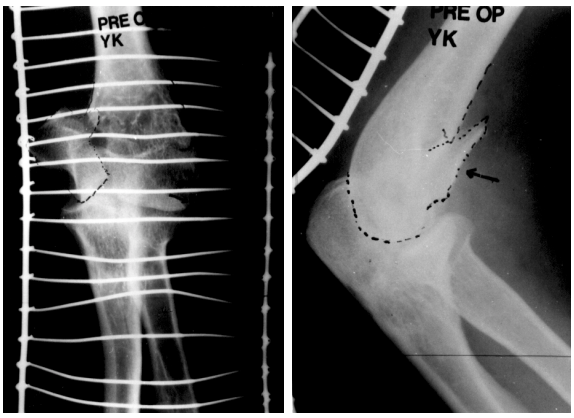

Fig. Ia Pre-operative x-ray photographs (AP and lateral view) showing Milch Type I displaced medial condylar fracture (Case 4).

Fig. 1b Same case (AP and lateral x-rays) 2.7 years after open reduction and internal fixation with two cancellous screws.

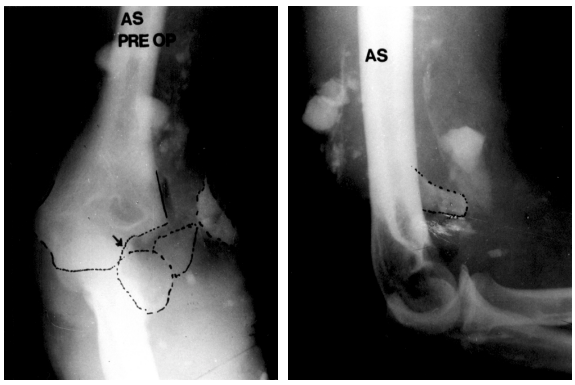

Fig. 2a Pre-operative x-ray photographs of case 6 showing comminuted medial condyle fracture after bullet injury.

Fig. 2b Same case two years eleven months after excision of the fractured condyle.

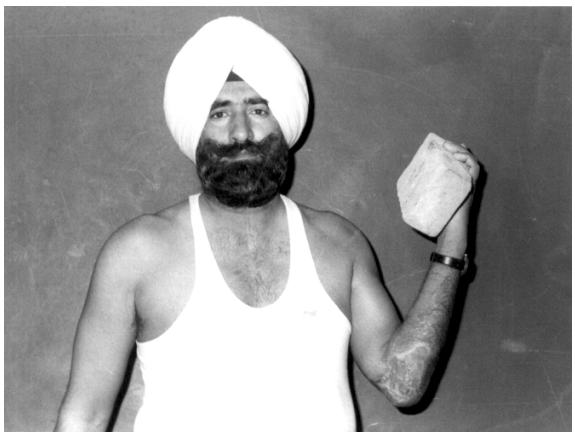

Fig. 2c Clinical photograph showing the function and range of elbow motion of case 6.

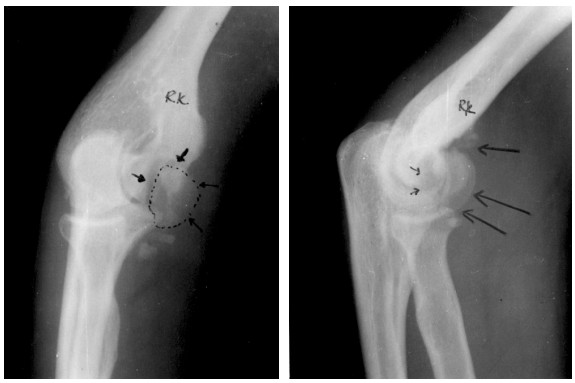

Fig. 3a Pre-operative radiographs showing a neglected fracture of the trochlear fragment (case 2).

Fig. 3b Same case after excision of the fragment. Note the screw fixing the medial collateral ligament.

dressings. Based on the clinical criteria for evaluation of results, good to excellent results were obtained in six cases. Only one case with non operative treatment had a poor result.

DISCUSSION

Isolated fractures of medial condyle of the humerus in adults are rare injuries. Fractures of the medial condyle occur due to abduction forces directed at right angles to the longitudinal axis of the extended elbow. Such forces may eventuate in two different type of fractures which are (1) an avulsion type of injury with downward displacement of the fractured condyle and (2) a compression type of fracture with upward displacement of the fractured condyles[8].

Problems in developing countries are somewhat different than those seen in the west; here some of the patients present to the orthopaedic surgeons at a late stage. The ideal management of these fractures when seen without any delay aims at achieving anatomic reduction and stable fixation followed by early range of motion exercises for the elbow. On the other hand, excessive tissue dissection is needed to attain good reduction in cases presenting late, and this may lead to problems like avascularity of the condylar fragment and stiffness of the elbow. In Milch type I fractures the injury mechanism is such that the lateral trochlear ridge is left intact with the main humeral shaft; in Milch type II, this ridge in a part of the fractured condylar fragment. Thus excision of the fractured fragment in Milch type I injuries does not significantly affect the stability of the elbow joint. In our series, we observed an unusual type of fracture in one case, involving just the trochlear fragment, and resembled a capitellar fracture on radiographs (Fig. 3). This presented late with stiffness of the elbow; being totally intra-articular, this fragment was excised through an approach which involved distal reflection of the medial ligament of the elbow along with a bony chip. This was subsequently reattached by a screw after the fractured fragment was excised. To the best of our knowledge, no similar case has been reported previously. In cases with severe comminution, the posteromedial approach to the elbow is recommended. This has the advantage of better visualization of the ulnar nerve; in some of these cases the epicondylar fragment is usually also fractured. All attempts must however be made to retain at least one third of the trochlea to prevent instability of the elbow and proximal migration of the ulna. The extent of residual inability is directly proportional to the amount of excised condylar fragment.

On comparing the results of the cases with excised fragments with the internally fixed ones, the only difference in function was the minimal additional instability in the case with excision of the completely shattered condyle. The other case where an intra articular condylar fragment was excised late, had no instability. This option in an acceptable alternative in neglected or comminuted fractures.

Ulnar nerve injury was observed in only one case (case 6) in our series. It is imperative that while surgically approaching the fragment, the ulnar nerve should be

Table III. Review of literature (20 years) of fractured medial humeral condyle in adults.

Authors study	No. of years	Age (yrs)	Mechanism of injury	Type of # (Milch classification)	Method of reduction fixation	Results
El Ghawabi 1975	2	20		NA	1 ORIF with chromic suture	Poor
		21			1 ORIF with K wires	Good
Mitsunaga 1982	1	NA		NA	ORIF	Poor
Wilson 1982	1	54		I	ORIF with screws	Good
Aitken 1986	2	NA		NA	ORIF	Good
Jupiter 1988	5	NA		II		Good/Excellent 4 Poor 1
Behrman & Shelton 1990	1	82		II	ORIF with OA screws	Good
Our study 1997	7	20-40 (mean: 27.1)		I	4 ORIF 2 Excision Fragment 1 Non-operative	Good/Excellent 6 Poor 1

Abbreviation: NA - Information not available

carefully exposed and protected. However anterior transposition of the ulnar nerve should be considered only in those cases where the fracture anatomy is such that the ulnar nerve is in direct contact with the fracture line and can be entrapped in callus. In inadequately reduced fractures also, the subsequent irregularity of the ulnar groove can lead to problems. In routine cases, however, anterior transposition is not always essential.

A review of literature over the last 20 years reveals that most previous reports are either isolated reports or small series of such injuries in adults[5-7,9-11].

Jupiter et al[11] presented the largest series of five cases (Table III). Most reports emphasize upon open reduction and there is no mention of neglected or severely comminuted cases. The results of treatment reported previously hence varied from poor to good, with most authors limited experience only. We have found that surgical intervention, regardless of the delay or comminution, is essential to achieve a fair to excellent result. The only case with poor result in our series was one who refused operation. However, all cases are not candidates for rigid internal fixation. The surgeon should keep the fracture anatomy in mind, along with other factors like neglect or compounding. By ensuring sharp tissue dissection during surgery and aggressive physiotherapy postoperatively, almost all cases can have a fairly good end result, even at centers where the best facilities are not available.

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