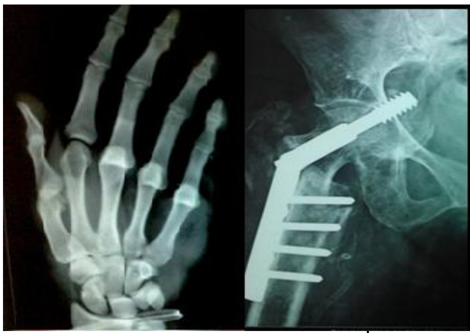

International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2016; 2(4): 140-142

www.orthopaper.com
Received: 22-08-2016
Accepted: 23-09-2016

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Clinical profile of intercondylar fracture of distal humerus in adults

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DOI: http://dx.doi.org/10.22271/ortho.2016.v2.i4c.22

Abstract
There are two types of injury. One is “flexion type” where condyles are present anterior to the humeral shaft. In the “extension type” Ulna is directed anterior against the posterior aspect of trochleas separating the condyles and at the same time supra condylar position is fractured. On arrival of patients at casualty or at OPD level, the various points were noted down according to the proforma. On admission of the patient, a careful history was elicited from the patient and/or attendants to reveal the mechanism of injury and the severity of trauma. The patients were then assessed clinically to evaluate their general condition and the local injury. In the present series there were no cases of type I fractures. There were 5 (25%) cases of type II fractures, 12 (60%) cases of type III fractures and 3 (15%) cases of type IV fractures. The mode of injury was direct fall on elbow or RTA.

Keywords: Humerus, intercondylar fracture, RTA

Introduction

The elbow is the last major joint in the vigorous kinetic chain that propels the ball during a throw. As a result of external torques and intrinsic function, the elbow structures are subject to three major stress experiences that can result in injury. Arm acceleration induces a valgus torque that imparts strain of the medial collateral ligament and potential compression at the radio humeral joint. Medial ligament failure and impact osteoarthritis are common pathologies. The medial epicondylar flexor pronator mass also is subjected to strain that may result in muscle tears. Deceleration demands challenge the elbow flexor mass, which may lead to tendinitis and contracture. Extra-articular fractures that traverse both columns of the distal humerus are most often the result of a fall. These fractures occur more commonly in children [1].

Intra-articular fractures are probably caused by the impact of the proximal ulna against the trochlea, forcing apart the condyles of the distal humerus. These fractures are associated with high-energy trauma, such as falls and motor vehicle accidents. Varus and valgus movements, bone quality, and the energy of the injury influence the degree of comminution.

Condylar fractures of the distal humerus can occur with adduction or abduction forces of the extended forearm, which concentrates these forces to one side of the distal humerus. This creates compressive forces on the articular surface. An eccentric force applied to the posterior aspect of a flexed elbow can also produce a fracture of one condyle.

A fracture of the capitellum usually results from shear forces. This fracture commonly results from a fall onto an outstretched hand. Isolated fractures of an epicondyle are more common in children than adults. In the adult, this fracture is commonly caused by a direct blow to the epicondyle [2].

There are two types of injury. One is “flexion type” where condyles are present anterior to the humeral shaft. In the “extension type” Ulna is directed anterior against the posterior aspect of trochleas separating the condyles and at the same time supra condylar position is fractured [3].

Another mechanism was described by Wilson & Cochrane, it occurs due to the splitting effect of humeral shaft as it is forced distally. In the extension type the humeral condyles lie behind the shaft. What ever the mechanism of injury there is always associated soft tissue injury, and some open laceration extend into fracture site. There is usually loss of bony continuity, since the fragments are displaced by opposed muscle traction, as it pulls the epicondyles distally and rotates the condyles, so that articular surface face a more proximal direction.

This converts the trochlear sulcus into a narrow inverted "v" and hence not congruous with the ulnar articular surface. The action of biceps anteriorly and triceps posteriorly pull articular surface of Ulna proximally. In an opposing fashion, the humeral shaft is forced distally between the rotated condyles [4].

Methodology

Inclusion criteria

- Patients with closed intercondylar fracture of the distal end of the humerus
- Patients above the age of 18 years
- Patients medically fit for surgery

Exclusion criteria

- Compound fractures of the distal humerus
- Old fractures of the distal humerus
- Patients with extra articular distal humeral fracture
- Patients with distal neurovascular injury.

On arrival of patients at casualty or at OPD level, the various points were noted down according to the proforma. On admission of the patient, a careful history was elicited from the patient and/or attendants to reveal the mechanism of injury and the severity of trauma. The patients were then assessed clinically to evaluate their general condition and the local injury.

The general condition of the patient, the vital signs were recorded. Methodical examination was done to rule out fractures at other sites. Local examination of injured elbow revealed swelling, deformity and loss of function. Any nerve injury was looked for and noted.

Results

Table 1: Age Distribution

Age in years	No. of cases	Percentage
21-30	6	30
31-40	5	25
41-50	2	10
51-60	7	35
Total	20	100

In this series, 6(30%) patients were between 21-30 years, 5 (25%) patients were between 31-40 years, 2 (10%) patients were between 41-50 years and patients between 51-60 years were 7(35%). The range of age was between 21-58 years, with mean age of 43.4 years. The maximum incidence was between 51 to 60 years i.e. 7 cases (35%).

Table 2: Gender distribution

Sex		No. of cases	Percentage
Males		11	55
Females		9	45
Total		20	100

In the present series there were 11 (55%) were males and 9(45%) were females with

Male: female ratio of 11:9

Table 3: Side involved

Side involved	No. of cases	Percentage
Right	9	45
Left	11	55
Total	20	100

Right upper limb was involved in 9 (45%) cases and left upper limb in 11 (55%) cases.

Table 4: Mode of injury

Mode of injury	No. of cases	Percentage
Direct fall	10	50
Road traffic accident	10	50
Total	20	100

In this series 10 cases (50%) were due to direct fall injury and 10 cases (50%) were due to road traffic accident.

Table 5: Type Of Fracture: (Riseborough Radin classification)

Type of fractures	No. of cases	Percentage
I	-	-
II	5	25
III	12	60
IV	3	15

In the present series there were no cases of type I fractures. There were 5 (25%) cases of type II fractures, 12 (60%) cases of type III fractures and 3 (15%) cases of type IV fractures.

Discussion

In our study fractures were commoner in the fifth and sixth decade with average age being 43.4 years (21-65). Our findings are comparable to the study made by Jesse B. Jupiter 1985, Gabel *et al* 1987, M. Bradford Henley *et al* 1987, Kun-Chuang Want *et al*., In 1985 Jesse B. Jupiter *et al* found 57 years as the average age in their series. In 1987 Gabel *et al* found 45 years as the average in their series. In 1987 M. Bradford Henley *et al* found 32 years as the average age in their series. In 1994 Kun-Chuang Want *et al*, found 47 years as the average age in their series.

Table 6: Comparison of age

Series	Age in years	Range
Jese B. Jupiter *et al* 1985 [5]	57	17-79
Gabel *et al*, 1987 [6]	45	17-75
M. Bradford Henley *et al*, 1987 [7]	32	15-61
Kun-Chuang Wang, *et al*, 1994 [8]	47	20-68
Present study	43	21-65

Our series had a male predominance with 55% and 45% female patient which were comparable to Kun-Chuang Wang *et al*, (1994) study.

Jesse B. Jupiter *et al*, (1985) in his study noted about 47% male and 53% female, sex distribution. M. Bradford Henley *et al* in his study noted about 52% male and 48% female incidence. Kun-Chuang Wang *et al*, in his study noted 60% male and 40% female incidence. Male predominance is probable due to their increased involvement in outdoor activity level.

Table 7: Comparison of gender

Series	Male	Female
Jesse B. Jupiter *et al* 1985 [5]	16 (47%)	18 (53%)
M. Bradford Henley *et al*, 1987 [7]	17 (52%)	16 (48%)
Kun-Chuang Wang, *et al*, 1994 [8]	12 (60%)	8 (40%)
Present study	11 (55%)	9 (45%)

In our series 50% of the cases were due to direct fall and 50% of cases had road traffic accident. Gabel *et al* accounted 100% of his cases to direct fall. M. Bradford Henley accounted 61% of his cases to road traffic accident, 39% due to direct fall. Kun-Chuang Wang, *et al*, accounted 30% of the cases to direct fall and 70% of the cases to road traffic accident. The results of the M. Bradford Henley *et al*, 1987 are comparable with our series.

Table 7: Comparison of mode of injury

Series	RTA	Direct fall	
Gabel *et al*, 1987 [6]	-	13	(100%)
M. Bradford Henley *et al*, 1987 [7]	20 (61%)	13 (39%)	
Kun-Chuang Wang, *et al*, 1994 [8]	14 (70%)	6	(30%)
Present study	10 (50%)	10 (50%)	

We accounted about 45% incidence of fractures in right side and 55% of the fracture in left side, which is also comparable to other studies.

Jesse B. Jupiter reported about 62% incidence of fractures in left distal end of humerus. M. Broadford Henley *et al* reported about 55% incidence of fractures in left distal end of humerus.

Left sided predominance is probable due to direct fall injury, left sided predominance which is common in our series.

Table 8: Comparison of side involved

Series	Right	Left
Jesse B. Jupiter *et al* 1985 [5]	13 (38%)	21 (62%)
M. Bradford Henley *et al*, 1987 [7]	15 (45%)	18 (55%)
Present study	9 (45%)	11 (55%)

In our series we accounted no cases of fractures of RR type I, 25% fractures of RR type II, 60% fractures of RR type III and 15% fractures of RR type IV.

Gabel *et al* in his series noted about 23% of fractures of RR type I, 15% fractures of RR type II, 31% fractures of RR type III and 23% fractures of RR type IV. M. Bradford *et al* in his series noted about 9% of fractures of RR type I, 12% fractures of RR type II, 43% fractures of RR type III and 36% fractures of RR type IV.

Table 9: Comparison of type of fracture

		R.R. types		
Series	I	II	III	IV
Gabel *et al*, 1987 [6]	3(23%)	2(15%)	5(39%)	3(23%)
M. Bradford Henley *et al*, 1987 [7]	3(9%)	4(12%)	14(43%)	12(36%)
Present study	-	5(25%)	12(60%)	3(15%)

Conclusion

- Inter condylar fractures of the distal humerus are commoner in fifth and sixth decade of life with male predominant in high incidence of fracture due to outdoor activity.
- Inter condylar fractures demands careful evaluation, classification of fracture type and pre-operative planning.

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