

Epidemiology of Colle's Fracture

Dr. R. S. Kulkarni M.B.B.S.(Ortho.)

Civil Surgeon,

Civil Hospital, Sindhudurg

Sindhudurgnagari, Maharashtra State, India.

Tel. 91+ (02362) 228900 (P.) 228528(R), Fax : (02362) 228902

❖ Abstract ❖

Epidemiology of Colle's fractures is studied prospectively during two years in a population of about 1,63,573. The overall incidence rate was 6 fractures per 10,000 person years. The main mechanism of injury was fall on ground in fields and fall from mango, cashewnut tree 110(49.1%)patients. Contrary to the observations from other countries. It is found that sex ratio with a steep rise in fracture incidence of both men and women upto the age of 40-50 years.

Introduction

This study prospectively analysed the epidemiology of Colle's fracture in a geographically well defined population of 1,63,573 and the fractures occurred in 158 men and 66 women with the age specific incidence of Colle's fractures determined and compared with similar investigations from other countries. The aim of this prospective epidemiologic study was to evaluate the fracture risk in a given population, describe the mechanism of trauma and investigate the fracture pattern.

Patients & Methods

The Government Rural Hospital of Kudal, serves as the only Orthopaedic Centre having largest

patient population in the vicinity, and had 112482 inhabitants, 15 years of age older. Most 102 (45.5%) patients were seen primarily, but majority 122 (54.4%) patients were referred from other hospitals. The data reported in this study is from our hospital only. These residents of Kudal were defined as the population at risk and formed the basis of the study. Each verified radiologically Colle's fracture patient attending Government Rural Hospital Kudal during the period of 1st June 1996 to 30th May 1998 were entered prospectively; in a specially designed questionnaire protocol. Visitors and Tourists who sustained Colle's fractures during their stay in the area of Kudal 12 (5.3 %)patients, whereas inhabitants of Kudal area who sustained Colle's fractures elsewhere were excluded. 6(2.6%) patients had compound injuries. Other associated skeletal injuries were seen in 18(8.0%) patients. (Incidence rate/confidence interval around incidence rate/X² Test with Yates) (Dr. B. B. Gaitonde).

218 patients sustained 224 Colle's fractures. Predominently seen in men 158 (70.5%) women constituted 66(29.5%). The mean ages of women and men were 38 (7-92) and 36 (9-94) years respectively. Two patients had repeat Colle's fracture on the same side with a span of 6 and 8 months duration. Left

Age and Sex Incidence

Sex	Age in Years									
	0-10	11-20	21-30	31-40	41-50	51-60	51-70	71-80	81-90	91-100
<i>I</i>	2	3	4	5	6	7	8	9	10	11
Male	10	24	34	27	25	16	11	6	3	2
Female	2	10	15	18	12	4	4	1	0	0

side involved in 128 (57.1 %) patients and Right wrist involved in 96 (42.9 %) patients.

Mechanism of Injury	Percentage
Fall at Home	10 (4.4%)
Fall at Bathroom / Toilet	08 (3.5%)
Fall at work in fields	48 (21.4%)
Fall in Schools / Colleges	18 (8.0%)
Fall from Chair / Stool / Table	06 (2.6%)
Fall from Tree (Mango / Cashewnut)	62 (27.6%)
Fall during Sports	05 (2.2%)
Pulling / Pushing in fields	08 (3.5%)
Lifting heavy weight in fields	12 (5.3%)
Direct Trauma in fields	23 (10.2%)
Injury sustained in Industry	04 (1.7%)
Vehicular Accidents	12 (5.3%)
Labourers at Construction work	06 (2.6%)
Unknown	02 (0.8%)

Seasonal Variation of Fractures

Year	Seasonal Variation											
	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>
1996-97	6	8	4	18	18	12	15	10	10	5	6	5
1997-98	4	4	5	18	20	12	10	9	11	4	5	5

The statistical probability was calculated by ANOVA for multiple comparisons. The student's 't' test for 2 means and Fischer's exact test for proportions and a 'P' value of < 0.05 was considered statistically significant.

Each case was classified regarding the type and displacement of fracture.

Classification of Fracture

Sr.No.	Fractures	Distal ulnar Fracture	
		Absent	Present
1	Extra articular	I (98)	II (44)
2	Intra articular Involving radio carpal joint	III (48)	IV (14)
3	Intra articular Involving distal radio ulnar joint	V (05)	VI (03)
4	Intra articular Involving both radio and distal radio ulnar joints	VII (04)	VIII (08)

Results

More seen in women than men between 25 to 50 years 86 (38.3 %) patients -contrary to western literature as in Malmo (Bengner and Johnell 1985); Upsala (Malimin and Lianghall 1992). Moderate Trauma fracture incidence among women increased over two fold between ages of 20 to 40 years and to three fold in men between ages of 21 to 50 years and then levelled off.

More seen in Young men 64 (28.5%) than young women upto 25 years. The steep rise in fracture incidence in women till 50 years was quite unlike that reported from Owen et.al 1982 at Rochester.

Number of fractures per day throughout month were nearly equal for all the days in the week. During rainy season (from June to September) the incidence is seen more in both sexes 89 (39.7%) as they are working in fields; predominantly seen in men as they constitute major bulk in working class. High incidence of Colle's fractures 74 (33.0%) is seen in the month of April and May, more so students who are on vacation, and also as it is the season for mango and cashewnuts - fall from trees is more observed. Fractures occurred more frequently in 182 (81.2%) patients in morning and at noon.

The number of undisplaced fracture was very high in young men and women below the age of 20 years and in women above the age of 40 years contrary to observations of S. Sologuard and V. S. Petersen 1985. In men and women from 20 to 50 years (Frykman type III to VIII) had a more equal distribution. The average time duration of arrival to hospital and treatment was 10 hours.

Contrary to observations of (J.Doezi and A Renner 1994) this study reveals onehalf due to falls outside home at fields. Fall from coconut and mango trees in young men and women constituted to one quarter, peculiar to this area of geographical situation of west coast of Maharashtra.

The rate of reduction performed in this series was 76%(P = 0.01) even higher than that reported by Frykman (1967).

Industrial injuries were observed in only 4 (1.7%) patients and Vehicular accidents constituted to 12 (5.3%) patients.

For both the sexes, there was age dependant increase in the proportion of Colle's fractures (Frykman Type V, VI, VII & VIII). Upto 50 years of age, about 60% of these types of fractures were considered to be of these types; whereas in males

Classification of Fracture

Age	Women			Men		
	No. of Fractures	Population of risk in Thousands	Incidence per 10,000	No. of Fractures	Population of risk in Thousands	Incidence per 10,000
1	2	3	4	5	6	7
0-10	6	16	6	8	12	8
11-20	18	22	8	16	16	10
21-30	22	24	24	25	21	26
31-40	21	22	50	18	26	55
41-50	24	24	78	19	24	69
51-60	8	15	6	12	15	8
61-70	7	8.2	26	8	9	24
71-80	3	7.4	48	4	6.5	46
81-90	1	3.5	42	2	3	6
91-100	1	0.8	39	1	0.4	32

above the age of 60 years, frequency of Frykman Type I to IV fractures was to 75%. A similar pattern was seen with regard to the females above 60 years of age.

Even though all patients in this study were right handed, comparatively less number of right wrist was involved in 96 (42.9%) for reasons unknown.

Discussion

Contrary to the western literature, nearly half of our patients sustained fractures in the fields and a quarter, fall from mango and cashewnut trees also seemed clearly to be more frequent in both sexes upto the age of 50 years. In women after the age of 40 years, the distal radius affected by post menopausal bony changes of osteoporosis is not at all frequently seen contrary to observations demonstrated in Malmo and Oslo of Western hemisphere. Hence the fractures in women above the age of 40 years, is not necessarily because of reduction in bone mass, but reduced postural instability (Crilly et al 1987), and progressive insufficiency of functions of locomotor organs with ageing & would also be considered; indicating that the cause of fracture is a fall and severity of fracture is caused by bone fragility.

Earlier studies of epidemiology of Colle’s fractures have not included, the time interval between the trauma time and attending the hospital for treatments. 78% of patients attended the hospital within 24 hours after sustaining the injury. Patients who attended the hospital late are as follows : 14% from 1 to 5 days of injury; 4.9% from 6 to 14 days of injury and 1.8% came after two weeks of injury possibly this could be explained because of poverty, illiteracy and lack of Orthopaedic facilities available at rural area in this country.

The incidence of severe trauma fractures, although based on relatively small numbers, did not increase appreciably with age and did not differ greatly, between men and women in most age groups, confirms the findings of R.A. Owen et.al.(1982).

The incidence of Malmo (Bengner & Johnell 1985) and particularly in Oslo (Falch 1983), however, was higher than in our series. The higher incidence in men could possibly be explained by this series a higher number of fractures in the summer and rainy season.

In the Norwegian investigation (Falch 1983), the peak incidence in women occurred in the age-group 60-70 years. A similar peak has been demonstrated in USA (Melton & Riggs 1983) and in Yugoslavia (Matkovic et al. 1979), but in a recent investigation from Malmo (Bengner & Johnell 1985) the peak incidence was, as unlike in the present series, at a higher age.

Earlier studies of the epidemiology of distal radius fractures have not included a classification of the fractures. In the present study, which is the first epidemiologic study of distal radius fractures in Maharashtra, it was demonstrated that in men the four fracture types were almost evenly distributed in the older age-groups.

This finding directs even greater attention to endogenous factors in the etiology of fractures, of which we consider osteoporosis is to be the most important but not the single cause (Mallmin and Ljunghall 1992).

Time Duration Between Occurrence of Trauma And Arrival To Hospital

Time Duration	No. of Patients	Percentage
0-6 Hours	42	18.7
7-12 Hours	116	51.7
13-24 Hours	18	8
1-2 Days	22	9.8
3-5 Days	11	4.9
6-10 Days	6	2.6
11-14 Days	5	2.2
Above 14 Days	4	1.7

References

1. Bengner U, Johnell O. : Increasing incidence of forearm fracture — A comparison of epidemiologic patterns 25 years apart.: Acta Orthop Scand; 1985 : 56,158-160.
2. Doezi J, Renner A. : Epidemiology of distal radius fractures in Budapest A retrospective study of 2241 cases in 1989, Acta Orthop Scand; 1994 : 65(4), 432-3.
3. Falch J A. : Epidemiology of fractures of the distal forearm in Oslo, Norway.: Acta Orthop Scand; 1983 : 54, 291-295.
4. Frykman G. : Fracture of the distal radius including sequelae - Shoulder-hand- finger syndrome, disturbance in the distal radio-ulnar joint and impairment of nerve function. — A clinical and experimental study. : Acta Orthop Scand (Suppl 108); 1967.
5. Mallmin H, Ljunghall S. : Incidence of Colle's Fracture in Uppsala. — A prospective study of a quarter-million population. : Acta Orthop Scand; 1992 : 63(2): 213-5.
6. Matkovic V, Kostial K, Simonovic I, Buzina R, Brodarec A, Nordin B E C. : Bone status and fracture rates in two regions of Yugoslavia. : Am J Clin Nutr;1979: 32,540-549.
7. Owen R A, Melton L J, Johnson K A, Ilstrup D M, Riggs B L. : Incidence of Colle's fracture in a North American community. : Am J Public Health; 1982 : 72(6): 605-7.
8. Solgaard S, Petersen V S. : Epidemiology of distal radius fractures. : Acta Orthop Scand; 1985 : 56 (5): 391-3.

