

BILATERAL NON-CONTEMPORARY FRACTURES OF THE PROXIMAL FEMUR

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Ninety-seven bilateral non-contemporary fractures of the upper end of the femur were analysed retrospectively. They were collected from among a total of 1333 fractures treated in a 5-year period in two clinics, one in Athens and one in Geneva. The incidence of bilateral non-contemporary fractures was about 7.5 per cent of the total. The interval between the two fractures was shorter in males than in females, but a preponderance of females with bilateral fractures was evident. There was a significantly higher percentage of symmetrical fractures in the bilateral groups (70 per cent). No difference in the age, habits and general condition was found between the control (unilateral) and the bilateral fracture groups.

Key words: fractures, bilateral; hip

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Fractures of the proximal femur are probably among the most common bone injuries in the elderly (Boucher 1959, Pogrund et al. 1977).

In spite of the high risks involved these fractures have been successfully treated during the last two decades and many of the patients have returned to an almost normal active life for several years.

On the other hand, the longer life expectancy increases the risk of a similar fracture of the contralateral femur. Usually the fracture is the result of a trivial injury and many authors believe that there are also internal factors responsible for the fracture.

This paper deals with bilateral non-contemporary fractures of the proximal femur among patients (most of them being elderly) treated in two clinics (Athens and Geneva) and the stimulus for this work was the marked similarity between the two fractures in the majority of the patients.

This project was started, by coincidence, in

both Geneva and Athens separately, and only recently, by chance, it was found that both clinics were working on the same subject with parallel methods and results.

The present study is based on clinical material from both clinics.

MATERIAL AND METHODS

During a period of 5 years, 1009 fractures of the upper end of the femur were treated in Geneva and 324 in Athens. These represent the control groups. Retrospectively, 72 bilateral non-contemporary fractures were found in the Geneva group and 25 in the Athens group.

The following parameters were selected for study for each patient: age at the first fracture, interval between the two fractures, sex, type of fracture, civil status, treatment and complications.

The control and the bilateral groups were analysed statistically and the results of their comparison are presented below.

FINDINGS

1. The incidence of bilateral non-contemporary fractures was approximately the same in Athens (total number of fractures of the upper end of the femur 324, bilateral 25 or 7.6 per cent) and in Geneva (total 1009, bilateral 72 or 7.2 per cent).
2. A preponderance of female patients was found in the control groups (ratio female: male in the total number of fractures = 2.5 : 1) as well as in the bilateral fracture groups (ratio female: male in the bilateral fractures = 5.9 : 1), but this is obviously more accentuated in the bilateral groups and this difference is statistically significant (χ^2 test : 6.156 $0.05 > P > 0.01$).
3. The age in the control groups (total number of fractures, both sexes) and in the bilateral groups at the time of the first fracture did not show any significant difference (Geneva 74 years $\pm$ 12, Athens 75 years $\pm$ 10). The age in the bilateral groups at the time of the second fracture was naturally higher (Geneva 78.8 years $\pm$ 11, Athens 79 years $\pm$ 10), but if the males and females are considered separately, an interesting difference is noted:

		Male	Female
ATHENS	1st fract.	76 $\pm$ 11	74.5 $\pm$ 9
	2nd fract.	78.5 $\pm$ 11	79.5 $\pm$ 9
	Interval between fract.	2.5 years	5 years
GENEVA	1st fract.	70 $\pm$ 12	74.7 $\pm$ 11
	2nd fract.	72 $\pm$ 12	80 $\pm$ 11
	Interval between fract.	2.1 years	5.4 years

The interval between the two fractures is much shorter in males than in females and the difference is statistically significant (t test : $0.02 < P < 0.025$).

From this it would appear that men sustain a second fracture much earlier than women.

4. The fractures of the upper end of the femur were divided into two groups: peritrochanteric

Table 1. Localisation of the fractures (93 bilateral fractures and 4 triple fractures)

1st fracture	2nd fracture	3rd fracture	Total
neck	neck		25
troch.	troch.		41
neck	neck	neck	1
troch.	troch.	troch.	1
			68
			(identical)
neck	troch.		17
troch.	neck		10
neck	troch.	neck	1
troch.	neck	troch.	1
			29
			(different)

(extracapsular) and neck fractures (intracapsular). The percentage incidence of these two main types of fracture was found to be approximately the same in the control and in the bilateral groups, both in Athens and in Geneva.

It is very interesting to see how many of the fractures in the bilateral groups were identical. The localisation of these fractures (including 4 triple fractures) is shown in Table 1.

It is statistically significant that in most cases of bilateral, non-contemporary fractures the second fracture will be symmetrical (X^2 test : 10.889 $P > 0.001$). It is also evident that the weakest point is usually in the trochanteric region.

In Table 2 the incidence of symmetrical fractures of the upper end of the femur is shown.

Table 2. Comparison of series of bilateral non-contemporary fractures of the upper end of the femur

Bilateral series	Total	Identical	Different
Stewart (1957)	27	25 (92%)	2
Alffram (1964)	59	46 (78%)	13
Athens and Geneva	97	68 (70%)	29

5. Most of the fractures were operated on; conservative treatment was reserved for those few cases where the risk was very high.

The complications were the same as those that occurred in the unilateral fractures.

DISCUSSION AND CONCLUSIONS

There is at present a body of literature dealing with bilateral *contemporary* fractures of the proximal femur. These fractures are usually caused by a severe injury or anti-convulsive treatment, or may be a sequel to irradiation etc. (Androp 1941, D'Angelo & Peixoto 1960, Bickel et al. 1961, Dhanik 1953 and Powell 1960). There are, however, very few studies of bilateral *non-contemporary* fractures of the proximal femur (Alffram 1964, Stewart 1957).

The present retrospective study, carried out separately in Athens and Geneva, gives some interesting hints and stimulus for further research.

It can not be purely coincidental that almost all the parameters analysed produced approximately the same statistical findings in the two quite separate cities, but in persons belonging to the same race (Caucasian), and this should be of some importance.

To sum up, the identical findings in the Geneva and the Athens groups were the following:

- a) The incidence of bilateral non-contemporary fractures among the population was about the same.
- b) In both groups, the percentage of females was significantly higher than the percentage of male patients.
- c) The interval between the two fractures (in years) was much shorter in males than in females.

- d) The localisation of the second fracture was very often the same as that of the first (symmetrical fractures).

The occurrence of a second fracture is not determined by factors such as age, sex, general condition, habits and complications following the first fracture, since they were found to be the same in the control and the bilateral groups.

The high percentage of symmetrical fractures found in the bilateral groups indicates the possible existence of endogenic factors playing a role in the localisation of the fractures of the upper end of the femur.

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