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FRACTURE OF THE FEMORAL NECK IN CASES WITH COXARTHROSIS ON THE AFFECTED SIDE

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If a patient with coxarthrosis obtains a fracture of the femoral neck on the affected side, there seems to be a greater tendency to fracture of the trochanteric type than should normally be expected. Thus Ståhl (1957) claimed that the combination cervical femoral neck fracture-coxarthrosis rarely occurs. Upon examining fifty cases of operated, lateral (trochanteric) fracture, however, he recorded coxarthrosis in about 40 per cent of the cases.

After analyzing a material of 1664 fractures of the femoral neck, Alffram (1966) had the impression that trochanteric fractures predominate in cases with coxarthrosis. He did not, however, penetrate the subject any further.

This study is an attempt to illuminate whether there is a correlation between trochanteric fracture of the femur and coxarthrosis.

MATERIAL

Radiographs of 440 cases of fracture of the femoral neck, initial films as well as those taken later at operations, were evaluated.

During the 5 year period 1958-1962, a total of 536 patients with femoral neck fracture were recorded at the Radiodiagnostic Department, Östersund, Sweden. Ninety-six of these were excluded for various technical reasons, missing or incomplete films, poor quality, etc.

RADIOLOGY

The usual anteroposterior and "classical" lateral views were used.

The fracture. In the classification of the fractures, the author used the terms adopted by Alffram (1964), principally based on Faltin's

classification (1924): (1) subcapital fractures (immediately below the head of the femur), (2) transcervical fractures (localized between this region and the base of the proper neck of the femur), and (3) trochanteric fractures (including Faltin's intertrochanteric and pertrochanteric fractures). Subtrochanteric fractures, occurring at the level of or below the lesser trochanter, were excluded.

Stewart (1955) replaced the terms medial and lateral for the two main fracture types by the terms cervical (subcapital plus transcervical) and trochanteric.

The coxarthrosis. As shown by Danielsson (1964), osteophytes are part of normal age changes in the hip joint and have no clinical significance. Osteophytes alone cannot be taken as a radiographic criterion of coxarthrosis.

The diagnosis of coxarthrosis in this investigation has therefore been based on the demonstration of structural changes (hyperdensity, cysts) and/or joint space changes (narrowing, effacement).

For estimation of the severity of radiographic changes, the author used Heripret's scheme (Danielsson et al. 1964), thus classifying the cases of coxarthrosis as "moderate" or "severe".

RESULTS

Tables 1 and 2 show the age and sex distribution of the patients. The mean age in the material agrees with figures in previous studies (Bickel & Jackson 1950, Finney, Jones & Eaton 1959, Alffram 1964).

The female:male sex ratio was 2.8.

Table 1. Age distribution of patients with fracture of the femoral neck

Age	No. of cases	Per cent
20	0	0
21-30	1	0.2
31-40	8	1.8
41-50	17	3.9
51-60	49	11.1
61-70	107	24.3
71-80	149	33.9
81-90	96	21.8
91-100	13	3.0
100	0	0
Total	440	100

Table 2. Fractures grouped according to sex and average age

	No. of cases	Average age
Women	324	72.2
Men	116	69.4
Total	440	71.4

Table 3. Distribution of patients on fracture types

Type of fracture	No. of cases	Per cent
Subcapital	151	34.3
Transcervical	155	35.2
Trochanteric	134	30.5

The predominance of left-sided fractures often reported (Jensenius 1956, Alffram 1964) was not confirmed in this material (left-sided fractures: 218 patients, right-sided fractures: 222 patients).

Table 3 shows the distribution according to fracture type; 69.5 per cent of the fractures were cervical, a somewhat higher frequency than in most previous published materials (Ibsen 1951: 58 per cent; Stewart 1955: 43 per cent; Alffram 1964: 63 per cent). Yet Thorsøe (1960) found 69 per cent cervical fractures in his material.

Coxarthrosis was found in 59 cases, and the age and sex distribution of the patients in this group is demonstrated in Table 4.

Table 4. Patients with coxarthrosis grouped according to sex and average age

	No. of cases	Average age
Women	44	73.1
Men	15	71.5
Total	59	72.7

Table 5 shows the number of patients with moderate and severe coxarthrosis in the three groups of femoral neck fractures. Nine out of eleven patients with severe radiographic changes in the hip joint suffered from trochanteric fractures.

More than one-fourth of the patients with trochanteric fracture had

coxarthrosis, whereas only about 8 per cent of the patients with cervical fracture showed radiographic criteria of this disease.

Table 5. Occurrence and degree of coxarthrosis in the different fracture types

Type of fracture	Moderate arthrosis	Severe arthrosis	Per cent of coxarthrosis
Subcapital	9	1	6.6
Transcervical	13	1	9.0
Trochanteric	26	9	26.1

DISCUSSION

It is evident that there is some connection between arthrosis of the hip joint and trochanteric fracture of the femoral neck on the affected side. The reasons for this are worth further consideration. A hypothesis was proposed by Ståhl (1957). While the *trochanteric* fracture seems to be due to extrinsic violence upon the femur, the *cervical* fracture, on the other hand, is probably in most cases the result of intrinsic forces, e.g. contraction of the external rotator muscles of the thigh with the extremity fixed in the orthostatic position (Smith 1953). In coxarthrosis, the range of internal rotation is diminished, and the resting position of the hip is in external rotation, giving rise to the characteristic rolled-out position of the foot (Perkins 1961). This could mean that the external rotator muscles in these cases are too "short" to break the femoral neck, thus producing a cervical fracture. Furthermore the inflammatory condition in the joint leads to increased muscular tonus, followed by bad nutrition, atrophy, and fibrous degeneration. A reduction of the intrinsic forces is the result.

Another possible explanation: as a result of the peripheral proliferation in coxarthrosis, with ossified excrescences surrounding the femoral head at the margin of the articular cartilage, the medial part of the femoral neck is reinforced. This is a hindrance to the occurrence of at least the subcapital type of fracture.

A combination of these theories might be the proper explanation of the phenomenon.

SUMMARY

1. In trochanteric fractures of the upper end of the femur, arthrotic changes in the affected hip joint are found far more often than in fractures of the cervical type.

2. Radiographs of 440 cases of femoral neck fracture were evaluated. In 134 cases of trochanteric fracture, arthrotic changes were found in the hip joint of the affected side in 26.1 per cent of the patients, whereas in 306 cases of cervical fracture, only 7.8 per cent of the patients had arthrotic hips. Nine out of eleven patients with severe coxarthrosis sustained trochanteric fractures.

3. Possible explanations of these findings are briefly discussed.

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