

Hip fracture in rheumatoid arthritis

All patients with rheumatoid arthritis, admitted for hip fracture to a regional hospital during a 5-year period, were studied in retrospect. Of 1092 hip fractures, 16 cervical and nine trochanteric fractures occurred in rheumatics. Four cervical fractures were stress fractures. The mean patient age was lower than in a normal hip fracture material and the female predominance more pronounced.

Of 14 surviving patients with cervical fractures, three had an uncomplicated 2-year healing, while 11 developed redisplacement, non-union or segmental collapse, in eight cases necessitating hip arthroplasty. Of eight surviving patients with trochanteric fractures, serious complications developed in two: non-union in one and septicaemia in one, necessitating nail extraction 1 week after the primary operation. The complication rate was higher than in an unselected femoral neck fracture material.

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In a consecutive series from Finland (Julkunen 1974), it was noted that 8 per cent of patients with femoral neck fractures had rheumatoid arthritis (RA). Reports on trochanteric fractures in RA are rare (Vahvanen 1971) whereas there are numerous reports on small femoral neck fracture materials (Maddison & Bacon 1974, Stephen 1981). An increased incidence of healing complications has been reported (Vahvanen 1971, Stephen 1981), as well as a high incidence of spontaneous fractures through the neck of the femur (Devas 1965, Schneider & Kaye 1975).

This series includes the clinical and radiographic outcome of all hip fractures in rheumatics, spontaneous or traumatic, treated at a regional hospital during a 5-year period.

Patients and methods

From 1977 through 1981, 1092 patients were admitted to the Department of Orthopaedic Surgery, Lund University Hospital, for a hip fracture, 621 for cervical and 471 for trochanteric fractures. Twenty-five of these, 16 with cervical and nine with trochanteric fractures, suffered from rheumatoid arthritis and had been receiving medication for this disease for more than 1 year. For the majority of patients, the diagnosis had been established at the Department of Rheumatology, Lund; the remainder who were diagnosed elsewhere, had sero-positive disease. The mean age was 67 (52-83) years. Twenty-two patients were female, and three male.

Cervical fractures

Fourteen females and two males had cervical fractures. Four fractures were undisplaced, Stage I-II (Garden 1961), and 12 were displaced, Stage III-IV. In no case were arthritic changes of the affected hip joint seen at the time of admission (Table 1).

In 12 cases, an eliciting trauma was found, while four fractures were regarded as stress fractures with spontaneous onset of pain on weight-bearing, in three cases more than 2 weeks before admission to the hospital. In four cases, the fracture-producing trauma was an indoor fall on the floor; the remaining eight had fallen outdoors or from one level to another (Table 1), most of them from stairs.

The operation was performed under fluoroscopy on an extension table. In 11 cases a four-flanged nail (Rydell 1964) was used for fracture fixation, in five cases two hook-pins (Strömqvist 1983). Mobilization with full weight-bearing was started on the first postoperative day.

Trochanteric fractures

Eight females and one male had sustained trochanteric fractures. Preoperatively, four fractures were characterized as stable and five as unstable (Evans 1949). In three cases arthritic hip joint changes were noted at the time of fracture, in one case the preoperative radiographs could not be found, and the remaining five had a radiographically normal hip joint (Table 2). One patient sustained her fracture during an epileptic seizure, one by a fall from her wheelchair, and two by a fall on the floor, while five had fallen outdoors or from one level to another (Table 2).

Table 1. Patient data. Cervical fractures

A	B	C	D	E	F	G	H	I	J	K
1	55	1	1	3	2	2	2	4	4	2
2	57	1	1	2	2	1	3	1	1	2
3	78	1	1	2	2	1	3	1	1	1
4	76	1	1	1	2	1	1	1	1	2
5	79	1	3	3	2	1	3	4	3	2
6	67	2	3	3	2	1	3	1	1	1
7	52	1	3	4	2	1	2	2	2	1
8	68	2	4	4	2	1	3	4	4	2
9	72	1	4	4	2	1	3	4	1	2
10	67	1	4	4	2	1	3	3	1	1
11	63	1	4	2	2	1	2	3	4	2
12	67	1	4	1	2	1	2	3	4	2
13	54	1	4	1	2	2	3	2	4	2
14	83	1	4	4	2	2	1	3	4	2
15	73	1	4	1	2	2	1	1	1	2
16	70	1	4	2	2	2	2	2	4	2

Key to data in Table 1

- A. Case number.
 B. Age.
 C. Sex. 1 = female; 2 = male.
 D. Fracture displacement (Garden). 1 = stage I-II; 3 = stage III; 4 = stage IV.
 E. Trauma. 1 = no trauma; 2 = fall indoors, same level; 3 = fall from stairs; 4 = fall outdoors.
 F. Pre-existing arthritic changes. 1 = yes; 2 = no.
 G. Method of internal fixation. 1 = flanged nail; 2 = hook-pins.
 H. Prognostic scintimetry. 1 = favourable; 2 = unfavourable; 3 = not performed.
 I. Radiographic healing complication. 1 = none; 2 = redisplacement; 3 = non-union; 4 = segmental collapse.
 J. Reoperation. 1 = none; 2 = re-nailing; 3 = nail extraction; 4 = THR.
 K. Dead within 2 years from fracture. 1 = yes; 2 = no.

Table 2. Patient data. Trochanteric fractures

A	B	C	D	E	F	G	H	I	J
17	69	1	2	5	2	1	1	2	2
18	68	1	2	2	1	1	1	2	2
19	66	1	1	4	1	1	2	3	2
20	52	1	2	3	2	1	1	1	2
21	79	2	1	4	2	2	1	4	2
22	72	1	2	4	3	2	2	3	1
23	73	1	2	3	2	1	1	1	2
24	58	1	1	2	2	2	3	?	3
25	61	1	1	2	2	2	1	1	2

Key to data in Table 2

- A. Case number.
 B. Age.
 C. Sex.
 D. Fracture type (Evans). 1 = stable; 2 = unstable.
 E. Trauma. 1 = no trauma; 2 = fall indoors, same level; 3 = fall from stairs; 4 = fall outdoors; 5 = grand-mal seizure.
 F. Preexisting arthritic changes. 1 = yes; 2 = no; 3 = unknown.
 G. Method of internal fixation. 1 = sliding screw and plate; 2 = intramedullary nails.
 H. Fracture union. 1 = yes; 2 = no; 3 = unknown.
 I. Radiographic complication. 1 = none; 2 = pronounced varisation; 3 = non-union; 4 = diaphyseal spiral fracture after nailing.
 J. Dead within 2 years from fracture. 1 = yes; 2 = no; 3 = unknown.

Fluoroscopy and an extension table were utilized during the operation, and the method of osteosynthesis was intramedullary Ender nails in four cases and sliding screw and plate in five cases. For four fractures, characterized as unstable postoperatively, prolonged (4–8 weeks) non-weight-bearing was prescribed.

Results

Cervical fractures

Undisplaced fractures. One patient with an undisplaced fracture died at 12 months, two fractures showed uncomplicated 2-year-healing, and one fracture developed segmental collapse of the femoral head, necessitating hip arthroplasty during the second post-operative year (Table 1).

Displaced fractures. One patient died at 9 months postoperatively with no known fracture complication. The remaining 11 patients with displaced fractures were followed up for 2 years postoperatively or until radiographic signs of healing complications were obvious. One fracture had healed at 2 years without signs of femoral head collapse. Three fractures redisplaced within 2 months, which led to total hip arthroplasty in two cases; in the third case renailing was attempted; the result at 12 months was satisfactory, but 2 months later this patient died. In four fractures, non-union was evident within 12 months (Figure 1); one patient was fairly asymptomatic and not interested in further surgery, while the other three had an arthroplasty. The last three patients all developed segmental femoral head collapse 10–18 months postoperatively. One of them had a hip arthroplasty, one nail extraction only, and one no reoperation; the latter two patients were rather immobile because of their generalized rheumatoid disease.

In all, radiographic complications were diagnosed in 10/12 displaced fractures, necessitating eight reoperations in this group.

Trochanteric fractures

Within 1 year of fracture, one patient had died after uncomplicated fracture healing (Table 2). In one case, the Ender nails were extracted 1



Figure 1. Displaced cervical hip fracture on admission (left) and at 11 months from operation, showing non-union (right). Case 11.

week after nailing because of septicaemia, and the patient deteriorated beyond therapy. In one fracture, non-union developed (Figure 2); the patient had chronic, infected varicose ulcers of the legs, contraindicating hip arthroplasty. Two fractures healed after pronounced varisation, resulting in leg length discrepancy of 3–4 cm but fairly asymptomatic hips. One fracture healed after prolonged non-weight-bearing because of the postoperative discovery of a spiral fracture entering the femoral shaft. In one case follow-up was incomplete and the remaining two followed an uneventful healing course. In the nine cases of trochanteric hip fracture, thus, three were followed to unevent-

ful healing and two had serious complications; no reoperations were performed in this group.

Discussion

Large hip fracture materials have a mean age of 75–80 years and a female:male ratio of about 3:1 (Jensen & Töndevold 1979, Zetterberg & Andersson 1982, Strömqvist 1983). The lower mean age of rheumatoid hip fracture patients noted in this study confirms earlier findings (Alffram 1964, Vahvanen 1971, Stephen 1981); the more pronounced female preponderance (Vahvanen 1971) corresponds to the sex distribution in rheumatoid arthritis.



Figure 2. Stable trochanteric fracture on admission to hospital (left) and at 16 months from operation, showing non-union (right), a most unexpected development. Case 19.

Two per cent of the hip fracture patients during a 5-year period suffered from rheumatoid arthritis (25/1092), which seems to correspond rather well to the reported incidence of rheumatoid arthritis in adults of 2–4 per cent (Scott 1978, Berglund 1979), but the rising RA prevalence figures seen with increasing age (Lawrence 1970, McCarthy 1979) were not reflected in the current study.

Spontaneous fractures of the femoral neck in rheumatoid arthritis are not uncommon (Rosenberg 1958, Haider & Storey 1962, Alffram 1964) and often present with minor pain and a normal radiograph (Schneider & Kaye 1975), while increasing pain on weight-bearing is caused by progressive fracture displacement (Devas 1965). With the better results in undisplaced than displaced fractures, it would seem important to establish the diagnosis in the pre-radiographic stage by Tc-MDP scintimetry, and perform fracture fixation before displacement occurs.

The complication rate after hip fracture in rheumatoid arthritis in the present study was high, for cervical fractures with displacement so high that the policy of treatment for this patient group may be questioned. Primary femoral head arthroplasty as femoral neck fracture treatment has been questioned (Hunter 1980), and has been regarded as contraindicated in rheumatoid arthritis (Gingras et al. 1980), but total hip arthroplasty for displaced fractures (Sim & Stauffer 1980) might prove rewarding in rheumatoid patients in the future. Preoperative scintimetry may select the fractures suited for this procedure (Strömquist et al. 1984), although the possibility of false positive results because of hip joint synovitis may have to be considered. One case of this type was encountered in the present study (Case 14). Another possibility would be that the improved osteosynthetic techniques developed during later years could improve the results, e.g. hook-pins (Strömquist et al. 1983) or cannulated screws (Zilch & Naseband 1980).

Two failures out of nine in trochanteric fractures is remarkable, although the material is too small for definite conclusions. The development of non-union in the stable fracture of Case 19 shown in Figure 2 is certainly surprising. Non-union in trochanteric fractures is

extremely rare (Evans 1949, Jensen et al. 1980), but one case in a rheumatoid was reported by Vahvanen (1971). However, re-operation for non-union of a trochanteric fracture would not normally be a serious problem.

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