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Intracapsular hip fractures in patients with rheumatoid arthritis

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Abstract We reviewed the treatment of 43 patients with rheumatoid arthritis and femoral neck fracture. Patients' average age was 66.4 (36–80) years and average duration of RA was 20.3 (4–42) years. Thirteen patients were treated with primary total hip arthroplasty (THA), and the clinical results were comparable to patients treated conservatively or by osteosynthesis. Eighteen patients were treated with primary bipolar hip prosthesis and after an average of 6.1 (1–13) years there was no acetabular destruction. However, long-term results were inferior to patients treated with THA. Nine patients were treated with osteosynthesis, of which two later had a hip prosthesis. Three cases with impacted fractures were treated conservatively with successful union in all.

Résumé Nous avons étudiés le traitement d'une fracture du col du fémur chez 43 malades atteints de polyarthrite rhumatoïde. L'âge moyen des malades était 66,4 ans (36–80) et la durée moyenne d'évolution de la polyarthrite rhumatoïde était 20,3 ans (4–42). Treize malades ont été traités par arthroplastie totale de la hanche et les résultats cliniques étaient comparables à ceux des malades traités d'une manière conservatrice ou par ostéosynthèse. Dix-huit malades ont été traités avec une prothèse bipolaire. Après une moyenne de 6,1 ans (1–13) il n'y avait aucune destruction acetabulaire mais les résultats éloignés étaient inférieurs à ceux des malades traités avec PTH. Neuf malades ont été traités avec ostéosynthèse et deux d'entre eux ont dû avoir secondairement

une prothèse de la hanche. Trois cas de fracture engrenée ont été traités d'une manière conservatrice avec succès.

Introduction

Intracapsular fractures of the femoral neck are one of the most common fractures in the elderly, and the incidence has increased significantly in the last decades [11]. Although treatment of these fractures by closed or open reduction and internal fixation is standard in younger patients, arthroplasty is the standard treatment in geriatric patients in many countries. The role of total hip arthroplasty (THA) for treatment of displaced intracapsular fractures is controversial. Some authors have strongly voiced against THA in active elderly patients with no preexisting acetabular disease [3]. Others have shown that treatment with bipolar hip prosthesis (BHP) may cause development of acetabular erosion, which might later require further revision to THA.

Conservative measures are used on patient request or in cases where the general condition does not allow surgical interference. In patients with rheumatoid arthritis (RA), there is usually multijoint replacement, and avoiding a major operation may be another advantage of the conservative measures.

Spontaneous femoral neck fracture is a well-documented condition in osteoporosis [16] and also known to occur in RA. Such fractures in normal individuals have been referred to as stress fractures, and although RA patients do not fall into this category, spontaneous fracture in these patients follows a similar pattern [9].

The aim of this study was to report on which treatment had been used in a series of RA patients with femoral neck fracture.

Patients and methods

Forty-three patients with RA and femoral neck fracture were treated. There were 38 women and five men with an average age of 66.4 (36–80) years. The mean duration of RA was 19.7 (4–42)

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Table 1 Demographics of the patients. *RA* rheumatoid arthritis, *CRP* C-reactive protein, *JOA* Japanese Orthopedic Association, *BHP* bipolar hip prosthesis, *THA* total hip arthroplasty, *CHS* compression hip screw, *CCHS* cannulated cancellous hip screws

	Age	Gender	Garden's classification	Duration of RA (years)	Hip grade ^a	CRP (mg/dl)	Singh's index [14]	Wrist grade ^a	Treatment method	Follow-up (years)	Results	Total JOA score
1	60	F	III	9	0	2.1	3	IV	Conservative	3	Union	84
2	59	F	III	27	II	3.2	3	IV	Conservative	2.7	Union	82
3	65	F	III	31	I	1.1	4	IV	Conservative	2	Union	94
4	52	F	II	17	0	1.2	4	V	CCHS	1	Union	74
5	58	F	III	10	I	4.8	4	IV	CCHS	2.2	Union	85
6	75	F	II	27	0	1.1	6	IV	CCHS	5	Union	72
7	36	F	IV	19	0	4.9	5	IV	CCHS	5.5	Union	96
8	40	F	III	28	0	1.9	5	V	Knowles pins	9	Union	95
9	69	F	II	33	0	3.1	2	V	Knowles pins	12	Union	76
10	78	F	III	17	0	2	5	IV	CHS	3	Union	83
11	73	M	IV	29	0	1.8	5	IV	Knowles pins⇒ BHP	6	Nonunion	72
12	66	F	III	40	II	2.1	5	IV	CHS⇒ THA	1.5	Nonunion	77
13	68	M	III	11	II	3.2	3	IV	BHP	1	-	60
14	60	F	III	9	I	1.2	4	III	BHP	1.5	-	93
15	80	F	III	14	I	1.3	3	III	BHP	2	Proximal migration	74
16	74	F	IV	17	0	1.1	3	III	BHP	5	-	71
17	72	F	III	32	I	2.8	3	IV	BHP	5	Proximal migration	69
18	70	F	III	7	I	1.9	3	V	BHP	7	-	67
19	78	F	IV	42	I	3	2	V	BHP	6	Loosening	45
20	66	M	IV	12	I	1.1	3	III	BHP	5	-	87
21	57	F	III	16	0	2.9	3	V	BHP	8	-	77
22	62	F	IV	18	0	1.4	4	IV	BHP	10	Proximal migration	69
23	70	F	III	16	I	4.8	4	IV	BHP	12	-	76
24	69	F	III	22	I	3.2	3	V	BHP	5	-	77
25	65	M	III	19	I	1.7	3	III	BHP	4	-	77
26	47	F	IV	12	I	3.6	3	V	BHP	13	Loosening infection	52
27	70	F	IV	14	0	1.1	3	III	BHP	11	Proximal migration	63
28	72	F	IV	35	I	1.2	4	V	BHP	8	Loosening	71
29	70	F	III	22	I	2.1	4	IV	BHP	9	-	72
30	73	F	III	12	0	1.9	3	II	BHP	7	-	71
31	69	F	III	9	I	4.9	5	III	THA	1	-	93
32	72	F	II	4	II	5.1	3	V	THA	1	-	84
33	66	F	IV	24	III	3.2	3	III	THA	1	-	86
34	74	F	IV	7	II	1.9	4	IV	THA	3.5	-	77
35	72	F	III	5	III	2.1	3	III	THA	4.5	-	87
36	80	F	IV	10	II	1.9	3	III	THA	6	-	77
37	64	F	III	37	I	1	4	V	THA	8	-	72
38	64	M	IV	21	IV	3.1	3	IV	THA	13	Loosening	78
39	64	F	IV	27	0	1.7	4	IV	THA	14	Loosening	79
40	71	F	IV	28	IV	2.6	3	III	THA	13	-	78
41	71	F	IV	42	2	3.1	3	V	THA	14	-	79
42	63	F	II	21	4	1.9	2	IV	THA	16	-	77
43	72	F	IV	22	1	2	4	IV	THA	7	-	81

^a Larsen's grade [7]

years. In 12 patients the fracture occurred spontaneously and in 29 after slipping and falling. In 15 patients at least 2 weeks passed before the diagnosis was established. Five fractures were classified as Garden type II, 21 as type III, and 17 as type IV. Geode lesion [9] was found in three cases, while the hip was unaffected by the inflammatory process of RA in 14 cases. Prednisolone in a dose of 5 mg or more was used by 22 patients, while 13 were using methotrexate. In 25 patients there was a history of one or more previous joint replacements. Further details on the patient's data are represented in Table 1.

Three modalities of treatment were undertaken. In 12 patients the femoral head was preserved. Three of these patients were treated by conservative measures and nine patients with internal fixation. Cannulated screws were used in four, Knowles pins in three, and compression screws in two. In 18 patients a BHP was inserted, and 13 patients underwent THA. Two patients with failed internal fixation had a BHP and a THA respectively as a secondary procedure.

Results

We used the clinical scoring system of the Japanese Orthopedic Association (JOA) to evaluate the patients [12]. The highest score was found in patients in whom the femoral head was preserved. Patients treated by internal fixation were followed for an average of 3.6 (1–12) years and those treated by conservative means for 2–3 years. The average score was 82.5 (72–96). Nonunion developed in two cases and made a secondary operation necessary.

Patients treated by THA were followed for an average 7.1 (1–16) years, and the average score was 80.6 (72–93). Two cases were found to have loosening, and

Fig. 1 Bipolar hip prosthesis (BHP) in a 62-year-old woman, early and 10-year follow-up, with proximal migration of the prosthesis. Notice advanced destruction of the wrist and other joints replaced

one was revised. Patients treated with BHP were followed for an average of 6.2 (1–13) years, and the average score was 70.6 (45–93). Loosening occurred in three cases, of which one was infected and one was revised. Proximal migration was observed in four cases (Fig. 1).

Discussion

Femoral neck fracture has been considered the unsolved fracture [4]. Treatment is a matter of controversy, ranging from conservative measures to THA. In protrusion or marked destruction of the acetabulum, THA is the treatment of choice [13]. Internal fixation of femoral neck fractures is associated with a higher incidence of complications than any other fracture. The rates of nonunion and avascular necrosis are unacceptably high, and these complications are the main reason for resorting to primary femoral head replacement in elderly patients in the presence of displaced fractures [5]. The goal of treatment is to return the patient to a level of function equal to the prefracture state. In this study various ways of treatment were evaluated. Although prosthetic replacement eliminates concerns about fixation failure, nonunion, and avascular necrosis, they introduce problems related to prosthetic loosening, acetabular erosion, dislocation, and infection [8]. In the 14 cases treated by THA, two cases showed aseptic loosening and one of them needed revision. In these two cases there was also a geode lesion.

In RA patients with femoral neck fracture treated by THA there is often polyarticular disease and limited functional requirements. Thus it might be argued that the incidence of mechanical loosening should be lower than in patients with osteoarthritis. However RA is a relentlessly progressive disease. Osteopenia and bone resorption are hallmarks of its activity. The continuing process of deleterious bone remodeling might negate the theoretic advantages gained by the patient's decreased mechanical requirements. Other studies have shown that without a preexisting acetabular disease, one can expect results comparable to those reported for elective THA and better than with BHP [3, 15].

In patients treated with BHP (18 primary cases and one revision case), we saw seven cases with proximal migration or loosening of the prosthesis. Two occurred before 5 years of follow-up. This high incidence of failure may be due to the already weakened acetabulum in patients with RA. BHP is a relatively simple operation in comparison to THA and carries the advantages of minimal blood loss and operation time. These benefits may outweigh the short-term results in high-risk patients with short life expectancy requiring minimal operative interference. However, in long-term follow-up, the high failure rate necessitates the switch to THA for patients with a longer life expectancy.

Maintaining the femoral head is the goal for the relatively young and active patients provided that the hip is without destruction and Geode lesion in the femoral neck, as this is usually associated with hip destruction [6]. The results of a united femoral neck fracture should be superior to any type of prosthetic replacement [2]. Internal fixation was performed in nine cases, of which five patients were older than 65 years. Two of these passed to nonunion and needed a secondary arthroplasty.

Three cases were treated with success by conservative measures. The fracture was impacted and abducted; thus the type and pattern of fracture is of utmost importance if considering this regimen of treatment. Gender, age, duration of RA, wrist grade of RA, C-reactive protein (CRP), use of prednisolone, and osteopenia, did not affect the outcome. Geode lesion of the femoral neck is an infrequent finding in RA [1, 10]. Loosening was observed in two of the three patients with geode lesions treated by primary THA. Thus geode lesion is an important risk factor.

In 12 patients there was a spontaneous fracture. The fractures occurred without any predisposing trauma, and pain ranged from dull aching to severe pain, worse on weight bearing. Delay in diagnosis can be avoided and treatment measures simplified if the possibility of a femoral neck stress fracture is considered in patients with chronic RA presenting with hip pains after minimal or no trauma, even in the face of normal X-rays.

The total number of patients in this study may be not large enough for specific recommendations, and a longer study on a larger number of patients is required. However the literature contains very few papers dealing with the treatment of femoral neck fractures in RA patients.

We conclude that in RA patients with femoral neck fracture, internal fixation is not advisable in patients older than 65 years. BHP should be considered only in patients with a short life expectancy and unfavorable general condition. A geode lesion is a potential risk factor. The results of THA are comparable to the results of united fractures.

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