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Failure of tibial bone grafting for femoral head necrosis

Pieter A. G. M. Bakx, Frans C. van Biezen and Bert van Linge

We treated 20 hips with femoral head necrosis in 16 patients using the Phemister tibial bone grafting procedure. After a mean follow-up of 3 years, the Harris hip score had improved in 15 out of 18 hips,

however without radiographic improvement. In 2 hips, an arthrodesis and an arthroplasty were performed. We concluded that the aim of our treatment was not achieved.

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The theoretic effect of the tibial bone grafting procedure for necrosis of the femoral head, as described by Phemister (1949) and Bonfiglio and Bardenstein (1958), is reduction of the intraosseous hypertension by core decompression, stimulation of revascularization and ossification, and increased load-bearing capacity (Penix et al. 1983).

The aim of our study was to evaluate the clinical and radiographic results of this technique.

Patients and methods

Between 1983 and 1989, 16 patients—6 women and 10 men with a mean age of 40 (29–47) and 31 (21–47) years, respectively—presented with necrosis of the femoral head, 4 with bilateral involvement. The etiologic factors included corticosteroids, alcohol abuse, trauma, barotrauma or dysbarism, and unknown factors (Table 1)

The operative technique was based on descriptions by Phemister (1949) and Bonfiglio and Bardenstein (1958). Via a lateral exposure and with the aid of an image intensifier, two 8-mm drill holes were made through the femoral neck into the necrotic part of the head. Cortical bone grafts from the ipsilateral tibia were inserted into the drill holes up to the subchondral bone, carefully avoiding penetration of the joint. Postoperatively, the patients were not allowed weight bearing for at least 3 months.

The radiographic stage was determined according to Ficat (1985), and the clinical result was assessed with the Harris (1969) hip score before the operation and at follow-up.

Results

At a mean follow-up time of 33 (12–73) months, one hip had undergone an arthrodesis and one hip an arthroplasty, which left 18 hips for evaluation (Table 1).

The arthrodesed hip had developed arthrosis as a result of penetration of the graft into the joint space. On the other hand, the donor tibia did not cause any postoperative problems.

Radiographically, according to Ficat, five out of 20 hips were still in the same stage, one out of 20 hips had improved, and 14 out of 20 hips had worsened one or two stages or had more symptoms with the same stage. The Harris hip score had improved in 15 out of 18 hips.

Discussion

Despite the clinically satisfying result, the radiographic aim was not achieved. Perhaps similar results could have been achieved with core decompression (Hungerford 1979, Ficat 1985, Camp and Colwell 1986), or even without treatment.

Several authors advocate that tibial bone grafting should only be performed in Ficat's Stage II (Boettcher et al. 1970, Marcus et al. 1973, Springfield and Enneking 1975, Smith et al. 1980, Penix et al. 1983). The hips operated on in Ficat's Stage II, indeed, seemed to have better radiographic results, but the number of patients was too small to draw definitive conclusions. There was no difference in the Harris hip score in patients operated on in Ficat's Stage II and in more advanced stages.

Table 1. Data on 20 hips with femoral head necrosis treated by tibial bone grafting

A	B	C	D	E	F	G	H	I
1	M	34	1	32	III	III	89	89
2	M	34	1	35	IV	IV ^a	63	87
3	M	28	1	15	II-III	III		
4	F	43	1	32	II	II	34	54
5	F	29	1	29	II	II	69	84
6	F	29	1	29	III	III	26	59
7	M	46	1	49	II-III	III	40	82
8	F	41	1	50	II-III	III	29	72
9	M	29	1	12	III	IV	36	72
10	M	28	1	20	III	III	49	72
11	M	22	1	69	II	IV	42	69
12	M	22	1	28	III	IV	75	78
13	F	52	2	29	III	IV	49	54
14	M	47	2	31	III	IV	19	19
15	M	47	2	30	IV	IV ^b	19	22
16	M	21	3	30	II-III	III	50	64
17	F	48	3	12	III	IV		
18	M	33	4	72	II-III	II	50	85
19	M	32	5	16	II	III	34	34
20	F	32	5	30	III	IV	16	7

A Hip number

B Sex

C Age

D Etiology

1 corticosteroid-induced

2 alcohol abuse

3 posttraumatic

4 barotrauma or dysbarism

5 unknown factors

E Follow-up, months

F Ficat's stage in preoperative radiograph

G Ficat's stage in postoperative radiograph

^awith increased arthrosis^bwith severe collapse

H Harris' hip score preoperatively

I Harris' hip score postoperatively

We were not able to find a correlation between the Harris hip score and the follow-up radiograph: in 14 out of 20 hips, there was radiographic progression, whereas the Harris hip score decreased in only 1 patient.

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