

Core decompression in femoral head osteonecrosis

18 Stage I hips followed up for 1–5 years

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In a prospective study, we performed 18 core decompressions for Stage I primary osteonecrosis of the femoral head. Only 5 patients (six hips)

seemed to have benefited from the intervention for more than 1 year.

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The good results of core decompression in the early stages of osteonecrosis have ranged from 80–90 percent (Ficat 1985, Tooke et al. 1988) to 25–50 percent (Camp and Colwell 1986, Hopson and Siverhus 1988, Learmonth et al. 1990). These studies have been retrospective, and the results may have been influenced by several factors: etiologic risk factors, steroid administration, alcohol abuse, or a segmental infarct (Saito et al. 1988).

Since 1985, we have performed a prospective study of Ficat and Arlet (1979) Stage I osteonecrosis.

Patients and methods

Our series comprised 7 men (eight hips) and 7 women (10 hips) with Ficat and Arlet (1979) Stage I osteonecrosis of the femoral head. The median age was 53 (38–66) years. All the patients complained of hip pain, and none of them had known predisposing factors for osteonecrosis. We tried to exclude patients with early arthrosis with a CT scan or lateral oblique standing radiographs to demonstrate the anterior and posterior parts of the joint. After measurements of pO_2 , pCO_2 , and hydrostatic pressure (Pedersen et al. 1989), a core biopsy was taken from the superior portion of the femoral head up to a distance of 5 mm from the joint space; an 8-mm trephine was used with the aid of image intensification. The biopsies were examined by the same pathologist and classified according to Arlet and Durroux (1973). The biopsy confirmed the diagnosis in 13 hips. In four hips the biopsy failed, and in one hip it was found to be normal (Table 1); but the

hydrostatic pressures were considered diagnostic (> 30 mmHg) in these patients. With a 4-mm drill, three additional channels were bored in different directions, after which the hydrostatic pressure was measured again. Patients with bilateral involvement underwent simultaneous core decompression of both hips. For the first 2 weeks, canes were used. After 3 and 12 months, we made clinical, radiographic (two projections), and scintigraphic examinations. The patients were reviewed in September 1990, i.e., after 1–5 years.

Results

The oxygen tensions (20–56 mmHg) in the femoral heads were below normal, whereas the pressures (30–80 mmHg) were above normal. Core decompression reduced the pressures by 20–60 mmHg, i.e., to normal.

Postoperatively, all the patients had a reduction of the pain; but in only 5 patients (six hips), this relief lasted for more than 12 months. In four hips, there was a radiographic progression of the necrosis (Table 1).

Discussion

Pathologic confirmation in preradiographic Stage I osteonecrosis is difficult. In the present study, the identification was accurate in 10 cases (histologic types 2 and 3; radiographic progression), very likely accurate in 5 cases (histologic type 1 and bone-marrow pressure above 30 mmHg), and likely

Table 1. Stage I osteonecrosis of the femoral head. Results of core decompression

Case	Hip	Observation (months)	Radiographic findings ^a	Histologic type ^b	Pressure (mmHg)	Pain relief (months)	Radiographic progression ^c
1	1	54	+	2	32	< 3	—
2	2	54	+	2	80	< 3	III
3	3	51	+	1	31	51	—
4	4	44	0	3	30	44	—
5	5	44	+	1	34	< 3	—
6	6	39	0	1	30	35	—
7	7	34	0	n	37	< 3	—
8	8	33	0	2	40	< 3	—
8	9	33	0	2	60	< 3	—
9	10	33	+	f	70	8	III
9	11	33	+	f	55	8	III
10	12	27	+	3	60	6	—
11	13	21	+	2	39	6	—
11	14	21	+	f	35	6	—
12	15	14	0	3	65	< 3	II
13	16	12	0	1	45	12	—
13	17	12	0	1	78	12	—
14	18	12	0	f	40	12	—

^a0 Normal, + loss of clarity of trabecular pattern.

^b1-4 (Arlet and Durroux 1973), n normal, f failed.

^cI-IV (Ficat and Arlet 1979).

Patient 6 had a painful period 14-18 months after the core decompression.

accurate in 3 cases (bone-marrow pressure above 30 mmHg). As regards hip pain, we could not confirm that the vicious circle of medullary hypertension and ischemia in Stage I osteonecrosis can be broken by a simple core decompression. A longer period of nonweight bearing might have improved our results. Weight bearing is a secondary factor in the development of osteonecrosis, and it can cause subchondral microfractures in the femoral head, which means that revascularization can be aborted (Atsumi et al. 1989). Other treatment modalities, such as bone grafting, electrical stimulation (Steinberg et al. 1989), and pulsing electromagnetic fields (Aaron et al. 1989), could have been a supplement.

Our follow-up period (1-5 years) is too short for evaluation of the influence of core decompression on the natural course (radiographic progression), which regrettably is mainly unknown as regards idiopathic preradiographic osteonecrosis.

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