SYNOVECTOMY OF THE HIP IN JUVENILE CHRONIC ARTHRITIS

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Eighteen synovectomies of the hip in 16 patients with juvenile chronic arthritis were performed with satisfactory relief of pain in 13 hips. The average age at operation was 14 years and the follow-up time 52 months. The mobility and walking capacity were not changed by the operation and progress as shown by radiographs before synovectomy continued for most patients. Synovectomy may relieve pain permanently and should always be considered before any prosthetic replacement.

Synovectomy of the hip in juvenile chronic arthritis (JCA) is an uncommon procedure and its value is uncertain. Few reports are available and the number of patients is small (Fink *et al.* 1969; Eyring, Longert and Bass 1971; Garrett and Campbell 1971; Granberry and Brewer 1974; Isaacson 1974; Albright, Albright and Ogden 1975; Brattström and Holgersson 1978; Jakubowski 1978; Neumann and Weber 1978). The aim of this study is to describe the technique and to present the late results after 18 synovectomies of the hip for JCA.

PATIENTS AND METHODS

During the 10-year period (1970–1980) 18 synovectomies of the hip were performed on 16 patients at the University Hospital, Lund. Pain was the main indication in 15 hips, subluxation and pain in two hips (Cases 1 and 17) and marked stiffness in one (Case 15). All 16 patients had juvenile chronic arthritis (Wood 1978) defined as an arthritis which had started before the sixteenth birthday and continued for at least three months, regardless of the age at which the patient was first seen. JCA, therefore, includes juvenile rheumatoid arthritis, juvenile ankylosing spondylitis, psoriatic arthropathy and arthropathy associated with inflammatory bowel disease. The mode of onset was systemic illness in six patients, polyarticular disease in six and pauciarticular disease in four.

Fourteen of the patients were classified as having juvenile rheumatoid arthritis (JRA) as they fulfilled the criteria laid down by Brewer and his colleagues in 1973 (see Table I) and showed polyarthritis of two or more joints or monoarthritis of more than three months' duration. The joints were either swollen or showed two of the three features of heat, pain and tenderness, or stiffness. Alternatively if the polyarthritis had been present for less than three months the patients also showed one of the following manifestations: a rash, a raised rheumatoid factor, iridocyclitis, involvement of cervical vertebrae, pericarditis, tenosynovitis, intermittent pain or morning stiffness. Twelve of the JRA patients had polyarthritis, one had a few joints involved and one had monoarthritis. Two were seropositive and positive to antinuclear antibody (ANA), one ANA-positive and HLA-B27 positive, and one seropositive only. One of the 16 patients developed a juvenile psoriatic polyarthropathy (Lambert *et al.* 1976); and another, with pauciartthritis, developed ulcerative colitis.

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The duration of the disease averaged seven years (range 1 to 19 years) and the duration of the hip condition five years (range 1 to 19 years). The mean age at the time of synovectomy was 14 years (range 8 to 29 years). The average follow-up time was 52 months with a range of 6 to 108 months. Three patients had been given one course and 12 patients two or more courses of major drugs such as steroids, chloroquine, gold salts, penicillamine, or cytostatics before the synovectomy. The activity of the disease was described as high, moderate, low or none and was evaluated before the operation and during the follow-up.

Assessment. The scoring system suggested by Merle d'Aubigné and Postel (1954) and modified by Charnley (1972) has been used together with the functional classification of the American Rheumatoid Association (ARA) (Steinbrocker, Traeger and Batterman 1949). Standard anteroposterior and lateral radiographs were taken before operation with the patient supine and were evaluated using a six-grade scale (Larsen, Dale and Eek 1977). Grade 0 represents a normal joint but changes not related to arthritis, for example bone deposition, may be present. In Grade I, one or more of the following changes may be present: periarticular soft-tissue swelling, periarticular osteoporosis and a slight narrowing of the joint space. In Grade II there are definite early changes with small erosions and some narrowing of the joint space. Grade III has moderate destructive changes with large erosions and narrowing of the joint space. Grade IV shows severe destructive changes with major erosions and bone attrition with deformity. In Grade V there are mutilating changes, the original articular surfaces have disappeared and gross bone deformation is present.

At synovectomy the synovial membrane was classified as either being normal or as showing mild, moderate or severe synovitis. The articular cartilage, likewise, was declared to be normal or to be showing mild, moderate or severe erosions (Holgersson *et al.* 1981).

Operative details. Sixteen of the synovectomies were performed through a lateral (Watson-Jones) approach and the anterior capsule was removed. In five hips tenotomy of the iliopsoas was also performed. By rotating the leg, a greater amount of the synovial tissue can be removed. This technique allows only a limited inspection of the femoral head and almost none of the acetabular cartilage. A partial synovectomy can be performed. In one of the 16 hips (Case 15) the femoral head dislocated spontaneously during the operation after extensive soft-tissue release. The last two synovectomies were performed through an anterolateral (Smith-Petersen) approach with dislocation of the hip. A total synovectomy could then be performed, taking care not to damage the

Table 1. Clinical, radiographic and operative findings in 18 synovectomised hips

Case	Sex	Age at operation (years)	JCA subgroup	Duration of hip symptoms (years)	Radiographs*			Findings at synovectomy		Other operations	Disease activity	
					1-2 years preoperatively	At operation	At follow-up	Synovia	Cartilage		Before	After
1	F	21	JRA polyarthritis	10	I	IV	V	Severe synovitis	Severe erosions	Tenotomy THR 3 years later	Moderate	High
2	M	12	JRA polyarthritis	9	II	IV	V	Severe	Severe	Tenotomy	High	Moderate
3	M	15	JRA polyarthritis	7	I	III	V	Moderate	Mild	Arthroscopy	Moderate	Low
4	F	12	JRA polyarthritis	5	I	II	II	Severe	Mild	—	Moderate	Low
5	M	15	Same patient as Case 3	7	I	III	V	Severe	Moderate	Arthroscopy	Moderate	Low
6	F	9	JRA polyarthritis	5	0	I	V	Severe	Moderate	—	High	Moderate
7	M	13	JRA polyarthritis	3	I	IV	V	Severe	Severe	THR 3 years later	High	Moderate
8	M	14	JRA monoarthritis	1	0	I	I	Severe	Mild	Arthroscopy tenotomy	Low	None
9	F	29	Psoriatic polyarthritis	19	I	I	I	Moderate	Severe	Arthroscopy	Low	Low
10	F	10	JRA polyarthritis	3	II	IV	V	Moderate	Severe	—	High	Moderate
11	F	9	Same patient as Case 6	6	I	IV	V	Severe	Severe	—	High	Moderate
12	M	12	JRA pauciartthritis	1	0	II	V	Severe	Moderate	Arthroscopy Surface replacement 3 years later	High	Moderate
13	F	15	JRA polyarthritis	8	I	II	IV	Severe	Could not be inspected	Tenotomy	Moderate	Moderate
14	F	18	JRA polyarthritis	4	I	IV	V	Severe	Severe	—	Moderate	Low
15	M	11	JRA polyarthritis	5	I	II	IV	Severe	Moderate	Tenotomy	High	Moderate
16	F	11	Pauciartthritis Ulcerative colitis	1	I	I	I	Moderate	Mild	—	High	Moderate
17	M	10	JRA polyarthritis	1	II	V	V	Severe	Severe	Tenotomy	High	Low
18	F	13	JRA polyarthritis	5	0	III	III	Severe	Moderate	Arthroscopy Tenotomy	High	Moderate

* The classification of Larsen *et al.* (1977) see text.

subsynovial vascular network of the femoral neck, and a complete inspection of the femoral and acetabular cartilage was possible.

Movement is encouraged immediately after the operation. The patient uses an abduction frame while at rest for three weeks. In the three cases where dislocation had occurred weight-bearing was not allowed for six weeks.

RESULTS

The operative findings correlated well with the preoperative radiographs in 14 hips (Table I) but in three there were great discrepancies and the cartilage could not be inspected in one. The greatest difference was in a patient (Case 9) with juvenile psoriatic arthropathy who had severe erosions both on the femoral head and in the acetabulum but in whom the radiograph showed only Grade I changes. The second patient (Case 3) appeared to have advanced radiographic changes (Grade III) but at operation only mild changes were found. The third patient (Case 6) had moderate cartilage changes at operation but only Grade I radiographic changes. None of the hips were radiographically normal before the operation; four were in Grade I, four in Grade II, three in Grade III and seven in Grade IV or V.

The total anaesthetic time was, on average, 117 minutes (range 55 to 210). The peroperative blood loss

was on average 325 millilitres (range 50 to 900) and the total blood loss 490 millilitres. The average postoperative inpatient stay was 26 days (range 14 to 52).

Relief of pain. Eleven patients (13 hips) were satisfied and judged the operation worthwhile (Table II). In one (Case 1) the relief lasted only two years and he was later converted to a total replacement with a good result. The pain was on average 2.4 points before the operation, 5.1 at discharge from hospital and 4.4 points at follow-up. The pain in the contralateral hip was 4.8 points before operation and 4.1 points at follow-up. Four patients (Cases 7, 9, 10, 12) were dissatisfied because the relief of pain was poor or short-lived.

Range of movements. The total range improved slightly at the time of discharge from hospital but was slightly less at follow-up (Table II). One pain-free patient (Case 15) was dissatisfied because of poor hip mobility (Table II): he had mobility Grade 1 before and after the operation. Twelve patients had a flexion contracture averaging 22 degrees (10 to 55) before the operation and 11 degrees (5 to 30) when they left the hospital. At follow-up 11 patients had an average 23 degrees of flexion contracture (5 to 55). The walking capacity was only slightly improved (Table II).

Table II. Numerical classification* of pain, range of movement and walking capacity in 18 synovectomised hips

Case	Follow-up (months)	Pain			Range of movement			Walking	
		Before operation	After operation	Follow-up	Before operation	After operation	Follow-up	Before operation	Follow-up
1	34	1	4	2	5	4	4	2	2
2	108	2	6	4	4	4	2	2	1
3	69	2	6	6	5	5	4	2	5
4	74	2	5	5	5	5	5	2	2
5	67	2	6	6	5	5	5	2	5
6	68	2	5	4	5	6	3	2	3
7	35	2	5	2	4	5	1	2	2
8	68	2	6	6	4	5	5	2	6
9	68	3	3	3	4	4	4	3	3
10	68	3	5	4	4	4	3	2	3
11	67	2	6	5	5	5	3	2	3
12	37	2	3	2	1	2	1	2	2
13	52	3	6	4	4	4	4	3	4
14	44	2	6	6	4	4	4	2	5
15	36	5	5	5	1	1	1	3	1
16	28	2	5	5	2	4	3	2	3
17	6	3	5	6	2	3	3	2	4
18	6	3	5	5	5	5	5	2	3
Average	52	2.4	5.1	4.4	3.8	4.2	3.3	2.2	3.1

* The classification of Merle d'Aubigné and Postel (1954) as modified by Charnley, see text.

Fig. 1

Fig. 2

Fig. 3

Figure 1—Radiograph three months after presentation showing narrowing of the joint space, cysts and erosions (Grade II) but with the hip well-contained. Figure 2—Severe irregular deformity and lateral subluxation of the femoral head 18 months later. Figure 3—The hip well contained six weeks after operation.

Function. The patients were on average in ARA class 2.8 before the operation, 2.6 at follow-up.

Activity. Fourteen of the patients had moderate or high activity of their disease before the operation and this persisted in 10 at follow-up. One patient (Case 8) had no disease activity at follow-up (Table I).

Radiographic appearance. At follow-up five hips (Cases 4, 8, 9, 16, 18) were in Grade I, II or III and 13 in Grades IV or V (Table I). Those who progressed during the last two years before the synovectomy progressed further with three exceptions (Cases 4, 8, 18).

Three of the synovectomised hips were later converted to total replacements (Cases 1, 7) or surface replacement (Case 12) and in two adductor tenotomies (Cases 1, 14) were performed. The unoperated contralateral hips were all within Grade 0 or I before the operation: seven of these hips progressed radiographically, three to Grade IV and V at follow-up and were later given either a total hip replacement or a surface replacement. At follow-up, 71 operations, including the synovectomies, had been performed on these 16 patients with an average of 4.4 operations (1 to 14) on each patient.

There was one superficial infection which healed with antibiotics. Six months later this patient developed a small fistula but after a suture granuloma had been removed the wound healed with no further complications.

ILLUSTRATIVE CASE REPORT

A 10-year-old boy (Case 17), with a three-year history of a systemic onset seronegative JRA which became polyarticular, had had left-sided hip disability for one year. He developed severe adduction and flexion contracture with a total range of movement from 50 to 70 degrees (Grade 1). He had moderate pain (Grade 3) and walked with two crutches. Radiographically he progressed during nine months from Grade II (Fig 1) to Grade V and the hip subluxated with severe irregular deformity both in the acetabulum and especially laterally in the femoral head (Fig. 2). The patient also developed a flexion contracture of the left knee and a scoliosis. He was operated on via a Smith-Petersen

approach and an extensive soft-tissue release was performed. The hip was dislocated and total synovectomy performed. The patient had severe damage to bone and cartilage both in the acetabulum and the femoral head and a severe synovitis. Postoperatively he was placed in a hip spica in abduction but the front part was removed to allow early controlled movement of the hip. The radiographs showed good containment of the femoral head (Fig. 3). Weight-bearing was allowed after three months. The pain was relieved (Grade 6) and the total hip mobility after six months was 65 degrees (Grade 3) with 15 degrees of flexion contracture.

DISCUSSION

The prognosis in JCA is influenced by the mode of onset, subgroups and duration of activity. About a quarter of the patients are left with severe disability (Laaksonen 1966; Hanson *et al.* 1977). Patients with a duration of activity of less than three years have a more favourable prognosis (Laaksonen 1966). The hip is often involved in JCA and is usually the main drawback to locomotion (Isdale 1970; Arden and Ansell 1978). Previous reports on synovectomy in JCA mention that if it is performed early the results are probably better; most of our cases are indeed late synovectomies where the long-term results are judged to be less favourable. Synovectomy of the hip in children is considered to be a major operation. There is probably a tendency, especially among rheumatologists, to wait and see if spontaneous remission will occur.

Destructive changes of the hips in JCA are late radiographic findings but 75 per cent of hips have narrowing of the joint space after five years of involvement (Rombouts and Rombouts-Lindemans 1971). Irregular extensive damage to the cartilage may be present in spite of an almost normal radiograph (Pahle, Kåss and Munthe 1978). The cartilage was found to be damaged in all our patients. Those with progressive worsening as shown on the radiographs before the operation continued to worsen, with three exceptions (Cases 4, 8, 18) (Table I). Subluxation of the hip due to synovitis and effusion is said to be a common feature in patients with JRA

(Rombouts and Rombouts-Lindemans 1971) but occurred in only two of our patients (Cases 1, 17).

At follow-up 11 of 15 patients were satisfied with the relief of their pain. Mobility was slightly reduced and walking capacity only slightly increased at follow-up. In only three hips had replacement been performed.

Synovitis of the hip increases the pressure in the joint and may by itself cause vascular disturbances in the femoral head (Soto-Hall, Johnson and Johnson 1964). Adduction contracture with lateral subluxation and a resulting severe lateral pressure deformity in the femoral head can sometimes be seen (Figs 1 to 3). Arthroscopy of the hip in JCA is a minor operation (Holgersson *et al.* 1981). If the hip disability cannot be controlled by anti-

inflammatory drugs or by physiotherapy, an arthroscopy should be done before radiological changes appear and, if necessary, a synovectomy be carried out. It is reasonable to believe that synovectomy has better results if it is done as early and as radically as possible. The only report on synovectomy in JCA where the hip is dislocated (Albright *et al.* 1975) makes no mention of any vascular complications and the femoral head is now routinely dislocated in surface replacement for JCA (Mogensen, Svantesson and Lidgren 1981).

Synovectomy can offer permanent relief of pain in the affected joint but often should only be considered as a time-gaining procedure; the relief of pain may delay the need for prosthetic replacement for several years.

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