PARTIAL SYNOVECTOMY AND CURETTAGE IN THE TREATMENT OF TUBERCULOSIS OF THE HIP

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The results of treatment of thirty-nine patients with tuberculosis of the hip are presented in this article, which is supplementary to a report published previously (Wilkinson 1953). All these patients were admitted during the years 1949–1955. They were selected patients in so far as none had suffered complete destruction of the joint space, though many had severe disease. All were treated by constitutional treatment, antibiotics and intra-articular operation, which varied from simple arthrotyomy to partial synovectomy with curettage of bone foci. The diagnosis was confirmed in thirty-five of the thirty-nine patients by microscopy; in two others tubercle bacilli were found in pus from an abscess, and two others had an active primary focus in the lung at the time of admission. The operative treatment varied not only according to the amount of disease present, but also according to the date when the patient was admitted. Thus during 1950 and the early part of 1951 caution forbade early operation because of uncertainty whether antibiotics afforded sufficient protection against dissemination of the disease. It became clear, however, that the results of this policy were variable, and from the early part of 1951 onwards operations were performed earlier and were more extensive. No attempt has ever been made to remove all the tuberculous tissue from a joint, nor has the femoral head ever been dislocated.

The immediate results of the treatment of these patients are recorded in Table I, where they are grouped according to the age of the patient on admission. It is seen that thirty-one patients recovered with some return of joint function, but that operative stabilisation was undertaken in eight patients. Three of the failures were in adults and one in an adolescent, and of these four, three had prolonged symptoms before admission.

The same results are classified according to the year during which the patient was admitted in Table II. It will be seen that five of the eight failures occurred in patients admitted during 1950: there were three failures in patients admitted during 1952 but two of these were the adults already referred to. Since 1951, when earlier and more complete operations were first undertaken, there has been only one immediate failure in the treatment of a child's hip.

In addition to the immediate failures there were two later relapses, but before these are referred to, the immediate failures will be discussed. One of the immediate failures during

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Restoration of function</th>
<th>Stabilisation operation</th>
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<tbody>
<tr>
<td>0–5</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>6–10</td>
<td>11</td>
<td>3</td>
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<td>11–15</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>16–20</td>
<td>4</td>
<td>1</td>
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<tr>
<td>21 and over</td>
<td>0</td>
<td>3</td>
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<tr>
<td></td>
<td>31</td>
<td>8</td>
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</table>

TABLE I
RESULTS OF TREATMENT OF THIRTY-NINE PATIENTS TREATED BY CONSTITUTIONAL THERAPY, ANTIBIOTICS AND INTRA-ARTICULAR OPERATION, ACCORDING TO AGE
1952 was in a child: she had constitutional treatment, full antibiotics and early and adequate surgery, yet the disease progressed to destruction of the joint. This was the only patient in the series to manifest this lack of response to early operative treatment. Three failures among patients admitted during 1950 were in children; two were in adults. The children were operated upon three and a half months, five and a half months and nine months after admission, at a time when the joints of two of them had already suffered damage which proved to be irreparable. After operation the progress of the disease was halted, but stabilisation had by that time become necessary. The disease in the third child admitted during 1950 and operated upon four months after admission progressed after operation. The following are brief particulars of these patients.

**CASE REPORTS**

**Case 1**—Boy aged seven. Admitted in May 1950 with acute tuberculous disease of the right hip. There was a delay of seven weeks before treatment with streptomycin was begun, but thereafter the drug was given in daily doses of 0.25 gramme for ninety days. Radiographs at the beginning of treatment showed that the joint was still intact. Plain radiographs and tomographs a month later showed no bone cavity; yet at operation in September 1950 marked synovial swelling was found, with pus and granulations in the joint. Pus was seen exuding through a cloaca in the cartilage of the femoral head. An attempt was made to curette the femoral head through this cloaca. Subsequently the joint deteriorated and was destroyed.

**Case 2**—Girl aged six. This child had been admitted for observation of the hip during 1949 but was later discharged as non-tuberculous. She was readmitted in December 1950 with acute disease in the left hip. Treatment with streptomycin (0.25 gramme daily) was started at once. The joint space was preserved but osteoporosis increased and the outer lip of the acetabulum was eroded. Operation was performed in September 1951: much thickening of the capsule and synovium with caseation was found; the cartilage of the femoral head was intact; the surface of the femoral neck was much roughened. Operation was followed by rapid clinical and radiological improvement but the integrity of the outer lip of the acetabulum was lost. Some adduction of the hip developed and a displacement osteotomy was therefore performed.

**Case 3**—Girl aged six. This patient was admitted with acute disease of the right hip in October 1950. Streptomycin (0.25 gramme daily) was given for ninety days. Early radiographs showed a narrowed joint space with a minimal area of ischaemic necrosis in the femoral head. Progressive subchondral destruction of the femoral head occurred, in spite of antibiotic treatment. Operation was performed in April 1951. In spite of the radiological evidence of loss of subchondral bone in the femoral head, the dome of the cartilage appeared to be intact. A cavity in the femoral neck was found which
communicated with the area of subchondral destruction and contained pus. After operation progressive recalcification rapidly occurred but some adduction deformity developed, and a displacement osteotomy was therefore performed.

It will be noted that all three of these children had only 0·25 gramme of streptomycin daily. Later, when more streptomycin became available, 0·5 gramme daily was prescribed for children. It is doubtful, however, whether the increased dose would have saved the joints of these children without operation, as all three had bony necrotic lesions.

The thirty-one patients who regained function as an immediate result of treatment will now be considered. A recent follow-up examination has been made on all but two of them. The exceptions were a child operated upon in 1950 who regained a good range of movement but who left the region a year after her discharge and has not been traced, and a youth whose joint had seemingly returned to normal three months after his discharge, but who also left the district. The follow-up results of twenty-nine patients are therefore given in Table III. By full range of movement is meant movement wholly or almost normal: by good range is meant flexion to 90 degrees or more with some movement in other directions: by small range of movement is meant a range of 25 degrees which was found in one patient (Figs. 1 and 2).

The two patients who relapsed were both children operated upon in 1950 and discharged during 1951. The cause of relapse was the same in both patients, namely that an acetabular cavity which was observed in 1950 was not curetted, though a partial synovectomy was performed. These children seemed at first to recover with good function, but after several years the cavity in each patient increased in size. In one child the joint has suffered further damage and an arthrodesis has become necessary. In the other child the cavity was curetted in time and full range of movement has been retained (Figs. 3 to 5). There has been no relapse among patients operated upon during 1951 or later, nor does any patient appear at present to be in danger of relapse.

MACROSCOPIC CHANGES FOUND AT OPERATION

The thirty-nine patients may be divided into two groups which have been assessed both on radiological appearances and on the condition found at operation. No necrosis of bone was visible in twelve of the patients; in twenty-seven there was significant evidence of bone necrosis. The prognosis for hips in which bone necrosis had occurred was worse in this series of patients (Table IV).

Nevertheless it does not follow that, because no bone foci are seen, the disease is necessarily benign. Four of the twelve patients with synovial disease were found to have
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Case 5—Tuberculosis of left hip. Intra-articular operation performed. Much pathological change in joint including partial destruction of cartilage.

Fig. 1

Case 5—Condition eighteen months later. Range of flexion through 25 degrees. Comfortable stable hip. Patient enjoys dancing and can play some games.

Fig. 2
Case 6—Tuberculosis of left hip. Rarefaction present at inner side of acetabular roof, which, on tomography, had the appearance of a cavity. Treated by partial synovectomy.

Case 6—Condition three years later. Slight coxa magna. Widening of joint space. No acetabular cavity visible.

Case 6—Two years later radiograph showed reappearance of acetabular cavity. Narrowing of joint space. Good function of hip maintained. The cavity was curetted and pus evacuated, and almost normal function was preserved.
pus and tuberculous granulations in the joint when it was opened: the physical signs of these patients, who had oedema and spasm of the hip, were more informative than the radiological films (Fig. 6). Eight of the twelve patients had no pus in the joint but the synovial membrane

<table>
<thead>
<tr>
<th>Type of disease</th>
<th>Number of patients</th>
<th>Successful results</th>
<th>Immediate failures</th>
<th>Later relapses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synovial</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Synovial plus bone</td>
<td>27</td>
<td>19</td>
<td>6</td>
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and capsule were thickened and oedematous. The margins of the articular cartilage were slightly eroded by pannus. In one patient who had had a considerable course of constitutional treatment and antibiotics there was much fibrosis of the synovial membrane, which was adherent to the femoral neck and to the capsule. The only patient in this group who had lost the cartilage over the femoral head was an adult.

![Fig. 6](image)

Case 7—Child aged three. Tuberculosis of left hip. Radiograph on admission showing little change. Oedema and spasm present clinically. Streptomycin (0.25 gramme daily) was given. Operation delayed owing to attack of tonsillitis. At exploration multiple abscesses were found. The capsule was ruptured with protruding tuberculous granulations. The cartilage was intact. Subsequent recovery, but with development of severe coxa magna.

The twenty-seven patients who had necrotic foci in bone all had an associated synovitis of the hip. Many of these patients had severe pathological changes, but it was remarkable how the cartilage had survived in most. Cavities were usually postero-medial, both in the
Case 8—Child aged fifteen months with tuberculosis of left hip. Radiograph shows condition on admission. History of only a few weeks duration. Full antibiotic treatment started.

Case 8—Condition three weeks after admission. Rapid progress of disease in spite of antibiotics. Operation shortly after this radiograph showed head and neck full of pus. Cartilage intact.
Case 8—Six weeks after operation there has been recalcification of the femoral neck: the femoral head is not visible, except for rim of bone beneath the arc of the cartilage.

Case 8—Fifteen months later. Partial reformation of the femoral head. Flattening and broadening of the femoral neck.
acetabular region and in the femoral neck: the subchondral bone of the femoral head appeared to be particularly vulnerable though the cartilage over it survived (Figs. 7 to 10).

![Figure 11](image1)

**Fig. 11**
Synovial membrane. Solitary tubercle showing increase in peripheral lymphocytes, some vacuolation of the centre and tendency to spindle forms of epithelioid cells. These tubercles are on the way to fibrosis. This change is more frequently seen after treatment with streptomycin treated lesions. (By courtesy of Dr Ian Prentice.)

![Figure 12](image2)

**Fig. 12**
Synovial membrane. A solitary tubercle showing increase in peripheral lymphocytes, vacuolation of the centre and "rounding" of the epithelioid cells. These tubercles are already on the way to complete resolution and several stages in the process can be seen in a single section. This change is more frequently seen after treatment with Isoniazid. (By courtesy of Dr Ian Prentice.)

Patients who were operated upon after antibiotic treatment seemed to have gained little benefit so far as the bony lesions were concerned. Pus was often found.
MICROSCOPICAL APPEARANCES

The improvement after antibiotic treatment was more marked in synovial membranes than in bone. The degree of change in the synovial membrane varied according to the duration of antibiotic treatment. The change effected by antibiotics consists in a gradual disintegration of the follicles, which may still be recognised by those accustomed to their altered appearance at quite a late stage of the process, but finally any specific changes may become unrecognisable though the changes of chronic inflammation persist. Fibrotic changes also supervene (Figs. 11 and 12).

Particular mention should be made of the patient already mentioned who relapsed on account of an acetabular cavity although the joint was not invaded. The cavity was curetted in 1955 and at the same time the synovial membrane, which had been partly removed five years before, was examined; though thickened it was found to be soft and pliable, and of healthy appearance. A piece was removed for microscopy. Fibrosis was seen but no evidence of tuberculosis or chronic inflammatory disease.

EARLY EFFECTS OF OPERATION

The early effects of operation can be divided into general and local. Robertson-Lavalle (1942) maintained that operation into a focus of skeletal tuberculosis produced an unexplained improvement in the patient's general condition. In my experience I have been able to verify this observation. An unsteady temperature becomes steady, appetite improves, and the patient gains weight. The erythrocyte sedimentation rate reverts to normal. The changes are comparable to those that follow drainage of an infected focus. Associated lesions, such as those in the lungs, are also found to improve. Even more striking is the local improvement in the affected joint. Oedema and spasm rapidly diminish, and evidence of commencing calcification is seen radiologically. All these changes may follow antibiotic treatment without intra-articular operation, but they are accelerated by operation and an effective response is usually produced in patients whose response to antibiotics is inadequate.

The course of events in one patient especially illustrated the need for liberation of any retained pus or necrotic material in bone.

CASE REPORT

Case 9—Boy aged eight. Admitted in June 1953: several necrotic osseous lesions present in an active tuberculous hip. Full constitutional and antibiotic treatment started. In July 1953 partial synovectomy was performed, and two cavities in the femoral neck were opened and curetted. Pus was drained from these cavities and also from another in the lower part of the acetabulum. A fourth focus in the intertrochanteric lesion was also opened but treated in a rather perfunctory manner as it was felt that the main foci had been dealt with. The hip improved but there was not the rapid resolution that one has become accustomed to expect. Radiographs in November 1953 showed improvement in the foci operated on, but progressive enlargement of the cavity in the intertrochanteric area was taking place. It was decided to explore and drain this cavity but before this could be done a cold abscess appeared in the thigh. The abscess did not return after one aspiration. The appearance in the bone rapidly improved and further progress was uninterrupted (Figs. 13 to 16).

LATE SEQUELAE

It has been interesting to note the late effects on joints that have been the seat of severe tuberculous infection but that have survived with return of function. The most frequent change observed is that to which the name of coxa magna has been given. The changes consist of a general enlargement of the femoral head and neck, due no doubt to increased blood supply, and comparable to the changes that have been observed after tuberculosis of the knee in children. As in tuberculosis of the growing knee lengthening is produced, so also in one patient with coxa magna lengthening was present. Some flattening and distortion of the femoral head may also occur, so that in some patients the final condition may somewhat resemble healed Perthes' disease. The femoral head may sometimes no longer fit the acetabulum.
FIG. 13

FIG. 14
Case 9—Condition four months after operation. Resolution delayed. Increase in size of cavity in upper end of femoral shaft.

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Case 9—Four months later. Rapid healing after spontaneous evacuation of abscess from bone.

Case 9—Two and a half years after onset. Bony lesions healed. Slight coxa magna. Increased width of joint space.
and may be partly extruded, but in this series Shenton’s line has not been interrupted and no instability has been present. The author therefore ventures the opinion that acetabuloplasty to form a false roof is not necessary: similar disparity which occurs after the treatment of tuberculosis of the knee in children adjusts itself as the child grows older and it seems possible that this will also occur after the treatment of tuberculosis of the hip. Coxa magna was found in fourteen of the thirty-one patients whose hips recovered with function. Most of these changes were only slight but several were moderate and one severe. In no instance has there been any discomfort or interference with function (Fig. 17).

A surprising sequel found on follow-up is that, whereas a joint space was narrowed on admission when compared with the normal side, it is found later to be wider than the normal side (Figs. 14 and 17). This widening was found in twelve of the thirty-one patients. It has been noted above that the cartilage at operation is usually found to be intact: narrowing therefore cannot be due to destruction of cartilage.

**SUMMARY AND CONCLUSIONS**

The records of these patients show that restitution of joint function is quite possible even after severe disease. These results have been obtained by a combination of three methods, constitutional, antibiotic and operative. The duration of treatment averaged ten months and the patients were discharged to full activities in a short time without splints. There was one immediate failure in a child who received full, early and adequate treatment. There were two late relapses in patients treated early in the series whose operation was inadequate. The results were more variable in adults. If it is conceded that the triple treatment is valuable for patients with bone necrosis or severe synovial disease with pus in the joint, eight patients in this series remain who might have got better without operation. Two of these had had a
synovial biopsy before admission. Whether the remaining six would have done as well without operation is a matter for speculation. It is difficult to assess the condition inside the joint solely by radiographic examination. Cauchox (1955) allows me to say that, at the Institut Calot, Berck Plage, he has used similar methods to those reported in this paper, and that he endorses my belief that good results can be obtained by them. He does not, however, open the joint when operating upon an iliac focus, and for patients with purely synovial disease he prefers repeated intra-articular injections of streptomycin to operation. For my part, I consider that a simple arthroscopy at the beginning of treatment is less disturbing, and that, even if it is only done for diagnosis, it may be of therapeutic benefit. To me it seems unjustifiable to delay intra-articular operation for a patient whose hip disease is not manifestly resolving: operation is especially indicated for patients who have necrotic bone lesions.

REFERENCES