LATE INFECTION ABOUT A TOTAL KNEE PROSTHESIS
Report of a Case Secondary to Urinary Tract Infection

A. J. HALL, LONDON, ENGLAND
From the Royal National Orthopaedic Hospital, London and Stanmore

It has been stated that late infection in prosthetic joints is the result of organisms introduced at the time of operation (Charnley and Eftekhar 1969; Charnley 1970). Parsons (1971) drew attention to the possibility of metastatic infection. This paper describes a proven haematogenous spread of infection to a prosthetic knee replacement five and a half years after its insertion.

CASE REPORT

The patient, a woman of sixty-five, had had rheumatoid arthritis for twelve years. She was first seen in 1960 with a three months' history of pain in the right knee and lower back, and the diagnosis of rheumatoid arthritis was confirmed by radiographs and a positive latex fixation test and an erythrocyte sedimentation rate of 39 millimetres at one hour (Westergren). After five years taking phenylbutazone intermittently to control pain the condition of her knees had deteriorated and she was admitted to the country section of the Royal National Orthopaedic Hospital, Stanmore, because of increasing difficulty in walking, with pain and instability in both knees. The left wrist and right elbow were painful and swollen.

Radiographs showed severe rheumatoid changes in both hands, the left wrist and right elbow. Both knees were involved, with disorganisation of the articular surfaces, and the right hip showed early radiological appearances of rheumatoid arthritis.

A plan of surgical treatment was devised for both knees, the left wrist and right elbow. Since the left hip was radiologically normal arthrodesis of the left knee was proposed, to be followed by hinge arthroplasty of the right knee.

The left knee was arthrodesed; two weeks later the left wrist had a synovectomy and excision of the distal end of the ulna. Four weeks later the head of the right radius was removed and partial synovectomy done.

Eight weeks after arthrodesis of the left knee in 1965, the right knee was replaced with a McKee hinged prosthesis. The operation was done through a longitudinal incision with excision of the patella. The components were fixed with acrylic cement. There was primary wound healing. The arthrodesis of the left knee was soundly united in a position of 15 degrees of flexion at three months. Mobilisation was slow but the patient returned home after four and a half months. Active movement in the right knee was from 30 to 90 degrees and passive extension lacked 10 degrees. Six months later she was able to walk two miles without pain, using two sticks.

Eighteen months later she complained of pain in the right thigh, and radiographs showed massive collapse of the right femoral head. She was admitted for right total hip replacement. At that time passive movement of the right knee was from 5 to 90 degrees and active movement from 20 to 80 degrees. She rapidly regained mobility after the hip operation and went home at six weeks.

Over the following four years she remained active with the aid of walking sticks and, apart from bilateral carpal tunnel decompression, needed no hospital treatment.

In May 1971 she was treated by her general practitioner for an Escherichia coli infection
of the urinary tract. Three weeks later she developed a painful swelling of the right knee. She was unable to walk and was admitted to hospital. She was flushed and there was pyrexia of 39 degrees Celsius. The right knee was tensely swollen, red and warm. There were no enlarged inguinal glands and no other joints appeared to be affected. The knee was aspirated and cultures of the pus removed produced a growth of Escherichia coli with the same sensitivities as the organism previously isolated from the urinary tract (Table I).

Appropriate antibiotic therapy was started, ampicillin 500 milligrams and cloxacillin 500 milligrams being given every six hours. Two plastic tubes were inserted into the joint through a trocar. The knee was irrigated continuously with noxytiolin ("Noxyflex"). The drainage system became blocked after sixteen days and the knee swelled again. The tubes were removed and replaced with corrugated drains. The discharge ceased at one month and the drains were removed. A plaster-of-Paris splint was applied and walking started.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>E. coli urine</th>
<th>E. coli knee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>Sensitive</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Carbenicillin</td>
<td>Sensitive</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>Not tested</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>Not tested</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>Sensitive</td>
<td>Not tested</td>
</tr>
<tr>
<td>Seprin</td>
<td>Not tested</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>Resistant</td>
<td>Resistant</td>
</tr>
<tr>
<td>Sulphonamides</td>
<td>Resistant</td>
<td>Resistant</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>Resistant</td>
<td>Resistant</td>
</tr>
</tbody>
</table>

After a month the knee again became distended (Fig. 1) and it was decided to excise all the necrotic tissue from the joint and to establish dependent postero-lateral drainage. After this the wounds healed and mobilisation was begun. She was able to return home after a total of nine months in hospital and continued on ampicillin and cloxacillin. Figure 2 shows the radiograph of the right knee on discharge from hospital. The patient has needed no further admission to hospital. When last seen in August 1973 she was walking with two sticks and had a range of active movement from 20 degrees to 80 degrees in the right knee. There was intermittent slight drainage from the lower end of the wound which was sterile to bacteriological culture and only required a dry dressing.

**DISCUSSION**

This case presents certain important implications. Firstly, haematogenous spread of infection has been shown to occur as late as five and a half years after prosthetic replacement of a joint. Any prosthetic joint must therefore be at risk during an episode of bacteraemia. Secondly, when one is faced with an infected prosthetic joint, it may be possible to preserve the joint by adequate surgical treatment and proper antibiotic cover.

The vulnerability of the prosthetic knee joint to infection was observed by Waldius (1960), who suggested that the proximity of the skin to the joint might be responsible. Other factors which have been implicated are the proximity of the lymphatics from the foot and the "dead"
space surrounding the prosthesis. Added to these is the abnormal susceptibility of rheumatoid patients to bacterial infection (Kellgren, Ball, Fairbrother and Barnes 1958; leading article *British Medical Journal* 1972). We should therefore heed the advice of Parsons (1971) who drew attention to the possibility of metastatic infection in prosthetic joints and recommended elimination of all septic foci before joint replacement.

It is proper to arrange for patients with prosthetic joints to take prophylactic antibiotics to cover all surgical procedures, especially dental extractions, in the same way as patients with rheumatic heart disease. Furthermore, any intercurrent infection should be treated energetically for a long time, and the family doctor should be informed of the vital importance of such treatment.

The technique of treating joint infections containing metallic implants by closed irrigation and the importance of precise excision of necrotic tissue from the joint has been described elsewhere (Leddy, Grantham and Stinchfield 1971; Groulier, Pinaud, Charvet and Trifaud 1972). This case illustrates that closed irrigation alone was totally inadequate but that when dead tissue was excised and dependent drainage established the infection settled rapidly.
SUMMARY

1. A case of late infection about a total knee prosthesis secondary to urinary tract infection is described, indicating that haematogenous spread of infection to a prosthetic joint can occur.
2. The prophylactic use of antibiotics to cover surgical and dental treatment and the energetic treatment of intercurrent infection are urged for patients with artificial joints.
3. Any conservative treatment of established infection in such cases should include complete excision of all necrotic material from the joint.

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REFERENCES


