ILIAC ANEURYSM AFTER TOTAL HIP ARTHROPLASTY

SURGICAL MANAGEMENT

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We report two cases of aneurysm of the external iliac artery after arthroplasty of the hip. In each case the patients suffered from severe, seropositive, rheumatoid arthritis, had been treated with oral corticosteroids and had defects in the acetabular floor which were complicated by sepsis. In these circumstances bleeding from the wound in the hip should be investigated by immediate arteriography with anteroposterior and lateral views. Though vascular injury during operations on the hip is rare, recognition is important as safe and satisfactory treatment can be achieved.

In the surgical management of these cases the following points should be noted: an alternative blood supply to the limb must be established using separate surgical incisions; to reduce the risk of sepsis these incisions should be closed and dressed before exploring the aneurysm; the aneurysmal vessel must be isolated and ligated, no attempt being made at primary repair; the aneurysm should be opened longitudinally to avoid damaging the femoral nerve which overlies it; and all foreign material should be removed from the hip.

Serious arterial injury related to surgery of the hip is rare. Nachbur et al. (1979) reported an incidence of 0.25 per cent. Most of these cases result from direct injury at operation and present immediately.

Vascular injury presenting late has been reported but it was the profunda femoris artery or one of its branches which was involved (Bassett and Houck 1964; Dameron 1964; Linton 1964; Meyer and Slager 1964). Dumanian and Kelikian (1969) reported injury to the distal external iliac artery and common femoral artery presenting two years after pinning of a slipped femoral epiphysis. A pin was found to lie in the floor of the false aneurysm. Lantin et al. (1977) have reported a false aneurysm of the external iliac artery presenting 22 years after insertion of a Böhler nail for fractured neck of femur. This was apparently caused by direct injury from the protruding nail. No sepsis was involved and direct repair was successful.

Scullin, Nelson and Beven (1975) reported a case of aneurysm of the external iliac artery 16 months after total hip replacement in a patient who had received radiotherapy resulting in weakening of the acetabular floor. Protrusion of the prosthesis into the pelvis required a second arthroplasty and this was complicated by sepsis. Brisk bleeding was encountered when the infected prosthesis was removed. Direct repair of the defect failed and a further operation was required.

We present two cases which parallel that of Scullin et al. but in our cases the diagnosis was made before operation.

CASE REPORTS

Case 1. A 61-year-old woman had suffered from nodular, erosive, seropositive rheumatoid arthritis and had been treated with oral corticosteroids for 12 years.

In February 1978 she underwent fusion of the first and second cervical vertebrae. In September 1978 increasing pain and stiffness of the left hip (Fig. 1) was treated by total hip arthroplasty using a longstem Stanmore prosthesis. Although restoration of useful mobility was achieved, the enforced recumbency that followed these procedures led to the development of a sacral pressure sore. This was closed by a local transposition flap in October 1979. She was discharged three weeks later, walking with a frame, but by April 1980 pus was again discharging from beneath the sacral flap. Culture of the discharge grew Staphylococcus aureus which was sensitive to flucloxacillin. In July 1980 a second operation was attempted to close the sacral defect.

By the middle of August cellulitis and a purulent discharge had developed in the wound over the hip. A sinogram of the sacral sinus demonstrated a communication with the hip joint (Fig. 2). Despite this finding conservative treatment improved her condition to the extent that she was allowed home, but after only two weeks she was readmitted with increasing pain in the left hip, inability to walk and a 24-hour history of fresh bleeding from the wound. In hospital she developed pain in the left iliac fossa and on examination a tender, pulsatile mass measuring 10 × 6 centimetres was detected arising out of the pelvis. A retrograde left femoral arteriogram demonstrated that the mass was an aneurysm arising from the left external iliac artery (Figs 3 and 4).

A third operation was carried out in October 1980. First an alternative arterial flow to the limb was established via separate incisions to reduce the risk of contamination from the possibly infected aneurysm. Both common femoral arteries were exposed via groin incisions and a portion of the long saphenous vein was excised from the right thigh. A femoro-femoral crossover graft was fashioned using this
vein. The left common femoral artery was then ligated just above the graft thus maintaining a pressure gradient in the graft to maintain patency and flow. The groin incisions were closed and dressed before the aneurysm was exposed via a left Rutherford-Morrison incision. The external iliac artery was ligated proximally and pulsed in the aneurysm ceased. The aneurysm was opened lateral to the femoral nerve and fresh blood and clot were sent for culture (which proved to be sterile). Forming part of the inferior wall of the aneurysm was the acetabular cup and bone cement complex which had protruded through the acetabular floor into the true pelvis. The cup and bone cement were removed en bloc from within the pelvis. The abdominal incision was then packed and covered with sterile towelling. The patient was then turned onto her right side and the incision over the hip reopened. The femoral prosthesis was dislocated by medial rotation of the leg. It was found to be firmly cemented and no frank pus was encountered. Stem and cement were extracted, resulting in a crack through the porous shaft of the femur. Both wounds were irrigated with saline and closed in layers over corrugated drains.

Upper tibial pin traction with five pounds (2.25 kilograms) weight was applied to distract the upper end of the femur from the deficient side wall of the pelvis into which a flap of gluteus medius muscle had been turned. Twelve weeks after operation she was mobilised with a frame and later she was discharged home, walking with the aid of a frame and a built-up shoe. At follow-up two years later her wounds were fully healed and the pulses in her foot were normal.

Case 2. A 57-year-old woman had had nodular, seropositive rheumatoid arthritis for over 30 years. She had always been difficult to manage, reacting adversely to many anti-arthritic medications. She had also had a vasculitis which produced ulceration of the legs and feet. In 1965, after an episode of septicemia and meningitis, her arthritis became poorly controlled and she was started on steroids. In 1971 she developed aseptic necrosis of the left femoral head (Fig. 5). Operation was deferred due to infected ulcers on the leg, but in October 1973 an arthroplasty of the left hip was performed. The immediate result was very satisfactory. Although her arthritis remained a problem to her she had no trouble with her left hip until March 1980 when she was readmitted and found to have a fracture of the base of the acetabulum and dislocation of the prosthesis (Fig. 6). Her total hip

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Fig. 1  Fig. 2  Fig. 3  Fig. 4
Case 1. Figure 1—Radiograph of the left hip before operation demonstrating a defect in the acetabular floor. Figure 2—Sinogram showing communication of the sacral bone with the hip joint. Figure 3—Angiogram: control film. Figure 4—Angiogram: late phase showing dye in the aneurysm superimposed on the bone cement.

Fig. 5  Fig. 6  Fig. 7  Fig. 8
Case 2. Figure 5—Necrosis of left femoral head. Figure 6—Initial McKee-Arden hip replacement with a Charnley restrictor centrally dislocated. Figure 7—Angiogram, also showing the revised arthroplasty with Eichler ring, long-stem Stanmore prosthesis and cerclage wire. Figure 8—Angiogram, showing aneurysm arising from the posterior aspect of the external iliac artery, and narrowly separated from bone cement.
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replacement was then revised, building up the acetabulum with a ring held with screws and cement. However, this dislocated and open reduction was required. The condition of the joint remained unsatisfactory and in April the arthroplasty was again revised, removing the acetabular cup which was in an unsatisfactory position and replacing with a new Eichler ring and Stanmore cup. The femoral prosthesis was removed and a long-stem prosthesis inserted. Discharge from the wound and further dislocation followed. The discharge was cultured and grew Staphylococcus aureus. Closed reduction was performed and the patient made better progress and was allowed home in June.

She was readmitted in March 1981 with a painful, swollen left leg; venography showed no evidence of venous thrombosis. The hip wound was still discharging. This was explored and some wire and loose cement was removed. In June 1981 the wound discharged fresh blood. No mass was palpable in the abdomen and no bruit could be heard, but arteriography was recommended. This demonstrated a small aneurysm arising from the posterior aspect of the left external iliac artery (Figs 7 and 8). Operation was performed exactly as in the first case, though the acetabular cup and bone cement were removed through the hip incision on this occasion.

Recovery was slow and nutritional support was required. At her most recent follow-up a programme of remobilisation was continuing.

DISCUSSION

The two patients described in this paper had inadequate bony support to the acetabular cup due to their severe, erosive type of rheumatoid arthritis, their treatment with steroids and generalised osteoporosis. This put them at risk from this type of vascular complication. This might have been prevented by using a flanged cup or the Müller acetabular roof reinforcement ring, the former being commonly required in cases of juvenile rheumatoid arthritis (Arden 1978).

Both these cases were complicated by sepsis. It is uncertain whether vascular injury was due to repeated trauma from the cement protrusions, or to pyogenic staphylococcal sepsis. We feel that sepsis plays an important role. In its absence, repeated local injury might be expected to produce fibrosis of the arterial wall with consequent stenosis or thrombosis rather than the weakening, rupture and false aneurysms that we have observed.

Injury to the external iliac artery is rare after hip operations but may occur when the acetabular floor has been broached by operative instrumentation or eroded by loosening of the prosthesis facilitated by osteoporosis, steroids or sepsis. This danger should be recognised and arteriography carried out before a revision operation is undertaken. In the presence of sepsis, the arterial defect must be isolated by ligating the vessel above and below rather than by attempting direct repair. An alternative blood supply must first be provided for the affected limb.

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REFERENCES


