ANTERIOR COMPARTMENT SYNDROME AFTER REVISION HIP ARTHROPLASTY

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We report a case of anterior compartment syndrome in the ipsilateral leg after a revision total hip arthroplasty. Possible causes include post-ischaemic swelling after occlusion of the vessels during prolonged surgery and vigorous repetitive stretching of the muscles of the anterior compartment from the intraoperative use of electrical calf stimulators.

Epidural infusions for postoperative analgesia may mask symptoms, but when there is clinical suspicion, we recommend measurement of the compartment pressures and early fasciotomy.

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Compartment syndrome of the leg is rare after orthopaedic surgery. Lachiewicz and Latimer (1991) reported six cases of rhabdomyolysis after total hip arthroplasty associated with a contralateral buttock compartment syndrome as a result of crushing of the gluteal muscles during prolonged surgery in the lateral decubitus position.

We report a case of compartment syndrome of the ipsilateral leg after a revision hip arthroplasty. This complication has not previously been described.

CASE REPORT

A 65-year-old man, who had had a left total hip arthroplasty for primary osteoarthritis in 1986, had a revision in 1993 for a broken femoral stem. Within two years he developed clinical and radiological signs of loosening and was readmitted in late 1995 for another revision. He had mild hypertension, but was otherwise fit. Our standard protocol includes the administration of 40 mg of Enoxaparin subcutaneously 12 hours preoperatively and then daily until discharge.

Under general and epidural anaesthesia the patient was placed in the lateral position and electrical calf stimulators (AMT Ltd, Londonderry, UK) which produce visible contraction of the gastrocnemius and soleus muscles were used on both calves for thromboprophylaxis throughout the operation. Using the Hardinge approach, we removed the loose femoral and acetabular components and cement and inserted a cemented Osteonics cup (Stryker UK Ltd, Aldermaston, UK), with bone grafting of the medial wall, and a Furlong HA-coated long-stem prosthesis (JRI Ltd, London, UK). An epidural infusion of morphine was used for postoperative analgesia.

Twenty-four hours after the operation the patient complained of pain in the left lower shin which was slightly swollen and tender. Active and passive movements of the ankle and toes produced some discomfort. He was reviewed regularly and on the following day reported slight improvement in his leg symptoms.

By the third postoperative day, however, the leg was more swollen, tense and painful, with paraesthesiae in the foot. The pressure in the anterior compartment measured with a wick catheter was over 32 mmHg. An urgent fasciotomy of the anterior compartment was performed through an anterior longitudinal incision. There was widespread muscle necrosis, involving tibialis anterior and part of extensor hallucis longus and extensor digitorum longus. All devitalised muscle was excised and the wound was left open. Further debridements were performed over a period of six days to complete excision of all dead muscle. Eventually, the wound was closed with a split skin graft, but the patient had no active dorsiflexion of his ankle and toes and required an ankle-foot orthosis.

DISCUSSION

The early diagnosis and management of acute compartment syndrome are critical for the prevention of long-term disability (McQueen, Christie and Court-Brown 1996). Diagnosis may be delayed when the condition is unexpected and when symptoms are masked by the use of analgesia. In our patient the rate of his epidural infusion was increased soon after pain first developed and this led to very misleading clinical symptoms.

Compartment syndrome may be caused by a decrease in compartment size or an increase in its contents due to bleeding, increased capillary pressure or increased capillary...
permeability (Matsen 1975). In our patient bleeding into the anterior compartment after the administration of Enoxaparin was a possible factor, but there was no evidence of this at fasciotomy.

Acute compartment syndrome after prolonged surgery has been described (Khalil 1987). Hypothermia, vasoconstriction and a low flow state from inadequate fluid administration are possible contributing factors. In our patient prolonged surgery with the leg held in a position which may have occluded the femoral vessels could have caused temporary ischaemia. In addition, postoperative reperfusion could have produced reactionary swelling of the muscles.

Exercise causes increased capillary permeability and increased capillary pressure. Reciprocal passive stretching of the anterior compartment was produced by the repetitive, vigorous ankle flexion from the use of electrical calf stimulators which was maintained for four hours. We have failed to find any documented reports of acute compartment syndrome after the use of calf stimulators, but in our patient the syndrome may have been precipitated at least in part by the vigorous stimulation and contraction of the calf muscles, producing oedema in the anterior compartment.

Early diagnosis of acute compartment syndrome is imperative, and any clinical suspicion, should lead to measurement of the compartment pressure (Rorabeck 1984). The differential diagnosis also includes the early onset of a deep-vein thrombosis.

**Conclusion.** Ipsilateral compartment syndrome after total hip arthroplasty is a rare but devastating complication, and any precautions that can be taken to help to prevent this should be encouraged. From our experience, we suggest that calf stimulators are set at a level which produces visible but not vigorous muscle contraction. Surgeons should also be aware that the use of continuous epidural analgesic infusions may mask the symptoms of such an acute compartment syndrome.

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**REFERENCES**


