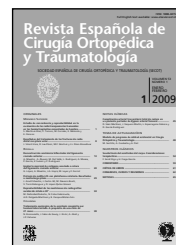




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## CASE REPORT

### Arterial complications following total hip arthroplasty in a patient with a femoro-femoral bypass

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#### KEYWORDS

Total hip prosthesis;  
Arterial graft;  
Arterial complication;  
Thrombosis

#### Abstract

*Purpose:* To report on the occlusion of a femoral artery bypass, an unusual complication of primary total hip replacement.

*Clinical case:* A 74-year-old male with a femoro-femoral implant and a Dacron graft suffered arterial ischemia resulting from thrombosis of the vascular graft further to total hip replacement. We present a brief bibliographical review of arterial complications following total hip arthroplasty.

*Discussion:* As the patient was operated through a posterolateral approach, we thought that the complication was caused by the limb adduction and internal rotation maneuvers that are required in such procedures, which could have bent the graft thereby causing a thrombus to be formed.

*Conclusions:* In addition to a careful preoperative vascular assessment, care must be taken in these cases with the maneuvers carried out on the limb during femoral preparation. As it is advisable to avoid the extreme flexion, adduction and internal rotation maneuvers necessary for the posterolateral approach, the anterior approach should be selected.

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**PALABRAS CLAVE**

Prótesis total de cadera;  
Injerto arterial;  
Complicación arterial;  
Trombosis

**Complicación arterial tras prótesis total de cadera en un paciente portador de bypass arterial femoral****Resumen**

*Objetivo:* comunicar la oclusión de un bypass arterial femoral, como complicación poco frecuente de una artroplastia primaria total de cadera.

*Caso clínico:* varón de 74 años con bypass femorofemoral con injerto de Dacron, que tras ser intervenido de una artroplastia primaria de cadera sufre un cuadro de isquemia arterial por trombosis del injerto. Se hace una breve revisión bibliográfica de las complicaciones arteriales tras artroplastia de cadera.

*Discusión:* intervenido con un abordaje posterolateral, pensamos que la complicación fue debida a las necesarias maniobras de aducción y rotación interna de la extremidad, que angularían el injerto provocando la formación de un trombo.

*Conclusiones:* además de una cuidadosa evaluación vascular previa a la cirugía, en estos casos debe tenerse precaución con las maniobras sobre la extremidad durante la preparación femoral; es conveniente evitar la flexión, la aducción o la rotación interna extremas, las cuales son necesarias en el abordaje posterolateral, por lo que aconsejamos el abordaje anterior.

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**Introduction**

Arterial complications in the course of total hip arthroplasty are relatively rare, although real prevalence depends on how this significant vascular problem is defined. Nonetheless, this infrequent complication leads to considerable morbidity and mortality rates<sup>1,2</sup>.

**Clinical case**

This report is on a 74-year-old patient that was treated in our hospital for bilateral hip pain of several years' evolution. His clinical history included a previous total hip prosthesis on the right side, chronic obstructive pulmonary disease and chronic lower limb ischemia that required a left femoro-femoral Dacron bypass in another hospital over 10 years before.

A diagnosis was made of left hip arthritis, with persistent pain and limitations for walking and for performing activities of daily living. The patient presented with a 10° flexum deformity, flexion greater than 90°, 30 degrees' abduction and 15° adduction. Prior to surgery, the patient was evaluated by the anesthesia team, who on several occasions ruled out surgery because of pulmonary problems. He was not assessed specifically by the vascular surgery department.

The procedure was carried out by means of a posterolateral approach. An uncemented total hip replacement was used, without the need to implant a screw ring. The radiologic follow-up showed that the operated limb was 3 cm longer than the unoperated side. There were no intraoperative complications. The patient was sent to the post-anesthesia recovery unit for 3 hours. At 6 hours from surgery antithrombotic prophylaxis was started with low molecular weight heparin (subcutaneous clexane, 40 mg/24 hours).

In the 2 days following surgery, the patient complained of persistent pain in the distal third of his left leg and

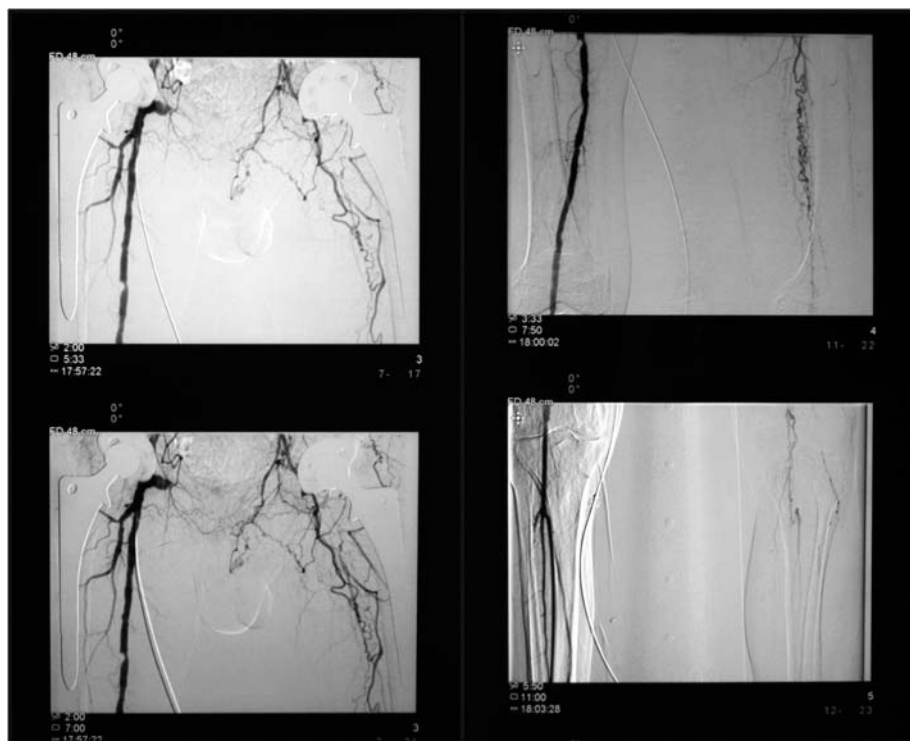
paresthesia in the dorsum of his foot. The third postoperative day the foot was cold on examination and neither pedal nor tibialis posterior pulse could be palpated. Neurologically, strength was normal. The Vascular Surgery Department used an emergency arteriogram to diagnose subacute left lower limb ischemia, secondary to an obstruction of the femoro-femoral bypass (fig. 1). Analgesic treatment was initiated together with anticoagulation in a continuous perfusion pump (sodium heparin, 18,000 U/24 h, at 11 ml/h). A left limb surgical thrombectomy was performed, with recanalization both of the popliteal artery and its bifurcation. The patient recovered from surgery satisfactorily except for a COPD flare-up, possibly of an infectious origin. Two months after surgery the patient did not experience distal pain in his leg or his foot.

**Discussion**

Arterial complications during total hip replacement are relatively rare, with a prevalence between 0.08 and 0.3%. Real prevalence depends on how different authors define a significant vascular problem. Hence, some series report rates of 1% excessive bleeding without finding lesions of any major vascular structure in the reoperated cases. Nevertheless, this rare complication is associated with 7% mortality, 15% amputation and 14% fasciotomy rates<sup>1</sup>.

One of the main risk factors that have been identified is peripheral vascular disease, which has been reported in up to one-third of injured arterial segments, invariably connected to the manipulation of atheromatous vessels during surgery<sup>1</sup>.

The most frequent type of arterial lesion is arterial thrombosis (78%), followed by lacerations or avulsions, the formation of pseudoaneurysms and arteriovenous fistulae. These may be caused directly or may be the result of



**Figure 1** Arteriogram, obstruction of the femoro-femoral bypass.

compression, stretching or tearing of the involved structures. The most frequently injured arteries tend to be the external iliac and common femoral arteries<sup>2</sup>.

The most usual presentation of an arterial lesion following total hip replacement is in the form of acute ischemia, with pain, paleness, lowering of the pulse rate and changes in Doppler signal power. The different series report that between 25 and 50% of cases fail to be diagnosed in the first 24 h, which has been attributed to epidural anesthesia, placement of compression stockings and to a surgical field preventing identification intraoperatively<sup>1,2</sup>.

The literature contains few reports of arterial *bypass* occlusion in the lower limb following total hip replacement. Trousdale et al<sup>3</sup> and Parfenchuck et al<sup>4</sup>, each of whom reported on one case of aortofemoral *bypass* occlusion, blame the posterolateral approach. During femoral preparation, the flexion, adduction and internal rotation would appear to bend the graft thus inducing the formation of a thrombus. Although there are no intraoperative studies showing arterial occlusion in this position, Stamatakis et al<sup>5</sup> showed that the femoral vein is subjected to severe torsion during the kind of flexion and internal rotation used in the posterolateral approach.

The following recommendations could be made on the basis of the present case: a) Need for a careful preoperative vascular assessment; b) Special care must be taken with the placement of retractors, especially those placed anteriorly; c) Need to spare the medial acetabular wall when reaming, placing screws or cementing (anterior quadrants); d) Need to withdraw excess cement; e) Care must be taken with the

position of the leg during femoral preparation. In patients with grafts or an aortofemoral or femoro-femoral bypass, it is best to avoid the flexion, the adduction and extreme internal rotation provoked during a posterolateral approach. In these patients, an anterior approach may help avoid intraoperative thrombosis; and f) Need for meticulous postoperative monitoring of any signs of ischemia.

### Conflict of interests

The authors have declared that they have no conflict of interests.

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