

FALSE ANEURYSM IN AN ILEOFEMORAL DACRON® GRAFT AFTER TOTAL HIP ARTHROPLASTY

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A 54 year-old woman patient had received a complete Zweymüller-type prosthesis of the left hip 9 years previously. The heat generated by the setting of the cement produced a thrombosis of the common femoral artery, and an ileofemoral Dacron® graft was made. After the 9 year period, the acetabular component was clearly loosened, and a replacement was attempted during which the existence of a pseudoaneurysm, the result of erosion of the Dacron® graft by the cement pin, was discovered.

Keywords : total hip replacement ; hip ; vascular injuries ; false aneurysm ; vascular graft.

Mots-clés : hanche ; arthroplastie totale ; lésions vasculaires ; faux anévrisme ; greffe vasculaire.

INTRODUCTION

Vascular injuries as complications of total hip arthroplasty are fortunately rare. A few isolated cases of vascular injuries from other causes have been published (1, 8, 9, 10, 13, 14, 19) : osteotomy, total arthroplasty and hip replacement, nail-plate fixation, the result of the introduction of Kirschner wires, because of heat given off during setting or because of separators. In 1974 Coventry *et al.* (3) studied 1684 patients with 2012 arthroplasties and found no vascular injuries. In a personal series, Elkin (6) from more than 650 interventions on aneurysms and arteriovenous fistulas found only 6 located in the knee or foot joints which could be attributed to surgical procedures. Matas (11) in 1903 described two types of pseudoaneurysm, sacular and fusiform, and suggested endoaneurysmorrhaphy for the repair of false aneurysms and

arteriovenous fistulas. In contrast to true aneurysms which are made up of three layers, intima, middle and adventitious, false aneurysms consist of only one layer, the adventitious, which is formed from a small laceration in the wall of an artery and leads to the formation of an apositional thrombosis with a central blood lake and the production of a pulsating hematoma. Its size and extent depend on the resistance of the surrounding tissue (1, 15).

CLINICAL CASE STUDY

A 46 year-old woman consulted in December 1982 because of pain in the hips and both knees of 6 years' duration. The radiological study confirmed the existence of bilateral coxarthroses more severe in the left hip (fig. 1). Interesting history included exogenous obesity which was being treated by the endocrinology department with a 1000 calorie diet, a 6 year history of arterial hypertension well controlled on a salt-free diet, and lumbar spondylosis.

In February 1983 she received a total Zweymüller prosthesis without cement through a Watson-Jones approach (fig. 2). The acetabulum was not deep and there was little internal or posterior wall, so an Ender component was not considered viable. Therefore a cemented Müller component was used. At the end of the surgical intervention,

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Fig. 1. -- Left coxarthrosis, immediately before operation.



Fig. 2. - Immediately after operation. Complete Zweymüller-type cementless prosthesis.

while the patient was still under anesthesia, the existence of an ischemic syndrome was discovered in the lower operated extremity with the absence of popliteal, posterior tibial and dorsalis pedis pulses. A cardiovascular consultation was requested. On suspicion of injury to the common femoral artery, an urgent vascular examination was made, and burns on the posterior wall of the common femoral artery were found, caused by the beat given off by the cement pin which had passed through the component and extended under the inguinal ligament. During the operation, a 3 cm invagination of the intima was observed which necessitated section. Multiple thrombi were extracted from both femoral arteries with a Fogarty catheter. When a terminoterminal Dacron® graft 8 mm in diameter was made, good distal pulses were noted. In the days following the operation, sensibility returned, but flexion-extension movements of the foot were absent. Successive electromyographs indicated a severe lesion of the lumbosacral plexus. On this charge the patient showed marked lack of strength in the lower left extremity. In April 1985 a complete fixed arthroplasty was carried out on the right hip with a Zweymüller prosthesis with a Müller component without complications.

After 8 years there was loosening of the acetabular cup component, which appeared to have protruded into the pelvis. In September 1991 an examination of the prosthesis was carried out. On physical examination of the component, a hematoma began to drain and later to bleed so profusely that it became necessary to request a cardiovascular consultation. The vascular surgeons made an anterior opening from the abdomen to the inguinal ligament. The anatomy seemed totally confused, but an 8 cm pulsating pseudoaneurysm could be seen. After the removal of the cement which had passed through the back of the component, the iliac and common femoral arteries were clamped, the pseudoaneurysm was dissected and the existence of an orifice in the vascular dacron prosthesis could be seen. The perforated dacron prosthesis was then removed and a new terminoterminal teflon graft was placed (fig. 4). The Gilderstone technique was used on the patient. Even though prophylactic antibiotic treatment was

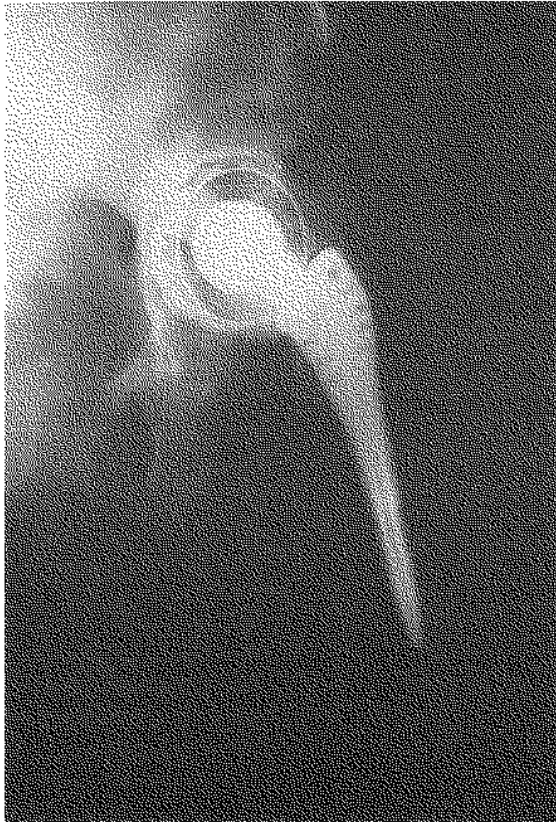


Fig. 3. — Loosening and protrusion of the acetabular cup component after 8 years.

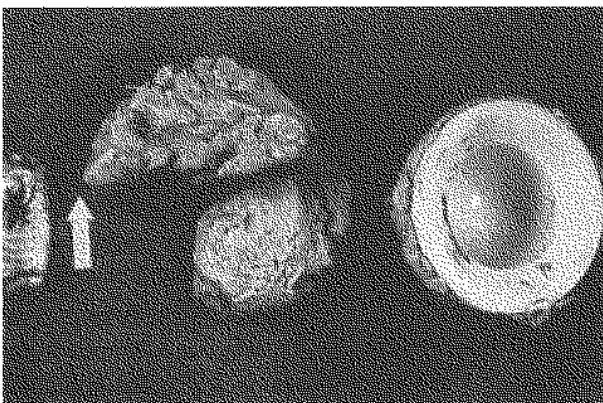


Fig. 4. — Material extracted during the examination of the prosthesis. The acetabular component of the prosthesis can be seen protruding into the endopelvis, the point (arrow) of which has eroded the dacron vascular prosthesis (see orifice).

given, there was a postoperative *Pseudomonas* infection of the surgical wound which was treated according to the sensitivity results. Drug-induced granulocytosis was confirmed by means of narrow aspiration, and the patient had to be isolated. Treatment with Ceftazidine® and Amikacin® was prescribed and the agranulocytosis resolved. A galium scan showed uptake at the level of the component and left inguinal fossa which was treated orally with Ciprofloxazine, but there was no sign of infection in the vascular graft. The patient began slowly to improve. She remained afebrile and took short walks without pain either in the hip or the knee.

DISCUSSION

The case with which we are concerned was one where, after a total arthroplasty, the heat generated by the setting of the cement caused burning and thrombosis in the common femoral artery which necessitated an ileofemoral Dacron® graft during the operation. An attempt at replacement revealed a pseudoaneurysm caused by the erosion which the component had progressively caused in the vascular prosthesis. In the literature we have found no cases of pseudoaneurysm as a consequence of the erosion of the acetabular cemented component of a total hip arthroplasty on a vascular dacron graft.

The possible etiologies are diverse. Nachbur *et al.* (14) studied hip operations carried out between the years 1970 and 1978 and found 15 cases of arterial injury representing 0.25% of the total. They distinguished 5 fundamental mechanisms of injury to the main vessels during hip surgery :

1. Perforation of a major artery with the point of a Hoffman separator, above the roof of the acetabulum ; immediately above this is the neuro-vascular bundle.
2. Excessive pulling on an arteriosclerotic artery and breaking of the intima with the consequent formation of a thrombus. This could occur in surgical manoeuvres dealing with dislocation of the hip by adduction and external rotation.
3. Breaking of the main artery during placement of a total hip prosthesis during osteotomy, or

while removing an osteophyte or loosened cement during a replacement.

4. Thrombotic occlusion of an artery owing to the intense heat of polymerization. The osteocement can reach temperatures of up to 110°C on setting, causing thrombosis in such arteries as the external iliac.
5. Development of aneurysms and arteriovenous fistulas caused by, for example, a Kirschner wire during an osteotomy.

This type of pathology can give rise to posterior thromboembolism (17).

The case we presented was interesting for two reasons :

- a) An injury to the common femoral artery produced by the heat generated by polymerization of the cement extruded through the back of the component, thereby necessitating a vascular dacron graft. This type of injury corresponds to a Nachbur type IV (14) (a complication which has been published by other authors such as Ratliff (18)).
- b) The progressive deterioration of the dacron graft with the formation of a pseudoaneurysm as a consequence of the erosion of the endopelvic cement on the loosened acetabular component, with no hemodynamic repercussions for the lower extremity. This pseudoaneurysm of the dacron graft was found when, because of symptoms, a replacement of the articular component was to be made.

In the literature we have consulted (2, 4, 5, 7, 12, 14, 15, 16, 18, 19), we have found no reference to this second type of pseudoaneurysmal injury produced in a vascular dacron prosthesis as a complication of total hip arthroplasty. In 1974, J. D. Dorr (5) described a case of false aneurysm in the common femoral artery where the author himself advanced the hypothesis of a gradual erosion caused by the methylmethacrylate spike extruded into the endopelvis, although he could not reject the possibility that this was a severe lesion which had passed unnoticed during the operation. We believe that our case shows clearly how the cement extruded through the back of the component could not only cause a severe lesion

to the neighboring vascular structures, but could also produce a chronic vascular lesion of the pseudoaneurysmal type as a consequence of the use to which the vascular graft is subjected when the prosthetic component is loosened. This injury mechanism, demonstrated in our case, would support the hypothesis of a chronic vascular lesion already suggested by J. D. Dorr (3).

CONCLUSION

The acetabular intervention in total hip arthroplasty should be meticulously carried out so as to avoid the possible perforation of the back of the acetabulum. If this occurs, it should be repaired immediately using bone graft or metallic net. In this context it should be remembered that on penetrating the endopelvis, the osteocement can cause :

1. Thermal lesions in the vascular structures.
2. Adhesions between neighboring structures which may cause tearing when the prosthetic component is removed.
3. Progressive deterioration of the vascular grafts after loosening.

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SAMENVATTING

A. FRIAS PEREZ, F. J. GARCIA GARCIA, J. A. ORTIZ GOMEZ, J. R. PRIETO MONTANA, F. GONZALO VIVAR. Pseudo-aneurysma van een ilio-femorale Dacron® ente, na totaalprothese van de heup.

Bij een 54-jarige vrouw werd 9 jaar voorheen een totaalprothese van de heup, type Zweymüller, geplaatst. De

warmte, ontwikkeld bij de polymerisatie van het cement, veroorzaakte een thrombosis van de arteria femoralis communis, behandeld met een ilio-femorale Dacron®-ente. Negen jaar later waren er duidelijke tekenen van loslating van het acetabulum en, tijdens een poging tot vervanging van dit stuk, werd een pseudoaneurysma vastgesteld, secundair aan de erosie van de Dacron®-ente door een cementuitstulping.

RÉSUMÉ

A. FRIAS PEREZ, F. J. GARCIA GARCIA, J. A. ORTIZ GOMEZ, J. R. PRIETO MONTANA, F. GONZALO VIVAR. Pseudo-anévrisme d'une greffe iléo-fémorale au Dacron®, après arthroplastie totale de hanche.

Les auteurs présentent l'observation d'une malade de 54 ans qui avait subi 9 ans auparavant d'une arthroplastie totale de hanche, type Zweymüller. La chaleur engendrée par la polymérisation du ciment avait provoqué une thrombose de l'artère fémorale commune, traitée par greffe au Dacron®. Neuf ans plus tard, le composant cotyloïdien était descellé ; au cours de l'intervention de remplacement, on constata l'existence d'un pseudoanévrisme résultant de l'érosion de la greffe de Dacron® par une saillie de ciment.