A Case of Bilateral Obturator Foramen Bypass

Hisao MASAKI, Atsuhisa ISHIDA, Ichiro MORITA, Takashi MIYAKE, Yoshiaki FUKUHIRO and Kazuo TANEMOTO

Department of Thoracic and Cardiovascular Surgery, Kawasaki Medical School, Kurashiki 701-0192, Japan

Accepted for publication November 17, 2000

ABSTRACT. We report a case of a bilateral obturator foramen bypass for repeatedly infected vascular prostheses of both inguinal regions occurring at different times.

A 85-year-old man was admitted into our hospital because redness and swelling of the right inguinal region of unknown origin. He had previously been treated for the same clinical signs and symptoms as this time. He had a past history of femoro-femoral cross over bypass for arteriosclerosis obliterans at 81 years of age. Although at the age of 83 years the inguinal region was washed for about one month with a saline solution containing povidone iodine for the first infection, his condition did not improve. Therefore, femoro-femoral cross over bypass graft was removed, and a right axillary-femoral bypass and a left obturator foramen bypass were performed. His postoperative course was uneventful, but redness and swelling of the right inguinal region of unknown origin similarly appeared again 2 years later. The right axillary-femoral bypass graft from the flank to the right femoral artery was removed, and using a 6 mm ringed expanded polytetrafluoroethylene (ePTFE), a right obturator foramen bypass was performed from the stump division of the flank of the right axillary-femoral bypass graft to a superficial femoral artery in the middle thigh through the retroperitoneum and obturator foramen. There has been no recurrence to date, but sufficient follow up is required.

We concluded that the obturator foramen bypass is a safe and satisfactory method of treatment for patient with groin infections after previous revascularization.

Key words: obturator foramen bypass — infected vascular prostheses — inguinal regions arteriosclerosis obliterans

The management of infection in a vascular prosthesis remains one of the most difficult problems in vascular reconstructive surgery. The most frequent site of infection is the upper thigh and groin, where sepsis in a femoral prosthesis is a life-threatening process that usually leads to catastrophic hemorrhage or sepsis if not treated. Conservative management, such as opening of the wound or administration of local and systemic antibiotics, is usually ineffective and often permits continuation of infection and thrombosis of vessels, resulting in amputation of the extremity or death.[1] The basic principles for management of infected prostheses, that is, the removal of all foreign material, drainage of the infected area, and provision of blood supply to the extremity by new vascular prostheses in an uncontaminated area, have been described by Shaw and Baue,[2] who originally suggested the obturator

正木久男，石田敦久，森田一郎，三宅　隆，福廣吉晃，種本和雄

foramen bypass as a technique for extraanatomic reconstruction in a clean operative field.

The following is a case report of a bilateral obturator foramen bypass for infected vascular prostheses of both inguinal regions occurring at different times.

CASE

The patient, an 85-year-old man had undergone surgery for prostatic cancer at 75 years of age. At 81 years of age, he was admitted to our hospital for intermittent claudication of his right lower extremity. Digital subtraction angiography revealed total occlusion of the right common iliac and external iliac arteries using a vascular prosthesis (PFV) under a diagnosis of arteriosclerosis obliterans, a femoro-femoral cross over bypass was performed (Fig 1).

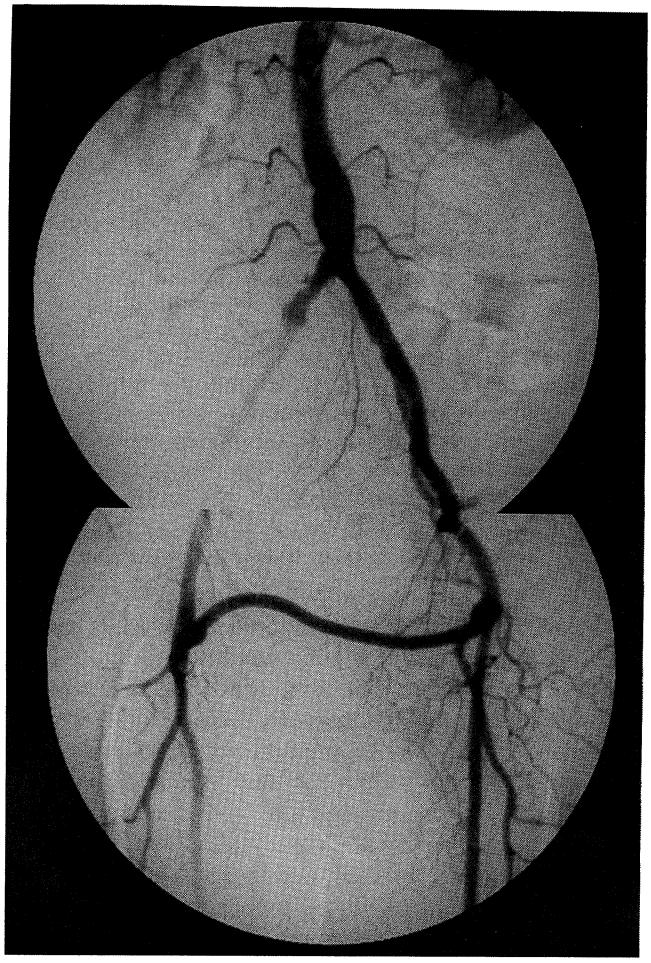

Fig 1. Angiogram showing after femorofemoral cross over bypass at 81 years of age. The graft was well patented.

When a right internal iliac aneurysm was detected six months later, it was removed. Although his postoperative course was uneventful, redness and swelling of the left inguinal region of unknown origin appeared at 83 years of age.

This was diagnosed as a groin infection, and incision and drainage were performed. Culturing of the groin wound was positive for Methicillin-sensitive staphylococcus aureus (MSSA).

Although we washed the groin for about one month with a saline solution containing povidine iodine, his symptoms were not relieved. Therefore, the femoro-femoral cross over bypass graft was removed, and an obuturator foramen bypass was done. Using a 6 mm ringed ePTFE in the extraperitoneal approach, an obturator foramen bypass was carried out from the left external iliac artery to the superficial femoral artery of the middle thigh.

In addition, a right axillary-femoral bypass was also done using an 8 mm ringed expanded polytetrafluoroethylene graft, since the right femoral artery was a recipient artery.

He was cured of groin infection after one month, and the graft was well patented even in his postoperative MR angiography.

However, redness and swelling of the right inguinal region of unknown origin similarly appeared again at 85 years of age (Fig 2).

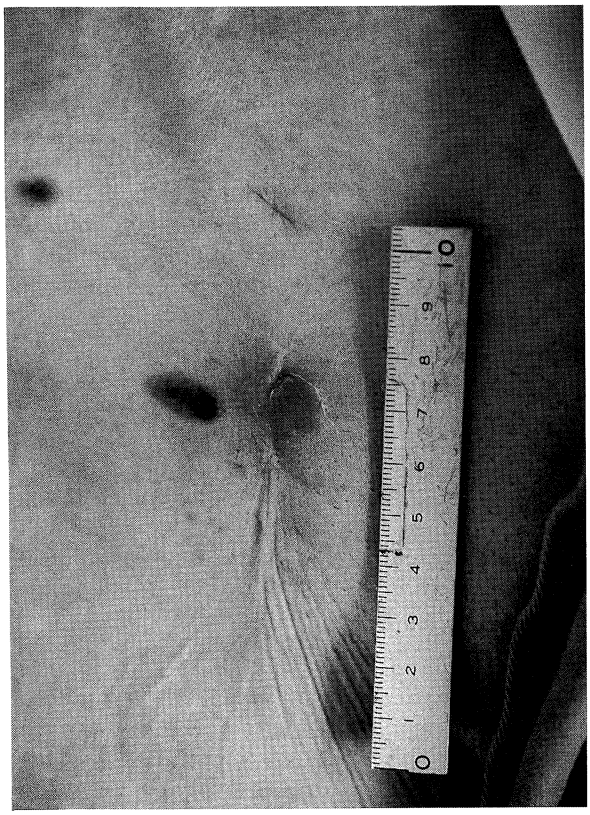

Fig 2. Photograph showing redness and swelling of the right inguinal region.

This was diagnosed as a groin infection, and incision and drainage were performed. Culturing of the groin wound was also positive for MSSA. The ring of the ePTFE graft was extracted and the prosthesis was brushed, and the groin wound was washed repeatedly with a saline solution containing povidine iodine. The wound was then closed, but the infection could not be controlled.

The right axillary-femoral bypass graft from the flank to the right femoral artery was removed, and using a 6 mm ringed ePTFE, an obturator foramen bypass was performed from the stump division of the flank of the right axillary-femoral bypass graft to the superficial femoral artery in the middle thigh through the retroperitoneum and obturator foramen (Fig 3A).

The postoperative groin infection was observed after one month, and the graft was well patented even in the postoperative MR angiography (Fig 3B).

Since the last operation was performed, there has been no recurrence of the prosthetic infection and the graft has remained patent and is functioning well.

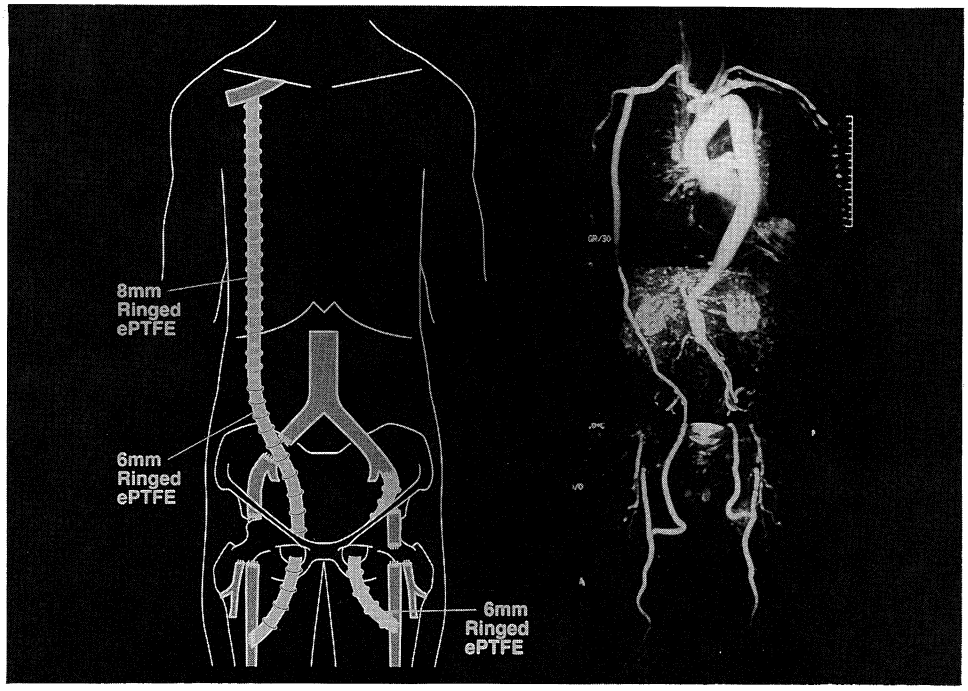

Fig 3. A : Schematic display of the procedure.
B : MR angiogram showing after bilateral obturator foramen bypass, The grafts were well patented.

DISCUSSION

The reported incidence of infection after vascular arterial reconstruction ranges from 1.8 to 6 percent,[3–6] which is higher rate than that usually considered acceptable, since the groin is associated with a higher incidence of wound complications, especially in vascular surgery Goldstone and Moore[7] attributed this is to its proximity to the perineum, the transportation of microorganisms from distal ulcerations on the legs through the lymphatic

vessels, and factors in the operative technique, such as extensive undermining of skin flaps and improper wound closure.

The basic methods of management include removing the source of infection, treating the infecting microorganisms with appropriate antibiotics, and maintaining the circulation of distal limbs through an uncontaminated extraanatomic route. In the femoral region, the obturator foramen bypass is perhaps the best approach, but a bilateral bypass, as in our case is very rare.

Rudich and colleagues[1] reported that one of seven patients died three days after operation from aspiration pneumonia, and in another patient the muscle of thigh became necrotic, and the five remaining patients recovered from operation and the prosthetic grafts were patent, and three prosthetic grafts became occluded as long as eight months after operation and below-knee amputation was necessary. Geroulakos and colleagues[8] reported that two of eight grafts failed and one of patients required an amputation, but none of the patients developed infection in the obturator foramen graft itself. David and colleagues[9] reported that five out of six grafts remained patent after 11-26 months follow up.

A bilateral obturator foramen bypass is indicated in the case of infection of unknown origin in a case with a clinical course of long duration.

In the present case, the cause could not be clarified, because there were more than 20 month periods between the time of the first infection and the primary operation, there had been no past history of injury, and no other infection was recognized , and the second was also similar.

Although C-reactve protein (CRP), his leukocyte count and fractionation were normalized one week after the first operation, antibiotics against the appearance of resistant microbes were administered for only two weeks. Following the second operation, antibiotics were administered for three months, as the prevention of recurrence. The administration period for antibiotics varies in the literatures. At present there has been no any sign of recurrence, but sufficient follow up will be required.

The complications which may accompany this operative method are : false aneurysm, obturator neuralgia, thigh necroses due to poor blood flow of the deep femoral artery.[9] To avoid false aneurysm or obturator neuralgia due to grafting damage, a prosthetic graft with a ring should be used instead of a large prosthetic graft which may press against the obturator nerve. Therefore, we used the 6mm prosthetic graft with the ring.

Although it is the best to use an autogenous vein, we used a prosthetic graft to shorten the operation time and because of no autogenous vein of sufficient available caliber. The deep femoral artery was not reconstructed in this case, but the thigh did not become necrotic, because peripheral run off under the Superficial femoral artery was good.

Regarding other operative methods for the treatment of groin infections, an anatomical bypass from the inside of the crest of the ilium through the thigh outside and a per iliac bone bypass through the graft by drilling a hole through the iliac bone have been reported.[10] The latter is suitable for cases in which the infection has reached the lamina profunda.

We concluded that the obturator foramen bypass is a safe and satisfactory method of treatment for patients with groin infections after previous revascularization.

REFERENCES

1) Rudich M, Gutierrez IZ, Gage AA : Obturator foramen bypass in the management of infected vascular prostheses. Am J Surg **137** : 657-660, 1979
2) Shaw RS, Baue AE : Management of sepsis complicating arterial reconstructive procedure. Surgery **53** : 75-86, 1963
3) Bunt TJ : Vascular graft infections-A personal experience. Cardiovasc Surg **1** : 489-493, 1993
4) Lorentzen JE, Nielsen OM, Adrendrup H, Kimose HH, Bille S, Andersen J, Jensen CH, Jacobsen F, Roder OC : Vascular graft infection : An analysis of sixty-two graft infections in 2411 consecutively in implanted synthetic vascular grafts. Surgery **98** : 81-86, 1985
5) Casali RE, Tucker WE, Thompson BW, Read RC : Infected prosthetic grafts, Arch Surg **115** : 577-580, 1980
6) Szilagyi DE, Smith RF, Elliot FP, Vrandecic MP : Infection in arterial reconstruction with synthetic grafts. Ann Surg **176** : 331-333, 1972
7) Goldstone J, and Moore WS : Infection in vascular prostheses. Am J Surg **128** : 225-233, 1974
8) Geroulakos G, Simon D, Peter R, Parvin F : Obuturator foramen bypass-The alternative route for sepsis in the femoral triangle. Acta Chir Scan **154** : 111-112, 1988
9) David TM, David H, John H : Obturator foramen bypass in the management of infected prosthetic vascular grafts. Aust NZ J Surg **63** : 811-814, 1993
10) Favre JP : Trans-osseus ilio-femoral bypass ; A new extra-anatomical bypass. J Cardiovasc Surg **34** : 455-459, 1993