

A Graft Infection after Abdominal Aortic Aneurysmectomy Successfully Treated by Local Disinfection Maneuver and Free Tissue Transposition

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Abstract: A 62-year-old man was operated for inflammatory abdominal aortic aneurysm through a median transperitoneal approach and was discharged. He returned 3 months later with signs of graft infection. He was re-explored through a left retroperitoneal approach, the remnant of previously left aneurysmal wall was resected as much as possible with extended debridement of necrotic tissues. The wound was thoroughly irrigated, then packed by sponges soaked with 10% iodine solution. This maneuver was repeated 6 times every 8 hours. After 48 hours, the left dorsal latissimus muscle was removed with the attachment of vascular pedicles and transpositioned to the retroperitoneal space around the graft. Vascular anastomoses were made to the inferior epigastric artery and vein. The wound was closed but drainage tubes were left in place. Although prolonged periods were required for the complete healing, he was eventually discharged with “in-situ” preservation of the original graft with no infectious signs. The recurrence of infection was not observed and he is doing well at over 5 years. (Jpn. J. Vasc. Surg., 15: 495–498, 2006)

Key words: Abdominal aortic aneurysmectomy, Graft infection, In-situ preservation, Tissue transposition

Introduction

Graft infection following abdominal aortic aneurysmectomy is considered to be a most serious complication^{1,2)} because it is not only technically difficult to eliminate this complication but also sometimes it will compromise the patient's life. Re-exploration and topical lavage usually do not control infection, therefore, conventional treatment is consisting of removal of the infected graft and creation of

either an in-situ bypass using synthetic graft or homograft if it is available or extra-anatomical bypass is considered best.

We have adopted a new strategy for the treatment of post-operative graft infection in cases of groin^{3,4)} and thoracic aortic surgery^{5,6)} and have been achieving considerable success. Our strategy combines procedures consisting of re-exploration of the wound, extensive disinfection maneuvers and tissue transposition to cover the graft as well as the tissue defect and dead space, to enhance in-situ preservation of the original graft.

We successfully attempted this procedure for the first time in a patient who had complications of graft infection after abdominal aortic aneurysm surgery. This report describes the details of the treatment procedure and final outcome in this patient.

Case Report

A 62-year-old man was admitted with a diagnosis of

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Fig. 1 Computed tomography scan at the time of re-admission showed the presence of multiple areas of gas around the graft.



Fig. 2 Latissimus dorsi muscle with vascular pedicle to be transplanted to the retroperitoneal space.

inflammatory abdominal aortic aneurysm, 6 cm in diameter. He underwent operation on February 28, 1997 through a median transperitoneal approach, with replacement of the diseased segment of the abdominal aorta from just below the renal arteries to the bilateral common iliac arteries by an 18 mm×9 mm bifurcated graft (Carbograft, Solin Company, Milan, Italy. This graft was implanted as part of a clinical trial study.) No sign of infection was detected in the aneurysmal wall either intraoperatively or on specimens taken for pathological examination. Postoperatively, 5 mg of predonine was administered daily until discharge from the hospital on April 21, 1997. At the time of discharge, his WBC count was 10,400/ μ l and CRP was 3.3 mg/dl. The computed tomography (CT) findings prior to discharge did not indicate infection. The patient returned to the hospital on May 26, 1997 with a high fever of several days duration. The CT scan taken then showed the presence of small multiple gaseous shadows in the remnant of the aneurysmal sac around the graft (**Fig. 1**). Marked leucocytosis of 13,000/ μ l and elevation of CRP to 14.8 mg/dl were also noted. With these findings, a diagnosis of graft infection occurred in the late follow-up period was made and the following procedures were immediately undertaken.

We performed re-exploration through a left-side retroperitoneal approach and the remnant of the left aneurysmal wall was opened. Accumulation of purulent material around the graft was observed. Specimens taken for bacterial study later demonstrated the presence of mixed infections with

Staphylococcus epidermidis, *E. coli*, *Enterococcus faecalis* and *Candida*. The infected aneurysmal wall was resected as much as possible, with extended debridement of necrotic tissues. The infected area was thoroughly washed and irrigated with saline and 10% iodine solution. Then the wound was packed with sponges soaked in 10% iodine solution, left open but covered with an aseptic drape and the patient was admitted to the intensive care unit (ICU). While in the ICU, he was completely sedated and intubated for respiratory control. Meanwhile, the wound was opened at intervals of 8 hours and the same maneuvers of irrigation and packing were repeated. He was re-transferred to the operation room (OR) 48 hours later and the left latissimus dorsi muscle with a vascular pedicle was freely transpositioned to the retroperitoneal space (**Fig. 2**). The arterial and venous vascular anastomosis were completed to the inferior epigastric artery and vein respectively and the latissimus dorsi muscle was laid to cover the graft and around the cavity to eliminate dead space. The wound was closed but drainage tubes were left in place. The serum iodine concentration at 48 hours increased to 4600 ng/dl but decreased to 330 ng/dl at one week. Following these procedures, the infection appeared to be controlled well, and the dead space gradually decreased. Although irrigation was continued through drainage tubes, the wound was eventually completely closed. The patient was discharged from the hospital on October 25, 1999. During 5 years of follow up, there has been no sign of recurrence of graft infection (**Fig. 3**).

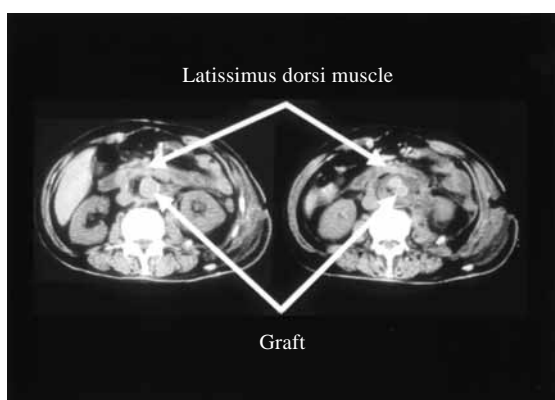


Fig. 3 Computed tomography scan during the follow up period. There is no sign of recurrence of graft infection. The transplanted latissimus dorsi muscle is remaining well as viable adjust to the graft.

Discussion

Graft infection associated with abdominal aortic aneurysmectomy cannot be controlled only by the administration of antibiotics. Although there have been sporadic reports on the successfulness of conservative treatment for prosthetic graft infection, aiming to preserve the original graft,^{7,8)} surgical intervention has to be undertaken in the majority of cases. The conventional procedures are either in-situ reconstruction or creation of an extra-anatomical bypass, removal of the diseased graft, closure of the aortic stump etcetera. However, the creation of a long superficial extraanatomical bypass presents problems with regard to the long-term patency rate, on the other hand with in-situ preservation, there is danger of re-infection of the newly implanted graft. Initially, we applied the present procedure for the treatment of postoperative graft infection in the groin as well as thoracic aorta, such as ascending, aortic arch and descending aortic replacement. As previously reported, we have achieved a considerably good success rate in controlling infection, at the same time, it was possible to preserve the original graft.^{6,9)}

Our present procedure consists of the following two steps. First, as soon as the diagnosis of graft infection is established, the wound is thoroughly re-explored. The necrotic tissues are removed and debridement is undertaken extensively and the wound is thoroughly irrigated with 10% iodine-saline solution. Then the wound is packed with sponges soaked with the same

solution and left in place for 6 to 8 hours. Then the sponges are removed and the same maneuver is repeated during a 48-hour period. Meanwhile, the patient is completely sedated and intubated for respiratory control. The wound is left open but covered by a steri-drape. In the second step, the patient is brought back to the OR and tissue is transpositioned around the graft and dead space, then the wound is closed primarily. The intention of the first step is to try to achieve complete disinfection of the graft as well as surrounding tissues and the second step of tissue transposition aims to protect the graft and eliminate the dead space. At the same time, we hope for the biological disinfection function of viable tissue which we believe to play an important role to control graft infection. The tissues to cover the graft are either omentum or muscle. In this particular case, we selected latissimus dorsi muscle as a source of viable tissue, however, we need to use a free vascular anastomotic technique. The reason we did not attempt to use the omentum in this case was a history of previous abdominal surgery.

The one disadvantage of this procedure is the appearance of high iodine concentration in the serum, since we use a large amount of iodine solution for irrigation and packing. The high concentration of iodine in serum can cause hepato-renal toxicity. Initially we used a high concentration of iodine solution, resulting in severe hepato-renal failure.⁵⁾ Following our experience with this grave complication, we now use 10% solution for disinfection,¹⁰⁾ and this has obtained satisfactory in-situ control of infection, although the optimal concentration for the disinfection purpose remains to be determined.^{11,12)}

The most desirable approach for the treatment of graft infection is probably removal of infected graft and homograft replacement. The difficulty of this particular procedure is the limited availability of material. This report is the first case of free graft transposition to control graft infection after abdominal aortic aneurysm surgery. It must also be emphasized that this maneuver is only applicable through the retroperitoneal approach.

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