

## SHORT REPORT

# Thoracofemoral Bypass Using Spliced Femoral Vein with Removal of an Infected Axillobifemoral Bypass Graft

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A 63-year-old male underwent emergency repair of a ruptured juxtarenal aortic aneurysm via a transabdominal approach using an aorto-bi-iliac Dacron graft. This became infected. A right axillobifemoral bypass was placed and the infected graft was removed with oversewing of the aorta. The patient was re-admitted 8 months later with an infected axillobifemoral prosthesis. We harvested both femoral veins (FV) and spliced them to perform a left thoracofemoral bypass with simultaneous explantation of the infected graft. The patient remains well with a patent graft 20 months post-operatively.

*Keywords:* Graft infection; Thoracofemoral bypass; Superficial femoral vein.

### Introduction

Infected aortic prostheses are challenging.<sup>1–3</sup> Traditional treatment involves removal of the infected graft and: (1) extra-anatomical bypass and oversew of the aortic stump,<sup>4</sup> (2) 'in situ' replacement of the infected graft with autologous vein or cryopreserved material<sup>5,6</sup> or (3) 'in-line' replacement with PTFE or Dacron by a retroperitoneal approach.<sup>7</sup>

### Case Report

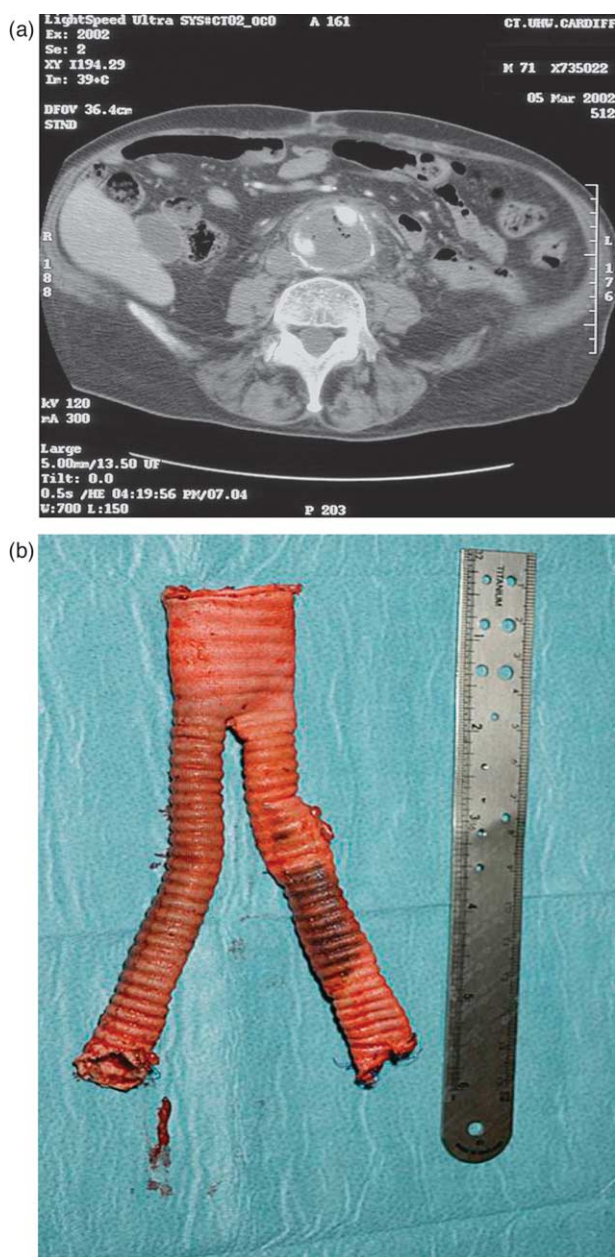
A 70-year-old man underwent emergency repair of a ruptured juxta-renal abdominal aortic aneurysm in November 2001 using 18×9 mm<sup>2</sup> Dacron graft. Initially, he did well. However, on post-operative day 4, he had a posterior myocardial infarction. Three days later he had a major upper gastrointestinal hemorrhage (Hemoglobin 4.7 g/dl). At surgery, he had

numerous gastric erosions but no evidence of an aortoenteric fistula.

At his outpatient appointment in March 2002 he reported feeling generally unwell with fevers and reported a 6 kg weight loss. His albumin was low (26 g/l) and his C-reactive protein (CRP) was 299. Blood cultures grew *Streptococcus anginosus*. A CT scan showed peri-graft gas (Fig. 1(a)). A labelled white cell scan confirmed graft infection. Before dealing with his infected graft, he required coronary artery bypass grafting using his left internal mammary and left greater saphenous vein. Following this, in April 2002, he underwent a right axillobifemoral bypass. The graft was soaked for 30 minutes in rifampicin prior to implantation and Teicoplanin 400 mg was given as prophylaxis. The infected graft was excised (Fig. 1(b)) and the aorta and iliac arteries were oversewn. The graft grew coliforms sensitive to ciprofloxacin. He was placed on long-term ciprofloxacin and discharged 4 weeks later. At the time he was afebrile with a normal white cell count ( $6.65 \times 10^9$ ) and biochemistry (C-Reactive Protein = 25, albumin 38 g/l).

Eight months later, he returned with an abscess on the right lateral wall of his thorax (Fig. 2(a)). A duplex scan showed an extensive fluid collection around the graft. A pus swab grew coagulase negative

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**Fig. 1.** (a) CT Scan with intravenous contrast showing perigraft gas collection. (b) Excised aorto-bi-iliac Dacron graft. Coliform species were grown.

*Staphylococcus*. A labelled white cell scan confirmed the axillobifemoral graft was infected (Fig. 2(b)). In February 2003, he was taken to the operating theatre. Both femoral veins (FVs) and the right greater saphenous vein (GSV) were harvested. The FVs were anastomosed end-to-end. A left thoractomy was performed through the ninth intercostal space and the descending thoracic aorta was dissected. A Satinsky clamp was placed on the aorta and an end-

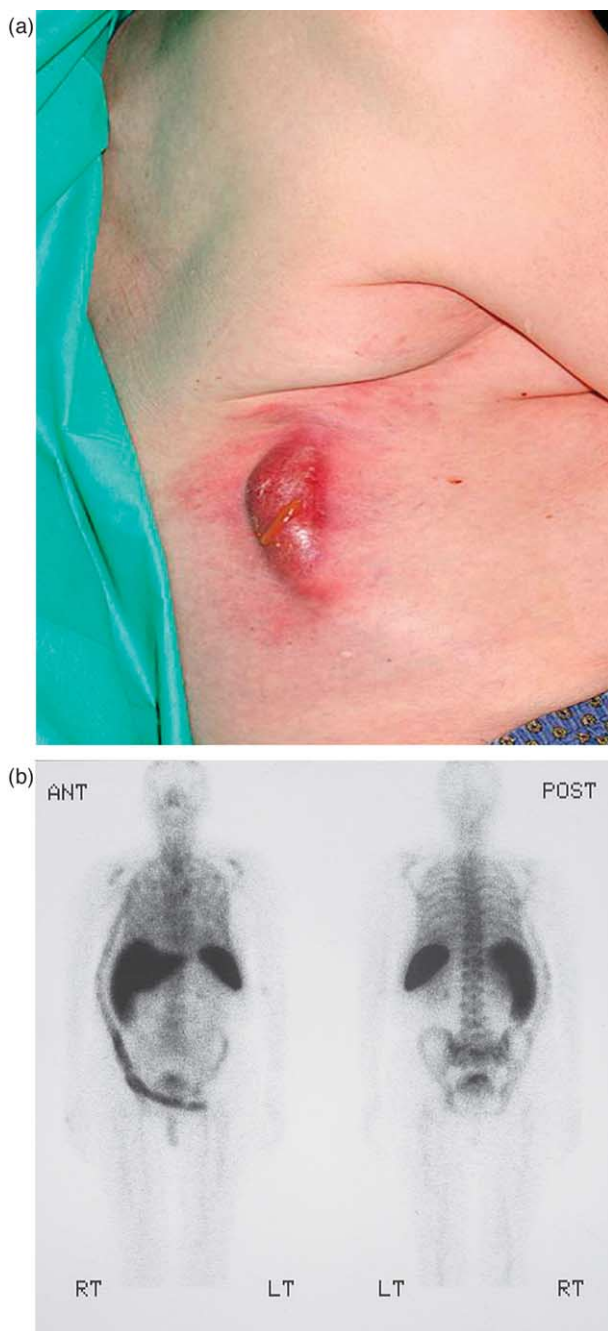
to-side anastomosis was fashioned with 4/0 polypropylene. The left groin incision was then re-opened and a tunneler was passed retroperitoneally to the left thoracic cavity. The FV graft was then brought down to the left groin incision. (Fig. 3(a) and (b)). The left limb of the axillobifemoral graft was disconnected and ligated, the FV graft divided and an end-to-side FV to common femoral artery anastomosis performed with 6/0 polypropylene. At this stage, it was anticipated that we would not have sufficient length of FV to complete the 'crossover' portion of the procedure and the intention was to use the harvested GSV. However, when measured, we had just enough length to proceed. The remnant of the FV was anastomosed to the FV graft and tunneled to the right groin. The right limb of the graft was then disconnected and another end-to-side FV to common femoral artery anastomosis was fashioned. The remainder of the infected axillobifemoral graft was then removed. Total operating time was 690 min.

The patient was extubated within 4 h. Enteral feeding was begun within 12 h. He made a smooth recovery from surgery. His only complication was a right groin wound infection which grew *Pseudomonas aeruginosa*. He was discharged well to home and remains free of complications 20 months later with a patent graft on Duplex.

## Discussion

This was a challenging case. With an infected axillobifemoral bypass, our options were limited. We applied the following criteria to any salvage procedure: (1) it must not involve prosthetic material, (2) we ought to avoid repeat surgery at the level of the aortic stump and (3) it ought to provide lower limb perfusion. We have previously used femoral vein (FV) to salvage patients with infected aortic prostheses. Our experience and that of other authors<sup>8,9</sup> has been that FV is very resistant to infection.

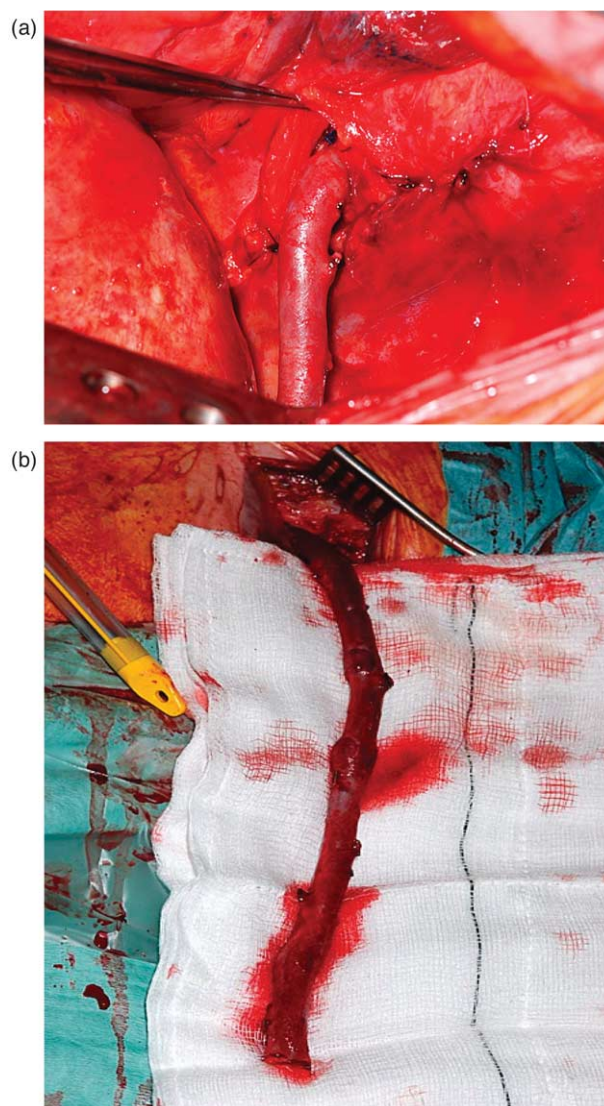
We considered taking inflow from the the left axillary artery but had concerns about long-term patency and having sufficient length of vein. The other option was the thoracic aorta. We were aware that prosthetic thoracofemoral bypasses have been used to salvage occluded axillobifemoral grafts<sup>10</sup> and felt confident that FV would also perform well in this setting. It also had the advantage of being 'virgin' artery. We were not sure prior to surgery that spliced FV would afford us enough length for a femoro-femoral crossover graft as well as the thoraco-femoral graft. Therefore, the right greater saphenous vein was



**Fig. 2.** (a) Right thoracic wall abscess over site of right axillobifemoral graft. Coagulase negative *Staphylococcus* were grown from pus. (b) Labelled white cell scan showing infected right axillobifemoral graft.

also harvested. In the event, we had just enough vein to perform the bypass.

Technically, the procedure was time-consuming more than technically difficult. To our knowledge this procedure has not been previously described. We describe it here to suggest another option for those faced with this difficult and challenging situation.



**Fig. 3.** (a) Left thoracic aorta with FV anastomosed end-to-side. (b) Left groin incision showing tunneled FV spliced graft.

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