SHORT REPORT

Small Bowel Perforation due to Tunnelling of a Femorofemoral Crossover Bypass

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We present a case in which sepsis due to small bowel perforation leading to death occurred two days after femorofemoral crossover bypass surgery. Autopsy revealed intra-abdominal sepsis as a result of tunnelling of the graft through the small bowel. Literature review showed that only three comparable cases were described.

Keywords: Femorofemoral (bypass OR graft); Crossover (bypass OR graft); (Postoperative) complications; Perforation; Hollow organ.

Introduction

Perforation of a hollow organ is a rare complication after femorofemoral crossover bypass surgery. For educational purpose we describe a fatal complication as a result of inadequate tunnelling and performed a literature search on intra-abdominal perforations.

Case Report

An 83-year-old man was admitted with critical right limb ischemia. Medical history revealed diabetes mellitus, retinopathy and an amputated left hallux. He smoked five cigarettes a day and used, besides oral antidiabetic agents, no other drugs.

Physical examination showed a cachectic man (Body Mass Index 17.2) with absence of groin and ankle pulsations and a necrotic hallux on the right. The ankle-brachial index was 0.53 and the transcutaneous oxygen pressure at the dorsum of the foot 14 mm Hg. Duplex examination and angiography revealed an occlusion of the external iliac, common femoral and superficial femoral artery with collateral filling of the popliteal artery on the right side. We performed a thromboendarterectomy of the common femoral bifurcation followed by a left to right ‘subcutaneous’ femorofemoral crossover bypass with a polytetrafluoroethylene (PTFE) graft. The tunnel was created ‘half blind’ with a stump clamp. Furthermore, a venous infragenual femoropopliteal bypass and a transmetatarsal amputation of the right hallux were performed. The procedure was performed under general anaesthesia and no peroperative complications occurred.

Initially the patient did well but the second postoperative day he became progressively dyspnoeic which was followed by a cardiac arrest. Successful cardiac pulmonary resuscitation (CPR) was performed. Physical exam showed diminished pulmonary ventilation and no abnormalities in abdomen and extremities. Blood investigation showed a severe metabolic acidosis, leuco- and thrombocytopenia. Chest X-ray, cardiac enzymes and transthoracic cardiac ultrasound were normal. It was concluded that the patient was severely septic without a clear explanation. At the same day, the patient again developed an asystole and second CPR was unsuccessful. Autopsy revealed that the PTFE bypass graft was not situated subcutaneously, but had perforated the peritoneum and the terminal ileum with faecal spill and peritonitis. Pulmonary oedema was present and other organs

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showed signs of sepsis as well. Blood cultures were positive for enterococci several days later.

**Literature search**

To find out how often perforation after a femorofemoral crossover bypass graft occurs we performed a literature search with help of a clinical librarian. Pub Med, EMBASE, Ovid, and the Cochrane Library were searched with the following key words: “femorofemoral (bypass OR graft)”,”(postoperative) complications OR mortality”, “perforation” and “hollow organ”. We found 37 relevant articles, in which only three comparable cases were described. Hinchliffe et al. reported two patients who developed graft sepsis due to ‘visceral damage after tunnelling the prosthetic graft’.1 More recently Hacker described a tunnelled graft through the bladder, which was successfully relocated extravesically.2 No other reports were found, and the exact incidence of this complication remains unknown, probably as a result of underreportation.

**Discussion**

Since 1952 the femorofemoral crossover bypass has been used for the treatment of unilateral iliac artery occlusion and more recently in combination with aorto uni-iliac endovascular abdominal aortic aneurysm repair.3 Reported morbidity rates vary from 2.7–27.8% and the main graft-related problems are occlusion, bleeding, infection, lymph fistula and false aneurysms.3–5 Our patient died of sepsis because we perforated the peritoneum and terminal ileum with the graft, probably facilitated by the extremely slim habitus of the patient. Because no intraoperative problems and clinical signs of peritonitis occurred, we did not consider this complication. The question is how such a complication could have been prevented. For tunnelling either a subcutaneous or prevesical (cavum Retzii) route might be used. To prevent inadequate tunnelling and perforation we like to stress that creation of a pocket a vue with digital dissection might help to prevent incorrect routing. The remaining short segment in the midline can than safely be passed with a stump clamp.

We conclude that in case of poorly understood sepsis after a femorofemoral crossover bypass, a perforation of a hollow organ by the graft should be considered in the differential diagnosis.

**References**


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