SHORT REPORT

Masked Prosthetic Graft to Sigmoid Colon Fistula Diagnosed by 18-fluorodeoxyglucose Positron Emission Tomography

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The diagnosis of low grade prosthetic graft infection or aorto-enteric fistula is difficult using conventional radiographic imaging modalities. We report a case of aorto-enteric fistula to the sigmoid colon diagnosed by the new technique of 18-fluorodeoxyglucose positron emission tomography.

Keywords: Infection; Aorto-enteric fistula; Aortic graft replacement; Diagnostic modalities.

Introduction

Aorto-enteric fistula, one of the manifestations of graft infection, remains a rare but devastating complication of aortic prosthetic grafting.1 Early and accurate diagnosis is needed to improve the prognosis of this condition. Recent reports have suggested the usefulness of 18-fluorodeoxyglucose positron emission tomography (FDG-PET) in the detection of infected grafts and aorto-enteric fistulas.2,3

Report

A 75-year-old man presented to the emergency department with spiking fever and malaise. The patient had a history of arteriosclerosis obliterans managed with aorto-biexternal iliac bypass grafting fifteen years previously. He also had a history of resection of a left renal abscess seven months previously. Laboratory examination revealed a hemoglobin of 9.9 g/dL, a white cell count of 7750/μL, and an increased C-reactive protein level of 6.04 mg/dl. He had no symptoms of melena, and faecal examination showed no occult blood. Anaerobic gram-positive bacilli were detected in a blood sample. Abdominal computed tomographic scans (CT) revealed faint enhancement of the soft tissue around the left limb of the prosthesis, a nonspecific finding suggestive of but not conclusive for aortic graft infection (Fig. 1A). The patient was referred for FDG-PET imaging for a clinically suspected infection of the vascular graft. Details of the technical protocol and image-evaluation criteria of FDG-PET were shown in our previous report.2 Briefly, transmission scans were initially obtained by using a line source of germanium 68/gallium 68 and then 185 MBq of FDG was administered intravenously. One hour later, emission from the entire body was imaged for 25 minutes. The emission data obtained from the ECAT EXACT 47 (Siemens/CTI, Knoxville, Tenn) were consecutively reconstructed with measured attenuation correction based on the transmission data. We evaluated both intensity and pattern of FDG accumulation to clearly distinguish between an infected and non-infected aortic graft. FDG-PET demonstrated strong uptake of 18-fluorodeoxyglucose (FDG) along both limbs of the prosthesis. The highest uptake was located at the distal portion of the left limb, comparable to physiologic urinary uptake by the bladder (Fig. 1B). The pattern of FDG accumulation was described as spotty or focal, and thus highly suggestive of graft infection.2 On the basis of these findings the patient was taken to surgery.

At operation there was no evidence of perigraft abscess. However, the sigmoid colon was tightly...
adherent to and had been penetrated by the left limb of the prosthesis (Fig. 2). The graft was fully excised after oversewing the proximal aortic stump. Revascularization of the lower extremities was obtained by axillo-bifemoral bypass using an 8 mm ringed expanded polytetrafluoroethylene (ePTFE) graft. The penetrated portion of the sigmoid colon was resected trianularly and directly closed. Pathologic findings were compatible with aorto-enteric fistula and graft infection with the existence of previously cultured anaerobic gram-positive bacilli. After one month of intravenous antibiotic therapy, he was discharged.

Discussion

Aorto-enteric fistula is a rare but devastating complication of aortic prosthetic grafting. Because delay or misdiagnosis contributes significantly to the high mortality rate, both invasive and noninvasive diagnostic modalities are advocated.

Armstrong et al. reported that bacterial organisms were identified by intraoperative culture results in 94% of patients with aorto-enteric fistulae. They speculated that underlying graft infection may promote adherence of adjacent bowel to facilitate eventual erosion and enteric luminal communication with the infected prosthetic graft surface. This underlying graft infection should be accurately and rapidly diagnosed to enable treatment of it.

CT is a method of choice for diagnosis of graft infection because of its high sensitivity and specificity. However, in cases of low grade infection, its sensitivity decreases to approximately 55%. Endoscopy is also a first-line diagnostic modality if there is an evidence of gastrointestinal bleeding. However it is neither sensitive nor specific.

FDG is a radioactive analog of glucose that is taken up and phosphorylated by inflammatory cells by the
same mechanism as glucose, and trapped within the cell. Thus detection of inflammatory activity is independent of leukocyte homing and migration. Recent reports highlighted that FDG-PET achieved over 90% sensitivity and 70 to 80% specificity in the diagnosis of infectious processes. Differentiation of infections from non-infected inflammatory reactions normally associated with implanted prostheses will increase the specificity of FDG-PET. We previously suggested that a focal accumulation pattern of FDG is a specific sign of infection, and that use of focal uptake as a diagnostic criterion resulted in a significant increase in the specificity of FDG-PET in the diagnosis of graft infection. We reported a sensitivity and specificity of 91% and 95% respectively. PET has a number of other advantages over other investigations, including the fast availability of results and lack of requirement for contrast.

At present CT is the first-line modality for diagnosis of graft infection or aorto-enteric fistula because of its availability and cost-effectiveness. However, FDG-PET may be useful when the findings of CT are equivocal.

References


Accepted 14 June 2006
Available online 10 August 2006