Successful Diagnosis of an Atypical Prosthetic Vascular Graft Infection Without Perivascular Abscess

Luminal Vegetation as the Hidden Septic Source

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A 62-year-old woman with a vascular prosthesis for a common hepatic artery aneurysm (3 years ago) was hospitalized because of a 2-week history of lumbago and fever. Six months previously, she was hospitalized at another medical facility for 1 month because of a fever of unknown pathogenesis. Laboratory examination revealed moderate inflammation with an elevated C-reactive protein level of 6.5 mg/dL and a white blood cell count of 7070/mm³. Initial 8-row multidetector computed tomography (CT) with contrast agent in the emergency department did not show any focus for the origin of the fever. She was referred to the orthopedic surgery department, and MRI of the pelvis revealed inflammation of the left sacroiliac joint (Figure 1). Her first 2 sets of blood cultures were positive for *Streptococcus anginosus*. Intravenous administration of ampicillin/oxacillin sodium was started. She was then transferred to the cardiology department for the evaluation of septicemia, which could have been caused by infectious endocarditis. A transthoracic echocardiogram showed severe aortic regurgitation, which was not seen at the time of previous surgery for the vascular prosthesis (Figure 2A). However, a transesophageal echocardiogram only detected a small degenerative change in the right coronary cusp of the aortic valve, which could be healed vegetation (Figure 2B). Therefore, ultrason sound screening of the abdomen was additionally performed and a mobile ellipsoid mass was found in the common hepatic artery at the distal end of the vascular prosthesis, which could be a thrombus or vegetation (Figure 3). A 64-row multidetector CT with intravenous contrast for the abdomen clearly showed the mass as a filling defect in the common hepatic artery that attached to the distal end of the vascular prosthesis (Figure 4). Fusion images obtained on fluorodeoxyglucose positron emission tomography/CT (FDG-PET/CT) showed high accumulations of the isotope in the mass and at the vascular prosthesis, whereas whole-body FDG-PET images in a maximum intensity projection rotating movie format showed no other infectious focus (Figures 5 and 6). Therefore, the mass was judged to be vegetation, and the condition was diagnosed as active prosthetic vascular graft infection (PVGI), which could cause both infectious endocarditis and bacterial arthritis. The patient underwent emergency surgery, including the extraction of the vascular prosthesis, debridement, and arterial homograft implantation with saphenous vein. Macroscopically, the extracted prosthetic vascular graft was partially occluded at the distal portion by yellowish mass, which was compatible with the luminal vegetation (Figure 7). Pathological examination of the surgical specimens including the vascular prosthesis revealed clear evidence of bacterial infection at the vascular prosthesis (Figure 8A and 8B). The culture of the extracted specimen was also positive for *S anginosus*. Her postoperative course was satisfactory; however, she developed multiple liver abscesses, which were successfully treated by drainage and intravenous administration of penicillin G.

Prosthetic vascular graft placement to treat abdominal aneurysms or diseases of other arteries is common practice and rarely has complications. Among them, PVGI is one of the most serious complications, which can result in bleeding, sepsis, or even death, although it has a low incidence (<1% in cases of aortic bypass at the subrenal but above femoral arteries). Therefore, early and precise diagnosis is necessary. Typically, the infected vascular graft is surrounded by an abscess on CT or MRI, and the diagnosis is obvious. However, in a few cases like ours, conventional imaging findings are nonspecific and the diagnosis can be difficult. Recently, the use of FDG-PET/CT to visualize the localization of infection in patients with suspected PVGI has been reported.

According to the recent guideline, the sensitivity of FDG-PET for the diagnosis of PVGI is high (88.9%), but the specificity is moderate (66.4%). In addition, the advantage of FDG-PET over the standard nuclear medicine technique is still unclear because of the limited number of published evidence. In our case, FDG-PET/CT images from a 64-row multi-detector CT with intravenous contrast clearly identified the focal inflammatory process at the thrombotic mass and the surrounding vascular prosthesis without showing abnormal accumulations of the isotope in the rest of the vessel, the perivasculard tissue, and other organs, which allowed us to successfully...
locate the origin of the repeating life-threatening infections. This further emphasizes the use of FDG-PET/CT in patients with PVGI, which is difficult to diagnose by conventional imaging techniques. Ultrasound images and multi-detector CT provided important information such as the presence of a thrombotic mass in the vascular graft. However, it was not enough to make a critical clinical decision. In this case, FDG-PET/CT provided decisive information; thus, the patient was immediately treated and saved.

Disclosures

None.

References


Key Words: grafts ■ infection ■ nuclear medicine
Figure 5. A fusion image obtained on fluorodeoxyglucose positron emission tomography and 64-row multi-detector computed tomography (corresponding to Figure 4), showing high accumulation of the isotope in the mass and the surrounding vascular prosthesis. Note the high-functioning bone marrows responding to the severe septicemia.

Figure 6. A whole-body fluorodeoxyglucose positron emission tomography in a maximum intensity projection rotating movie format, showing a focal accumulation of the isotope in the abdomen (arrowhead). Note the high-functioning spleen and bone marrows responding to the severe septicemia.

Figure 7. A macroscopic image of the extracted prosthetic vascular graft, showing the luminal vegetation (arrow).

Figure 8. Light microscopic images of the extracted prosthetic vascular graft, demonstrating luminal narrowing composed of fibrin with significant inflammatory infiltration (hematoxylin–eosin staining, ×200; A) and the accumulations of Gram-positive organisms (Gram staining, ×800; B).
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