

CASE REPORT

SPECT/CT for the accurate localization of ⁶⁷Ga uptake in mycotic abdominal aortic aneurysm

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Abstract

We report a case of mycotic abdominal aortic aneurysm where the use of hybrid imaging with gallium scan demonstrated increased uptake in the infected aneurysm and aided in differentiating physiological uptake in the bowel from pathological uptake.

Key words: Gallium-67, SPECT, SPECT/CT, mycotic aortic aneurysm

Introduction

The term 'mycotic aneurysm' has been used since the 1800s for infected aneurysms resulting from bacterial endocarditis complicated by septic arterial emboli [1, 3]. Wilson *et al.* classified the infected aneurysms according to their clinical characteristics:

mycotic (endocarditis-related), microbial arteritis, infection of existing aneurysm and post-traumatic infected false-aneurysm [4]. However, the majority of vascular surgeons nowadays keep to the commonly used definition of mycotic aneurysm to include all kind of infected aneurysms.

We report a case of mycotic abdominal aortic aneurysm where the use of hybrid imaging with gallium scan demonstrated increased uptake in the infected aneurysm and aided in differentiating physiological uptake in the bowel from pathological uptake.

Case report

A 61-year-old male with hypertension and a recent travel history to Cuba presented with a 3 week history of mild but unremitting pain in the lower abdomen and an episode of fever and chills 2 weeks prior to presentation. CT angiography of the abdomen was ordered for further evaluation of the pain, which revealed aortitis at the level of the infrarenal aorta with a pseudoaneurysm and small penetrating ulcer (Figure 1). A whole-body gallium-67 scan was ordered to assess for infection,

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Figure 1 Contrast-enhanced CT of the abdomen showing a pseudoaneurysm at the anterior right lateral aspect of the infrarenal aorta measuring approximately 0.8 cm. The aortic lumen is patent and of normal calibre. Computed tomography with contrast is the first choice of imaging modalities for the evaluation of vascular and perivascular abnormalities [2]

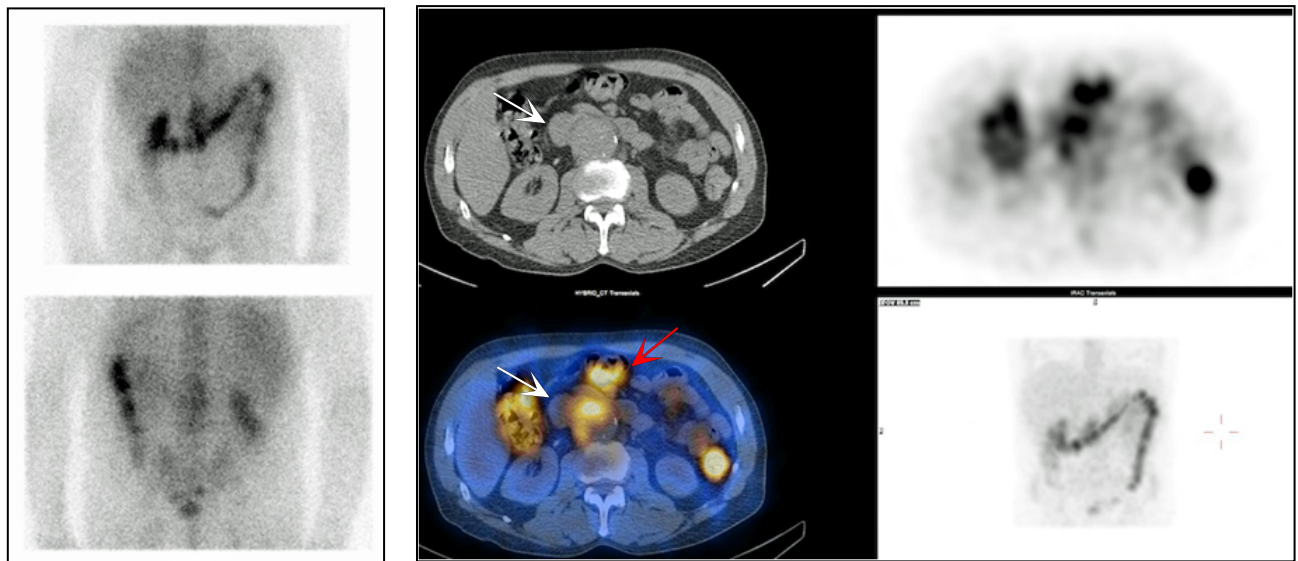


Figure 2 A whole-body gallium-67 scan and SPECT/CT were acquired on the same day as the first CT to assess for infection, which showed focal intense increased uptake in the known pseudoaneurysm sac in the infrarenal abdominal aorta. Gallium-67 planar images of the abdomen show physiological activity in the abdomen (left) with the SPECT/CT scan (right) demonstrating increased uptake in the aneurysmal sac (white arrows), which is distinct from bowel activity (red arrow)

which showed focal accumulation in the aneurysmal sac (Figure 2). The patient was treated with broad-spectrum antibiotics for one week. A repeat CT of the abdomen was

performed to assess the evolution of the infection, which showed expansion of the aneurysmal sac (Figure 3).



Figure 3 Follow-up contrast-enhanced CT of the abdomen after one week of broad-spectrum antibiotic therapy showing enlargement in the size of the aorta/aortic wall, with increased perfusion of the pseudoaneurysm area, which nonetheless remained contained. There were no signs of active inflammatory change beyond the aortic wall or sign of bleeding into the retroperitoneal space

The patient underwent an operative procedure to repair the contained ruptured mycotic aneurysm with neo-aortic in-situ repair with right superficial femoral vein.

Microbiological examination and cultures of the resected aorta grew salmonella species, resistant to trimethoprim and ciprofloxacin, sensitive to ceftriaxone and ampicillin. He was started on Ceftriaxone intravenous antibiotic therapy, and continued for 6 weeks, then was switched to oral cefixime for a duration of 6 months.

Discussion

Organisms have been isolated from aneurysmal tissue in up to 76 percent of patients with mycotic aneurysms [5]. Staphylococcus spp. and Salmonella spp. remain the most common [6, 7]. The diseased aorta appears to be vulnerable to Salmonella, and this pathogen is frequently isolated in infected aneurysms due to bacteraemic seeding of atherosclerotic plaque [8].

The role of gallium-67 uptake in infected aortic

aneurysms was previously described [9] on planar imaging with the aid of 3-phase ^{99m}Tc -MDP bone scan. Aneurysms have been reported as incidental findings on the blood flow and blood pool images of ^{99m}Tc -MDP or ^{99m}Tc tagged erythrocytes [10, 11]. Infected aneurysms have been previously described in the literature with several radiotracers, such as gallium-67, In-111 tagged leukocytes, ^{99m}Tc -hexamethylpropylene amine oxime (HMPAO) labelled leukocyte and ^{18}F -FDG. [12-16]. Gallium-67 scan is considered not reliable in the abdomen because of physiological bowel activity. In this case, hybrid imaging with SPECT/CT was able to differentiate physiological gallium-67 uptake in the bowel and pathological uptake in the abdomen and also localized the uptake to the aortic pseudoaneurysm, which indicated the presence of an infected pseudoaneurysm, a potentially life-threatening condition [17].

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