Diagnosis of Candida Endocarditis by Computed Tomography Scanning

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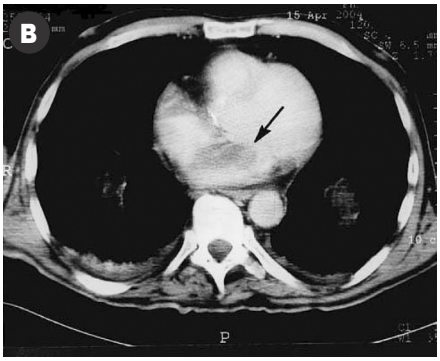
The role of computerized tomographic scanning in the diagnosis of bacterial endocarditis is not yet defined. We describe here a patient with *Candida albicans* endocarditis who presented with fever and left flank pain without significant heart murmurs, in whom the diagnosis of infective endocarditis was suggested by CT imaging.

Patient Description

A 70 year old demented man presented with fever (up to 39ºC) and left abdominal pain. The patient had a permanent cystostomic catheter. Ten days earlier he was discharged from another department after prolonged hospitalization for urosepsis treated with antibiotics. On physical examination the patient was pale with temperature of 38.9ºC. He had normal breath sounds and a minimal (1/6) systolic apical murmur. There was mild tenderness on the left flank without hepatosplenomegaly. His chest X-ray was normal. Laboratory evaluation revealed normocytic anemia (9.2 g/dl), leukocytosis of 21,800/mm^3, elevated erythrocyte sedimentation rate (75 mm/hour) and high levels of C-reactive protein (150 mg/L, normal < 8). Renal and liver function tests were normal. Since the patient had a recent history of urosepsis and his major complaints were fever and left flank pain, urine and blood cultures were taken and CT with intravenous contrast media injection was performed. Two hypodense areas were demonstrated in the spleen (not the classical wedge shape), suggesting splenic infarcts or splenic abscesses [Figure A]. His chest CT showed a huge filling defect in the left atrium [Figure B]. Several blood cultures revealed candidemia (*Candida albicans*). Transthoracic echocardiography demonstrated a large mitral valve vegetation, confirming the CT finding. The imaging (CT scan, TTE) and laboratory (blood cultures) tests established the diagnosis of candidial endocarditis causing splenic emboli or splenic abscesses. The patient and his family refused surgery and despite prolonged intravenous treatment with amphotericin B the patient died after 4 weeks.

[A] Contrast-enhanced axial CT scan through the upper abdomen demonstrates two hypodense areas at the periphery of the spleen.



[B] Axial CT scan through the lower thorax shows a large filling defect in the left atrium (arrow).

Comment

Fungal endocarditis is an uncommon disease with a prevalence of about 1% of all cases diagnosed with infective endocarditis [1]. Altogether, 152 cases of fungal endocarditis were reported in the English-language literature between 1 January 1995 and 30 June 2000 [2]. The median age of patients (44 years) was relatively young. Drug addiction with intravenous injection was reported as a risk factor in only 4.1% of cases. Other factors, including underlying cardiac abnormalities (47.3%), prosthetic valves (44.6%) and central venous catheters (30.4%), were more commonly identified as predisposing conditions for fungal endocarditis, reflecting the changing epidemiology of this syndrome. [2] *Candida albicans* and Aspergillus sp. are the most common isolated pathogens [3]. Fungal endocarditis typically generates large as well as long vegetations that can frequently lead to embolization (33–83%) toward the brain or other organs [4].

Echocardiography has a central role in the diagnosis of infective endocarditis and should be performed in all patients suspected of having endocarditis. Transesophageal echocardiography is more sensitive than TTE for the diagnosis of endocarditis. However, because of the high cost and invasive nature of TEE, it may be more cost-effective to perform TTE first and only if the TTE is technically inadequate or in the case of high clinical suspicion despite a negative TTE should TEE be done [4]. The role of other

TTE = transthoracic echocardiography

TEE = transesophageal echocardiography

imaging modalities, including CT, magnetic resonance imaging and nuclear imaging, in the diagnosis of infective endocarditis has not yet been established [4]. These modalities are therefore not routinely used for clinical evaluation of patients with endocarditis. CT and MRI may have a role in the diagnosis of endocarditis complications, especially aortic root abscesses and aneurysms [4].

It should be noted that not all atrial filling defects (as demonstrated in our patient, Figure B) or echocardiographic valvular mass lesions are infective. Sterile vegetations were reported in patients with systemic lupus erythematosus (Libman-Sacks endocarditis) or with advanced malignancies or septicemia (marantic endocarditis) [1,4]. In addition, atrial filling defects may represent cardiac tumors (e.g., atrial myxoma), ruptured chordae or degenerative thickening of cardiac valves [4].

Surgical treatment is required in most cases because medical therapy for endocarditis caused by Candida species and other fungi is unsuccessful [5]. The optimal time to perform surgery is before hemodynamic disability develops or the infection extends to perivalvular tissue. In some patients, like the one presented here with splenic involvement, the presence of metastatic infected emboli may need to be assessed before valve replacement surgery in order to avoid relapse of the fungal infection on the prosthetic valve seeded by the metastatic infected sites [5].

The case described here highlights the potential role of CT imaging in the diagnosis of infective endocarditis, especially in patients with large vegetations without heart murmurs.

References

1. Bayer AS, Scheld M. Endocarditis and intravascular infections. In: Mandell GL, Bennett JE, Dolin R, eds. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases. Philadelphia: Churchill Livingstone, 2000: 857–902.
2. Pierrotti LC, Baddour LM. Fungal endocarditis, 1995–2000. *Chest* 2002;122(1):302–10.
3. Zedtwitz-Liebenstein K, Gabriel H, Willinger B, et al. Prosthetic valve endocarditis due to *Candida tropicalis* complicated by multiple pseudoaneurysms. *Infection* 2001;29:177–9.
4. Sachedev M, Peterson GE, Jollis JG. Imaging techniques of infective endocarditis. *Cardiol Clin* 2003;21:185–95.
5. Mylonakis E, Calderwood SB. Infective endocarditis in adults. N *Engl J Med* 2001; 345:1318–0.

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Some people think they are worth a lot of money just because they have it

Fannie Hurst (1889-1968), U.S. writer and social reformer