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Unusual Presentation and Echocardiographic Management of Giant Mural Endocarditis Occurring Simultaneously with Aneurysmatic Aorta

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ABSTRACT

We describe a 32-year-old man who presented in a febrile, unconscious state with unusual staphylococcal endocarditis. We diagnosed the patient's illness by using transthoracic echocardiography (TTE), which revealed a giant vegetation on the left ventricular lateral wall. The patient had history of aortic valve replacement and coarctoplasty. Conservative treatment using repeated TTEs resulted in successful management of endocarditis and embolic brain abscess. After discharge, the patient underwent aortic reconstruction for the aneurysmatic dilatation of ascending aorta. This report confirms that chronic endocardial trauma may provide a fertile nidus for the development of bacterial vegetation. The clinical, echocardiographic, and laboratory findings contributed to therapeutic decision-making in the management of this case.

INTRODUCTION

Infective endocarditis (IE) is a life-threatening condition accompanied by devastating complications if not aggressively treated with antibiotics, combined or not with surgical intervention. Despite developments in healthcare, the incidence of IE has not changed over the past 2 decades, partly because of increases in cardiac intervention [Moreillon 2004]. Involvement of intact mural endocardium in IE has been reported only rarely [Grigorov 1999; Caruso 2002]; therefore, the management of this condition remains challenging. We present an unusual case of bacterial endocarditis in a patient with a history of cardiac surgery who was referred to our emergency room because of a 4-week fever and acute unconsciousness. By use of echocardiography, computed tomographic (CT) angiography, and laboratory tests we found the patient to have a large vegetation on the left ventricle wall, accompanied by an aortic aneurysm.

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CASE REPORT

A 32-year-old man was referred to our emergency room because of a 4-week fever and acute onset of unconsciousness. He had a history of aortic coarctoplasty (13 years earlier) and aortic valve replacement with a bileaflet prosthesis to correct a bicuspid aortic valve and chronic severe aortic regurgitation (12 years earlier). The primary physical examination revealed the patient to be febrile (40°C), unconscious, and normotensive, but with a sinus tachycardia of 120 beats/min. Heart sounds (S1, and metallic valve S2) were normal, and a 2/6 pansystolic murmur was heard at the apex. Janeway lesions were found on the hands and palms. In addition to unconsciousness, neurological examination was indicative of hyperreflexia, flexion rigidity, and positive Babinski sign in the left limb. The patient was hospitalized with a suspected diagnosis of complicated IE.

Blood count analysis demonstrated a white blood cell count of 12000 cells/mL with a differential of 79% neutrophils and chronic anemia (hemoglobin 10 g/dL) and increased erythrocyte sedimentation rate (108 mm/h) and C-reactive protein concentration (45 mg/L). The patient's urine was positive for protein (++) and ketone (+); serum chemistry analyses revealed blood urea nitrogen of 96 mg/dL and a creatinine increase from 1.0 to 2.7 mg/dL. Other findings were normal. Chest radiography showed a mildly increased cardiothoracic ratio. Two-dimensional transthoracic echocardiography (TTE) revealed a large hypermobile mural left ventricular (LV) mass (30 × 19 mm) attached to the lateral LV wall (Figure 1), with an LV ejection fraction of 45%. We also found a severe aneurysmatic dilatation of the ascending aorta and aortic root (diameter of 62 mm). The remaining findings of the TTE were unremarkable; revealing an aortic prosthetic valve functioning well, without regurgitation. In addition, no residual aortic coarctation was detected in the descending aorta. Transesophageal echocardiography (TEE) confirmed the presence of a large mural LV mass, thickening (4 mm) of the ascending aorta wall, and a small pseudoaneurysm of the descending aorta just below the Dacron graft. A CT scan of the brain showed cortical hemorrhage, infarction in the right temporal lobe, and a low-density area in the right cerebellar hemisphere suggesting a brain abscess (Figure 2). We obtained blood cultures, and the patient was

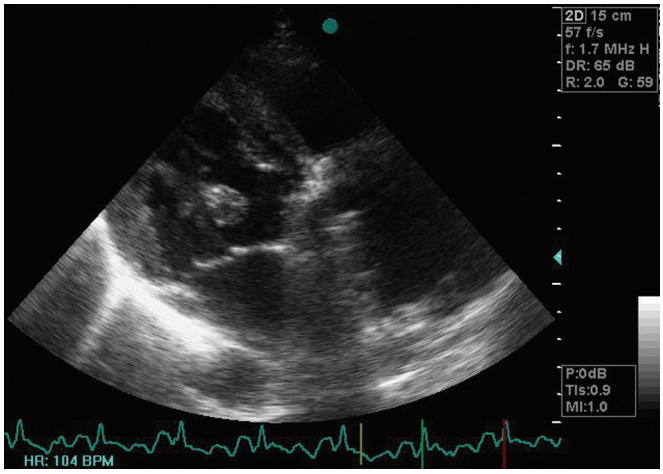


Figure 1. Two-dimensional transthoracic echocardiogram revealing a large homogenous mass (30 × 19 mm) on the left ventricle lateral wall.

admitted to the intensive care unit and began treatment with broad-spectrum antibiotics. On the third day of his hospital stay, the patient's blood cultures were found to be positive for *Staphylococcus aureus*. All of the above-mentioned data documented the presence of complicated acute IE; consequently, antibiotic therapy with vancomycin, gentamicin, and rifampin (based on antibiogram) was continued. After consultation with the neurologist and cardiac surgeons, we considered conservative treatment for the patient. During medical treatment, we witnessed gradual improvement in the patient's consciousness and elimination of the lateralized signs in his left extremities. Furthermore, repeated TTEs revealed a surprisingly rapid decrease in the size and mobility of the LV mass. The patient's fever subsided, and there was a gradual movement toward normal ranges in his leukocytosis and high titers of erythrocyte sedimentation rate and C-reactive protein. After 2 weeks of antibiotic therapy, the LV mass size visible in the TTE decreased to 8 × 5.5 mm, and no additional complications developed (Figure 3). The patient was transferred from the intensive care unit. He completed a 6-week course of antibiotic therapy for the staphylococcus endocarditis and was considered a candidate for aortoplasty after stabilization. A follow-up TTE performed 2 months after discharge showed no evidence of LV mass. CT angiography of the thoracic aorta revealed a 58-mm diameter aneurysm of the ascending aorta without dissection or hematoma (Figure 4). The patient underwent cardiopulmonary bypass to remove the aneurysmal portion of the aorta, which was replaced with a 30-mm Dacron tube (InterGard™; InterVascular, LA Ciotat, France). At a 17-month follow-up examination the patient was in good health with no complaints and was taking warfarin (7.5 mg daily) and propranolol (10 mg daily).

DISCUSSION

IE occurs most commonly on the valvular heart surface; however, other cardiac structures or remote vascular sites can be primarily or secondarily involved. Nonvalvular mural endocarditis has been rarely reported. Only 62 cases were previously reported on Medline between 1970 and 2005 [Ahmed 2006]. In the setting of bacteremia or fungemia, IE initially develops in the presence of a high-velocity blood jet due to a congenital anomaly, a regurgitant valve, or a prosthetic valve. It is thought that the high-velocity jet

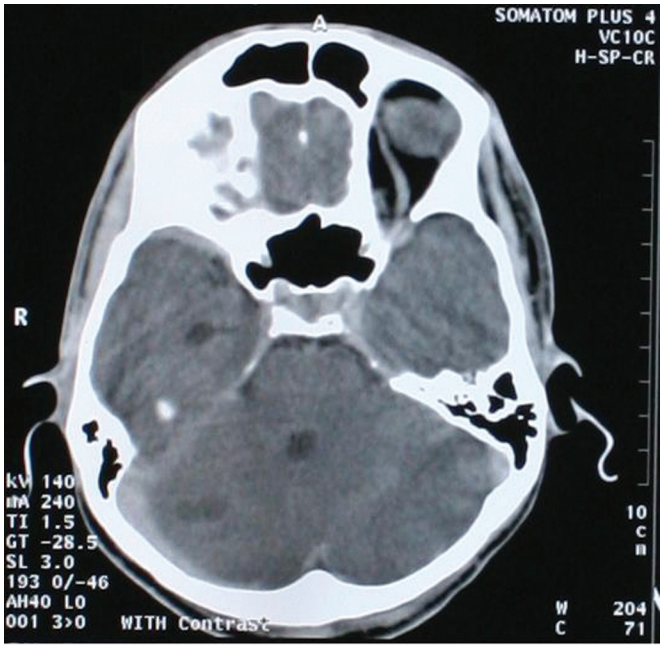


Figure 2. A, Axial head computed tomographic scan with contrast demonstrating a low-density area in the right cerebellar hemisphere suggesting an abscess and B, a cortical infarction in the right temporal lobe.

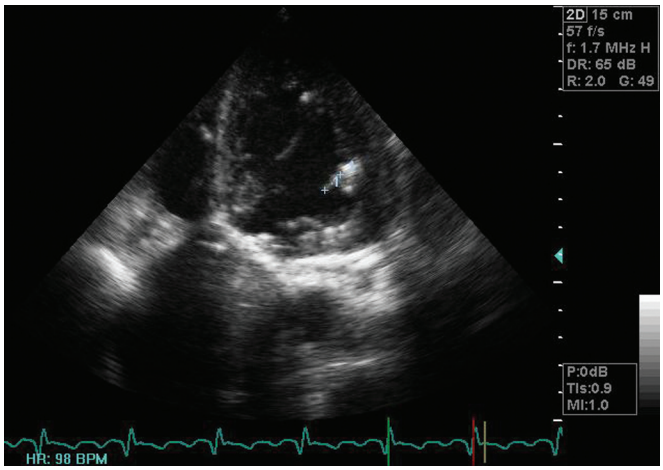
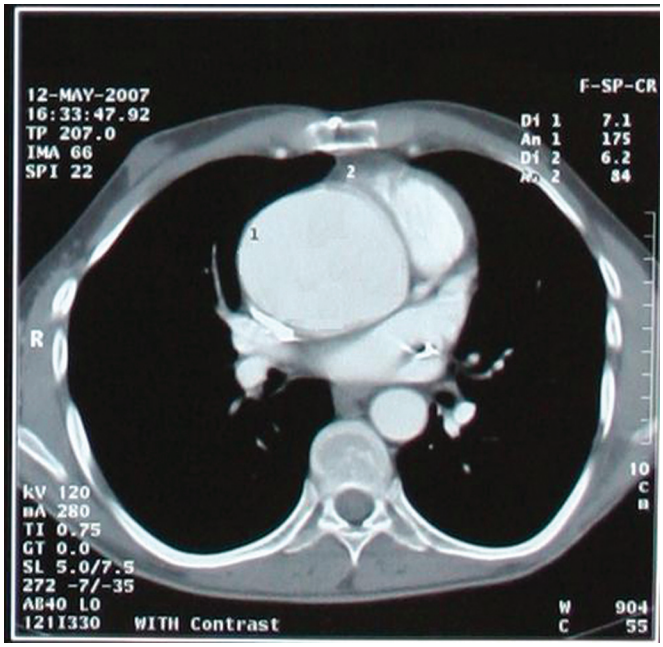


Figure 3. Two-dimensional transthoracic echocardiogram documents decreasing size of the mural vegetation (8 × 5.5 mm) on the left ventricle lateral wall.

interferes with the protective endothelial surface, allowing the blood-borne pathogens to adhere and coalesce. As a nidus of infection organizes, masses of microorganisms attract platelets, fibrin, and other material and become adherent to the endothelial surface to form a vegetation [Bierbrier 1991; Ahmed 2006; Bitigen 2007]. In our patient, previous aortic replacement and coarctoplasty may have contributed to the development of endocardial traumatization several years later. The organisms most frequently responsible for mural IE are those with the greatest ability to adhere to endocardium, namely *S. aureus* and *Streptococcus* spp. The most common presenting features are fever and chills, but in some cases (like the current case) an embolic event is the first manifestation of endocarditis [Ahmed 2006; Bitigen 2007].

Echocardiography, either TTE or TEE, can directly show cardiac damage, such as vegetations, abscesses, and prosthetic dehiscence. In various studies the sensitivity of TTE for detecting vegetations was approximately 60% to 70%, but TEE is generally preferred for the diagnosis of endocarditis, particularly prosthetic valve endocarditis, with a reported sensitivity of 93% to 100%. Interestingly, TTE seems to be superior in cases of mural ventricular vegetation [Kearney 1994; Shirani 1995]. A vegetation, an irregularly shaped, highly mobile mass, is attached to the free edge of a valve leaflet, chamber walls, or any foreign body such as a prosthetic valve sewing ring. Vegetations usually have low reflectance and are amorphous but homogeneous, with oscillating motion and variable sizes that may increase progressively or decrease over time after healing or embolization. Some studies have suggested that vegetations tend to become smaller and more circumscribed and echogenic over time as part of the healing process, as we observed in our patient [Shirani 1995].

A variety of complications may occur in the setting of active endocarditis that may affect outcome and management. The vegetation itself is an important source of possible complications. Vegetations on the left side of the heart can embolize, leading to stroke, distal infection, or ischemia. Stroke occurrence is consistently a strong negative determinant of outcome in patients with endocarditis. The only echocardiographic parameters that have been associated with an increased risk of embolization are vegetation size and



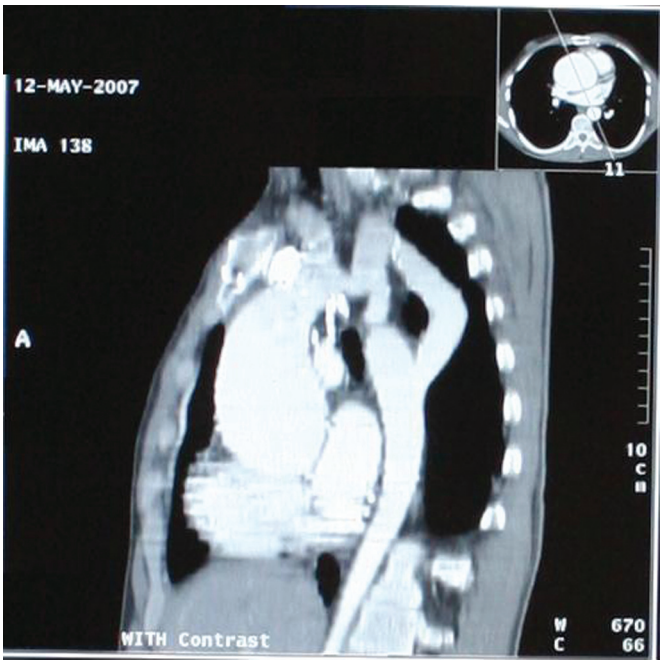


Figure 4. Spiral computed tomographic scan of the thoracic aorta demonstrating the A, aneurysmatic ascending aorta (diameter of 58 mm) and aortoplasty of descending aorta and B, reoriginated left subclavicular artery.

high mobility. Larger vegetations (more than 15 mm) are associated with a higher frequency of emboli, as are hypermobile vegetations, and these are relative indications for cardiac surgery [Hasbun 2003; Thuny 2005]. During administration of effective antibiotic therapy, however, the incidence of emboli decreases promptly. Owing to the large size and hypermobilty of the LV mass, which was a potential source for recurrent embolization in our patient, we discussed the possibility of urgent cardiac surgery with the cardiosurgeons. After taking the patient's recent cerebral problem into consideration, in addition to neurological consultation results, the surgeons decided to delay the surgery. An additional consideration was that the patient had a normally functioning prosthetic aortic valve but an aneurysmatic ascending aorta. Although surgical intervention was indicated for the excision of the large mural vegetation, this challenging condition was successfully managed with medical treatment, the effectiveness of which was monitored with repetitive TTEs.

The case reported here is of particular interest not only because a mural IE is rarely seen in the intact endocardial wall of the ventricle, but also because the large vegetation on the LV and the associated embolic brain abscesses were remarkably resolved after a broad-spectrum antibacterial regimen; therefore, the emergent surgical operation was obviated.

CONCLUSION

Echocardiography remains the cornerstone of imaging modalities that play a significant role in clinical diagnosis and guiding clinicians to the selection of effective therapeutic approaches for IE. Early diagnosis and initiation of antibiotic therapy for IE can eliminate disease complications and improve disease prognosis. To the best of our knowledge, this is the first reported case of a significant decrease in the size of mural vegetation by using medical treatment with monitoring by repetitive TTEs.

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