Endocarditis with pulmonary and systemic embolization

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Case report

A 45-year-old woman with a history of intravenous drug use and tricuspidal endocarditis was admitted to our medical center with a 1-week history of fever and dyspnea. She reported recent intravenous cocaine use.

On admission she was normotensive, febrile (temperature 38°C), mildly tachycardic (heart rate 105 beats/min) and tachypneic (respiratory rate 20 breaths/min) with an oxygen saturation of 92%.

Examination revealed nonlabored breathing with equal breath sounds. No lymphadenopathy, splenomegaly, or rash was identified. Laboratory tests showed a leukocytosis and increased levels of C-reactive protein. Chest radiography revealed a peripheral right infiltrate. Electrocardiography was unremarkable. Transthoracic echocardiogram detected the presence of a mobile mass (10 mm) attached to the posterior leaflet of the tricuspid valve. A diagnose of right-sided endocarditis was made. Blood cultures demonstrated methicillin-sensitive *Staphylococcus aureus*. An HIV test was negative. Treatment with oxacillin, gentamicin, and ampicillin was started.

During hospitalization, the fever resolved, but the patient complained of worsening dyspnea and left flank pain. Physical examination was unchanged except for the appearance of splinter hemorrhages and tender, subcutaneous nodules on the second finger of the right hand (Fig. 1).

A CT scan of the chest and abdomen was performed, and revealed multiple peripheral pulmonary infiltrates

consistent with septic pulmonary emboli (Fig. 2) and a splenic hypoperfusion area (Fig. 3). In consideration of pulmonary and systemic embolization, in order to make a differential diagnosis between paradoxical embolism and bilateral endocarditis, a transesophageal echocardiogram study was proposed, but the patient refused.

Transthoracic echocardiogram was repeated. The examination confirmed the tricuspid valve vegetation, and revealed the presence of another vegetation attached to the posterior leaflet of the mitral valve (5 mm). Septal defects and cardiac complications were not observed. Based on these findings, pulmonary and systemic embolization was interpreted as a consequence of bilateral endocarditis.

The patient was transferred to the Infectious Disease Unit. Antibiotic treatment was continued. The general condition improved, and no further complications occurred.

Discussion

Endocarditis is a common complication of intravenous drug use. *Staphylococcus aureus* is the most frequent pathogen identified, and the tricuspid valve is involved in most cases [1]. Endocarditis in drug users is associated with a lower mortality than in nondrug abusers, probably due to a younger age of the patient [2]. Negative prognostic factors are fungal etiology, involvement of the aortic valve, and presence of large vegetations. Patients with a left-sided endocarditis have a higher mortality in comparison to patients with right-sided endocarditis [3].

Valves previously involved by infection are more likely to be reinfected than normal valves. Furthermore, recurrent endocarditis is more common in drug users than in patients

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Fig. 1 Splinter hemorrhages and tender, subcutaneous nodules on the right hand

Fig. 2 Chest CT-scan: septic pulmonary emboli (arrows)

Fig. 3 Abdominal CT-scan: splenic infarction (arrow)

without drug abuse [4]. Cocaine use is associated with an increased incidence of endocarditis greater than heroin use, but this finding is not fully explained.

Embolic events occur in approximately one-third of cases, more frequently in patients with intravenous drug use, right-sided endocarditis or positive blood cultures [5]. In most cases, embolic events involve the central nervous system. Intracranial mycotic aneurysms represent the most dangerous systemic complication with a high mortality [6].

Splenic infarction complicates left-sided endocarditis in approximately 40% of cases. A splenic abscess rarely develops from an infarcted area. An abscess can be difficult to distinguish from a splenic infarction, but may be a cause of persistent fever necessitating a splenectomy.

In right-sided endocarditis, pulmonary embolic manifestations are frequently present. Septic pulmonary emboli are detected in more than 80% of cases, and may be associated with pleuritic chest pain and dyspnea [3].

When systemic and pulmonary embolic manifestations are contemporaneously observed, bilateral endocarditis or paradoxical embolism should be considered. Bilateral endocarditis is not infrequent [1], and occurs most commonly with *Pseudomonas endocarditis* [7]. Paradoxical embolism is due to right-to-left shunting in the presence of a patent atrial septal defect [8] or a pulmonary arteriovenous fistula. In most cases, septal defects are congenital but very rarely arise from septal perforation as a result of bacterial invasion. Pulmonary arteriovenous fistula is a rare event, and occurs as a congenital anomaly or as a consequence of mycotic pulmonary aneurysm [9].

In conclusion, in patients with endocarditis, search for clinical and radiological signs of embolization is mandatory. The presence of both pulmonary and systemic embolization deserves particular attention. A diagnosis of paradoxical embolism or bilateral endocarditis should be searched for due to prognostic and therapeutic implications. A septal defect may require a surgical approach, whereas the presence of left-sided endocarditis in addition to right-sided endocarditis carries a higher mortality.

Conflict of interest None.

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