A case of endocarditis with cerebral embolism successfully treated with daptomycin

Robert Doria, Enrico Tagliaferri, Giovanni Andreotti, Riccardo Taddei, Rubinia Nardini, Carlo Tascini, Francesco Menichetti
Infectious Diseases Unit, Cisanello Hospital, Pisa, Italy

Abstract

A young girl was admitted for fever, headache, paresthesia of the hands, involuntary blinking of the left eye and aphasia. Imaging revealed myotic cerebral aneurysms and finally infective endocarditis was diagnosed and successfully treated with daptomycin. She had a history of mitral prolapse and she had undergone dental procedures some months before without any antibiotic prophylaxis, according to the 2007 guidelines of the American Heart Association.

Case Report

A 26-year-old female was admitted to the Neurology Unit for fever, severe temporal, parietal and occipital headache, paresthesia of the hands and involuntary blinking of the left eye which had started 10 days before. A transient episode of aphasia was also reported.

The patient was a non-smoker and was not taking any medication. Mitral prolapse with moderate insufficiency was detected when she was 8 years old. She had undergone dental procedures some months before without any antibiotic prophylaxis.

On physical examination a holosystolic murmur was heard.

The erythrocyte sedimentation rate and the C-reactive protein were slightly increased while the white blood count was normal. Haemoglobin was 9.8 g/dL.

A computed tomography scan detected two small areas of hyperintensity compatible with subarachnoid haemorrhage in the left parietal lobe; a smaller area with the same characteristics was detected in the right parietal lobe. Magnetic resonance imaging (MRI) and angi-MRI revealed an irregular, nodular image of 4 mm with high flow, in the left parietal lobe, interpreted as a vascular malformation; two smaller areas with similar characteristics were observed in the left and the right parietal lobe. Angiography revealed three small aneurysmal dilatations along the course of the left paracentic lobular artery, the left superior parietal artery and the left angular artery (Figure 1).

Aneurysms were interpreted as possible myotic aneurysms and an echocardiography was requested because infective endocarditis was suspected. A trans-thoracic echocardiography confirmed the mitral prolapse with moderate insufficiency and revealed thickened mitral lems. The patient was therefore transferred to the Infectious Diseases Unit. A transesophageal echocardiography revealed vegetation on the mitral valve suggesting infective endocarditis. A Tc-99m leukocyte scintigraphy demonstrated accumulation on the mitral valve. Areas of focal accumulation in the brain were also observed. One single blood culture resulted positive for methicillin resistant *Staphylococcus epidermidis*. Treatment with IV 500 mg daptomycin was given for six weeks. Therapeutic drug monitoring was conducted and daptomycin resulted in the therapeutic range. A follow-up cerebral angiography showed complete resolution of the aneurysms. A follow-up transesophageal echocardiography documented remarkable reduction of the thickness of the lems of the mitral valve and an improvement of the mitral regurgitation. A follow up MRI of the brain showed hemosiderin deposits as a result of bleeding. A follow-up scintigraphy showed the resolution of the accumulation on the mitral valve and at brain level. Valvular replacement was planned.

Discussion

According to the most recent guidelines of the American Heart Association, issued in 2007, antibiotic prophylaxis is no longer indicated in patients with mitral prolapse undergoing dental procedures, as it was in the previous edition. This decision has been criticized by some authors who reported cases of infective endocarditis occurring in patients with such a cardiac defect and undergoing dental procedures without any prophylaxis. Though infective endocarditis in these patients cannot be attributed to dental procedures for sure, we believe a more prudent approach should be considered.

The diagnosis of endocarditis is based on the Duke criteria. In our case, the following occurred: one major criteria (major echocardiographic findings) and four minor criteria (fever, embolism, predisposing heart condition and minor microbiological criteria). Positive leukocyte scintigraphy is not included in the Duke criteria; however, in our case, it was consistent with the diagnosis of endocarditis with cerebral embolism. Some data suggests scintigraphy is of little value in the evaluation of patients with suspected endocarditis, since vegetations consist mainly of masses of fibrin, clotted platelets, blood cell debris, bacteria and only a few leukocytes. Other studies suggest a positive granulocyte scintigraphy correlates with high activity of the inflammatory process and predicts a poor prognosis for the patients concerned. Probably, more evidence is needed to define the role of scintigraphy in the diagnosis of infective endocarditis.

Indications for therapy with daptomycin approved by the FDA include *Staphylococcus aureus* bloodstream infections including right-sided endocarditis and daptomycin is also considered as an alternative option for the empirical treatment of endocarditis on native valves and the treatment of endocarditis due to Gram positive bacteria. Daptomycin is not generally recommended for infections of the central nervous system since there is no adequate evidence on its penetration in the cerebral parenchyma and the cerebrospinal fluid. However, in our case, we considered cerebral myotic aneurysms as caused by the infection of the vascular side of the wall of the vessels. Our report suggests that daptomycin is safe and effective in case of left endocarditis with cerebral embolism.

Figure 1. Brain angiography showing myotic aneurysms due to septic embolism.
References

1. Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. Circulation 2007;116:1736-54.

2. Cunha BA, D’Elia AA, Pawar N, Schoch P. Viridans streptococcal (Streptococcus intermedius) mitral valve subacute bacterial endocarditis (SBE) in a patient with mitral valve prolapse after a dental procedure: the importance of antibiotic prophylaxis. Heart Lung 2010;39:64-72.

3. Dhoble A, Vedre A, Abdelmoneim SS, et al. Prophylaxis to prevent infective endocarditis: to use or not to use? Clin Cardiol 2009;32:429-33.

4. Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis: diagnosis, antimicrobial therapy, and management of complications: a statement for healthcare professionals from the Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease, Council on Cardiovascular Disease in the Young, and the Councils on Clinical Cardiology, Stroke, and Cardiovascular Surgery and Anesthesia, American Heart Association: endorsed by the Infectious Diseases Society of America. Circulation 2005;111:e394-434.

5. Ellemann A, Rubow S, Erlank P, Reuter H. Is there a role for 99mTc-HMPAO leucocyte scintigraphy in infective endocarditis? Cardiovasc J S Afr 2003;14:199-203.

6. Borst U, Becker W, Maisch B, et al. Clinical and prognostic effect of a positive granulocyte scan in infective endocarditis. Clin Nucl Med 1993;18:35-9.

7. Cubicin Full Prescribing Information. http://www.cubicin.com. Accessed: 14th October 2011.

8. Gilbert DN, Moellering RC, Eliopoulos GM. The Sanford Guide to Antimicrobial Therapy. Sperryville, VA: Antimicrobial Therapy, Inc.; 2010. p. 25.