Native aortic valve endocarditis and multisystem embolization despite adequate antibiotic treatment: a case report

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Abstract

Introduction
Providers and patients face challenges with changes in medical guidelines. Providers struggle with the risks of medical treatment, including prophylaxis, versus the risks without treatment. We describe a case of infective endocarditis in a patient with native valve aortic stenosis. We highlight the potential challenges of the new endocarditis guidelines, which do not recommend antibiotic prophylaxis in native valve aortic stenosis. We further describe the clinical course of our patient as he endured recurrent endocarditis despite standard antibiotic therapy.

Case report
We present a case of a 68-year-old male who was seen by his primary provider for back pain and fevers. He had a previous history of mild tri-leaflet aortic stenosis and had undergone a dental procedure cleaning five days previously.

Discussion
We found relatively little evidence about potential dangers to patients with the changes in the endocarditis guidelines. In fact, many international medical societies are restricting antibiotic prophylaxis in native valve aortic stenosis/regurgitation. Unfortunately, our patient experienced endocarditis. Ultimately, there has been little evidence that restricting antibiotic use has resulted in increased rates of endocarditis. Providers must remember that there are inherent risks of antibiotic use including allergy, microbial resistance, cost and Clostridium difficile infection, among other potential side effects.

Conclusion
Medical providers and scientists must continue to evaluate the potential risks and benefits of antibiotic prophylaxis in patients with native valvular disease. This case report adds to that discussion.

Introduction
Infective endocarditis is a challenging and potentially life-threatening illness for patients. It is likely that up to 15,000 new cases of endocarditis occur each year in the USA. Guidelines for prophylaxis of infective endocarditis for dental procedures have been modified multiple times in the past as evidence has changed. In the last 10 years, guidelines were altered in France, the UK and in the USA to drastically reduce the indications for antibiotic prophylaxis. Guidelines in the USA do not recommend endocarditis prophylaxis in people with healthy native valves. We describe a case of endocarditis in a patient who developed endocarditis after a dental procedure and developed septic emboli after four weeks of antibiotic treatment.

Case report
We present a case of a 68-year-old male who was seen by his primary provider for back pain and fevers. He had a previous history of mild tri-leaflet aortic stenosis and had undergone a dental procedure cleaning five days previously. Based on his history and examination, a working diagnosis of disc space infection was made. He underwent an a spinal magnetic resonance imaging, which revealed multilevel discitis and osteomyelitis. He also had blood cultures drawn. Blood cultures (three sets) subsequently grew Streptococcus viridans in all bottles, which was sensitive to penicillin. He was hospitalised and because of the bacteraemia and history of aortic stenosis, the medical team was concerned about endocarditis. Transthoracic echocardiogram (TTE) showed vegetation on the non-coronary cusp of the aortic valve. After the initial diagnosis, the medical team initiated two weeks of gentamicin and ceftriaxone, followed by four weeks of ceftriaxone alone.

One week after starting antibiotic therapy, the patient experienced resolution of his back pain but suffered persistent low-grade fevers and occasional sweats. Four weeks after his initial presentation, he presented to our tertiary care facility with acute confusion, fever, dysarthria, dysphagia, right-sided neurological symptoms, abdominal pain, dyspnoea and cough. Although repeat blood cultures were negative, a computed tomography (CT) scan of the head showed infarction in the left posterior cerebral artery area. Further, a magnetic resonance angiogram (MRA) of the head showed a focal haemorrhage around the left posterior cerebral artery with a contained mycotic aneurysm (Figure 1). Due to abdominal pain, a CT scan of the abdomen was pursued that showed a large splenic infarct.

After transfer and further evaluation, he was placed on extended

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Case Report

Results

Spectrum antibiotics of vancomycin, cefepime and metronidazole for two weeks. Overall, he received 12 weeks of antibiotic treatment due to discitis and osteomyelitis. Aortic valve replacement was deferred as he was not a candidate for anticoagulation. A repeat TTE, before completion of antibiotic therapy, showed moderate aortic regurgitation, no vegetations, likely cusp perforation and preserved left ventricular function of 60%. He was discharged after six weeks of rehabilitation at a skilled nursing facility. He was independent for most activities of daily living and used a walker or a cane to ambulate. Subsequent visits showed resolved vegetation on TTE. The mycotic aneurysm on the MRA resolved after 12 weeks of treatment.

Discussion

We describe a case of native valve endocarditis. Previous guidelines recommended antibiotic prophylaxis in patients with native valve regurgitation or stenosis to prevent endocarditis. Guidelines have changed and have reduced antibiotic use; however, in our patient, the lack of antibiotics may have contributed to his endocarditis. He not only had endocarditis but also had continued infectious complications of endocarditis that persisted even after prolonged treatment outlined as per the guidelines for treatment. These complications included subsequent embolization through various organ systems with ensuing fevers and functional debility. Despite the embolization, the patient did fairly well and continued to do so even without surgical interventions for his endocarditis.

Infective endocarditis has a poor prognosis with high morbidity and mortality. Six-month mortality rates can be as high as 26%. Emboli to the brain, lung or spleen occur in 30% of patients and are often the presenting feature. Patients can suffer encephalopathy, meningoencephalitis and cerebral haemorrhage as well. Native valve endocarditis has a better prognosis than prosthetic valve endocarditis as described in the study by Romano et al. Presently, USA guidelines recommend the antibiotic prophylaxis in prosthetic valves only (Table 1).

Table 1. Current guidelines for infective endocarditis prophylaxis.

| CHD, congenital heart disease. |
|------------------------------|
| Prosthetic cardiac valve or prosthetic material used for valve repair |
| Previous infective endocarditis |
| CHD |
| Unrepaired cyanotic CHD, including palliative shunts and conduits |
| Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first six months after the procedure |
| Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibits endothelialisation) |
| Cardiac transplant recipients who develop cardiac valvulopathy |

Dental procedures are often a common source of endocarditis. All dental procedures that involve manipulation of gingival tissue require endocarditis prophylaxis in prosthetic valve patients. Although native valve endocarditis is not common after a dental cleaning procedure, it is a possibility as evidenced by this case. In an Italian study of 1082 patients, 69.9% had native valve endocarditis and 7% had aortic stenosis like our patient. The presumed mechanism of action for endocarditis after dental procedure is transient bacteraemia. Transient bacteraemia could occur from dental plaque formation, which could translocate into the blood stream by dental cleaning. The dental procedure as...

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well as a patient’s oral care could play a role in infective endocarditis. Poor dental and oral hygiene could be a significant risk factor in the infective endocarditis related to oral flora. The bacteremia with dental cleaning is no more than what occurs with brushing teeth. As suggested by the literature, 20% to 65% of cases of infective endocarditis could occur from bacteria that are native to the mouth.

Despite a 78.6% reduction in antibiotic prophylaxis prescribed after the introduction of the new guidelines in 2007, the incidence of infective endocarditis remains to be proven substantially. Thornhill et al. showed that there was no upward change in the incidence of, or death from, infective endocarditis after changes in the guideline. DeSimo et al. demonstrated, by the first population-based study in the USA, that there was no increase in the incidence of Streptococcus viridans infective endocarditis in Olmsted County, Minnesota, since the publication of the 2007 American Heart Association endocarditis prevention guidelines. Duval and colleagues did population-based surveys in three regions of France that included 11 million patients aged 20 years and older and found no increase in the incidence of S. viridans endocarditis although they noted a significant increase in the Staphylococcus endocarditis after publication of the more restrictive guidelines. Nevertheless, results from well-designed studies are needed to validate and support the new endocarditis prophylaxis guidelines.

Because our patient also suffered systemic embolization from his infective endocarditis, one might consider surgical intervention. The timing and indications for surgical intervention to prevent systemic embolism in infective endocarditis remain controversial. A prospective randomised trial showed early surgery in patients with endocarditis, and large vegetations significantly reduced the composite endpoint of death from and embolic events by effectively decreasing the risk of systemic embolism. Surgery for endocarditis is potentially lifesaving and required in 25% to 30% of cases during acute infection and in 20% to 40% of cases during convalescence. Surgery was not performed in this case because the patient wasn’t a good candidate for anticoagulation.

With the antibiotic treatment failure, one considers further options for either choice of antibiotics or length of use of antibiotics. There are no specific guidelines for the treatment of endocarditis in the setting of treatment failure, in terms of length and duration of antibiotic treatment. To our knowledge, there have been minimal reports in the literature of native valve infective endocarditis in the setting of the new infective endocarditis antibiotic prophylaxis guidelines. One might expect that endocarditis has occurred but was not reported because of the awareness of many clinicians regarding native valve endocarditis and dental cleaning.

Conclusion
Infective endocarditis can result in morbidity and mortality and should be a consideration of clinicians seeing acutely ill patients. One must consider a dental source of the endocarditis if S. viridans is cultured as the source of endocarditis. Although it is rare to see infective endocarditis after dental cleaning, it is possible as evidenced in this case. Embolization predominantly occurs between the first two weeks of antibiotic treatment. When fever persists or recurs during the treatment of endocarditis, further investigations to look for the cause of fever should be undertaken. There are no specific guidelines for S. viridans endocarditis treatment failures. In patients with a definite microbiological diagnosis, antibiotic therapy should not be altered because of persistent or recurrent fever.

Abbreviations list
CT, computed tomography; MRA, magnetic resonance angiography; TTE, transthoracic echocardiogram.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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