

# Infective endocarditis in a new immigrant

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Infective endocarditis is a rare but potentially fatal cardiac infection associated with a mortality rate as high as 20% to 25%.<sup>1</sup> Although endocarditis has become a disease of older patients and intravenous drug users in developed countries, in developing countries rheumatic heart disease remains the key risk factor for this infectious disease.<sup>2</sup> Primary care providers in Canada are seeing a growing number of new immigrant and refugee patients. Every year Canada receives more than 500 000 permanent and temporary migrants; in 2008, 21 860 of these migrants were refugees.<sup>3</sup> Patients who are newly arrived in Canada often face substantial barriers to receiving health care and are at risk of a rapid decline in health after arrival in Canada.<sup>4</sup> This case of infective endocarditis in a newly arrived refugee, which was seen in an urban family medicine inpatient service, presented a number of diagnostic and management challenges that family physicians will increasingly face in a globalized world.

## Search strategy

We searched PubMed and Google Scholar for the terms *endocarditis* and *infective endocarditis*. We selected papers examining the epidemiology, diagnosis, and management of endocarditis. The search was limited to articles published in English involving humans. We also reviewed websites from the Government of Canada and Medavie Blue Cross for epidemiologic and program information.

## Case

Ms Z. was a 60-year-old woman who presented to the emergency department complaining of 3 weeks of intermittent fevers, fatigue, and anorexia. She had emigrated from Eastern Africa 4 days earlier as a refugee. Her past medical history was relevant for autoimmune hepatitis treated with prednisone and azathioprine, as well as type 2 diabetes controlled with insulin. There was no known history of rheumatic heart disease.

On examination in the emergency department she was afebrile and had a normal respiratory rate. Her pulse was 96 beats per minute and blood pressure was 129/50 mm Hg. There was no lymphadenopathy and the neck was supple. The neurologic examination findings were normal. The cardiac examination revealed a grade 3/6 pansystolic murmur at the apex with radiation through the precordium. There were no splinter hemorrhages, Janeway lesions, or Osler nodes. There was no skin rash. Blood cultures were drawn, and thick and thin smears for malaria were sent. Leukocyte levels were elevated at  $13 \times 10^9/L$  with a left shift; the sodium level was 129 mmol/L; the random glucose level was 27.4 mmol/L; and the rest of the bloodwork findings were within normal limits. Electrocardiogram findings showed normal sinus rhythm and right atrial enlargement. A chest x-ray scan did not show any

## EDITOR'S KEY POINTS

- Although infective endocarditis has become a disease of older patients and intravenous drug users in developed countries, in developing countries rheumatic heart disease remains the key risk factor for this infectious disease. As primary care providers in Canada are seeing a growing number of new immigrant and refugee patients, they should be aware that patients from regions with a high incidence of rheumatic fever are at increased risk of infective endocarditis.

- Although infective endocarditis is uncommon, given the mortality rate of 20% to 25% and the importance of timely treatment, it is critical for family physicians to perform blood cultures and echocardiographic assessments on patients with history of fever, constitutional symptoms, and heart murmur. Appropriate management in new immigrants and refugees also requires knowledge of the patient's insurance coverage, which might be through the Interim Federal Health Program.

## POINTS DE REPÈRE DU RÉDACTEUR

- Bien que l'endocardite infectieuse soit devenue une maladie des patients plus âgés et des utilisateurs de drogues intraveineuses dans les pays développés, dans les pays en développement, la cardiopathie rhumatismale demeure un facteur de risque important de cette maladie infectieuse. Étant donné que les médecins de soins primaires au Canada voient un nombre grandissant de nouveaux immigrants et de patients réfugiés, ils devraient être au courant que les patients venant de régions où l'incidence de la fièvre rhumatismale est élevée ont un risque accru d'endocardite infectieuse.

- Même si l'endocardite infectieuse est rare, étant donné son taux de mortalité de 20 % à 25 % et l'importance d'un traitement sans délai, il est essentiel que les médecins de famille fassent une culture sanguine et des évaluations échocardiographiques chez les patients ayant des antécédents de fièvre, de symptômes constitutionnels et de souffles cardiaques. La prise en charge appropriée des nouveaux immigrants et des réfugiés exige aussi de connaître la situation du patient quant à ses assurances, susceptibles d'être fournies par l'intermédiaire du Programme fédéral de santé intérimaire.

This article has been peer reviewed.

Cet article a fait l'objet d'une révision par des pairs.

*Can Fam Physician* 2013;59:644-6

intrapulmonary disease. An echocardiogram was ordered.

The patient was admitted to the family medicine inpatient service. On the third day after admission the patient's blood cultures grew viridans streptococci in 3 out of 3 samples, with the final report showing *Streptococcus constellatus* with a penicillin minimum inhibitory concentration of 0.016 mg/L. Transthoracic and subsequent transesophageal echocardiograms both revealed severe mitral regurgitation with vegetations on the mitral valve. A diagnosis of infective endocarditis was made, and the patient was started on 2 g of intravenous ceftriaxone once daily. The infectious disease and cardiology services were consulted, and a plan of medical management was decided upon. Repeat blood cultures following administration of ceftriaxone were sterile.

The patient was discharged home with a peripherally inserted central catheter line and 4 weeks of intravenous ceftriaxone. Her discharge was delayed owing to difficulties ensuring payment for her home care and medications, as she was covered by the Interim Federal Health Program (IFHP) and did not have provincial insurance.

The patient was seen in outpatient follow-up 6 weeks later and reported no further fevers and no symptoms of congestive heart failure or neurologic symptoms. Ms Z. was given appropriate advice on endocarditis prophylaxis, and routine preventive care was planned with her family physician.

## Discussion

In the pre-antibiotic era, endocarditis was predominantly a fatal disease of the young that followed rheumatic heart disease. More recently, endocarditis has become a disease of older patients with comorbidities and of intravenous drug users.<sup>2</sup> However, in developing countries rheumatic heart disease remains the most frequent underlying cardiac condition predisposing patients to endocarditis.<sup>1</sup> Acute rheumatic fever causes a pancarditis, which most often results in mitral regurgitation.<sup>5</sup> Our patient was from a developing country and had severe mitral regurgitation, although she had no known history of rheumatic heart disease.

A diagnosis of endocarditis is made using the modified Duke criteria (**Box 1**).<sup>6</sup> Our patient had 2 major criteria, including blood cultures showing a causative agent (viridans streptococci) and echocardiographic evidence of a vegetation.<sup>6</sup> Definitive diagnosis by modified Duke criteria requires 2 major, 1 major and 3 minor, or 5 minor criteria. Many patients with endocarditis present with nonspecific features such as fevers, constitutional symptoms, and new or pre-existing heart murmurs.<sup>7</sup> The classic features of endocarditis such as splinter hemorrhages, Janeway lesions, and Osler nodes are relatively rare.<sup>7</sup>

### Box 1. Modified Duke criteria for diagnosis of infective endocarditis

#### Major criteria

- Blood cultures positive for typical infective endocarditis organism
- New valvular regurgitation
- Echocardiographic evidence of infective endocarditis

#### Minor criteria

- Predisposing cardiac condition or intravenous drug use
- Fever (>38°C)
- Vascular factors (eg, serious arterial emboli, septic pulmonary infarct, mycotic aneurysms, intracranial hemorrhage, conjunctival hemorrhage, Janeway lesions)
- Immunologic factors (eg, glomerulonephritis, Osler nodes, Roth spots, rheumatoid factor)
- Microbiology factors (eg, blood cultures positive for organisms not meeting major criteria, serologic evidence of active infection with plausible microorganism)

Data from Li et al.<sup>6</sup>

In all suspected cases of endocarditis, 2 sets of blood cultures should be drawn at least 30 minutes apart.<sup>8</sup> Blood culture results are positive in about 90% of cases.<sup>3</sup> In more than 80% of cases, the causative agents are *Staphylococcus aureus*, streptococci, or enterococci.<sup>8</sup>

All patients suspected of having endocarditis should undergo at least 1 echocardiographic assessment.<sup>8</sup> Transthoracic echo is fast and noninvasive; it has a specificity of 98% but a sensitivity of only 60% to 70% for vegetations.<sup>1</sup> Transesophageal echocardiography enhances sensitivity for the diagnosis of vegetations to about 85% to 90%.<sup>2</sup> It is still essential to consider the diagnosis of endocarditis in the context of a negative echocardiogram result, as patients might meet the modified Duke criteria even without echocardiographic evidence.

Management of endocarditis requires a multidisciplinary approach, with input from infectious disease specialists and cardiologists. Patients infected with viridans streptococci should be treated for 4 weeks with 2 to 3 million units of intravenous aqueous penicillin G 6 times daily or 2 g of intravenous ceftriaxone daily. The bacteriologic cure rate with such treatment is 98%.<sup>7</sup> Repeat blood cultures should be obtained to ensure eradication of the organism.<sup>7</sup> The recurrence of fever after an initial defervescence suggests an embolic event, a drug reaction, or the emergence of resistant bacteria.<sup>7</sup>

The overall mortality rates for endocarditis remain as high as 20% to 25%, with death resulting primarily from embolic events and heart failure.<sup>1</sup> The usual cause of congestive heart failure is infection-induced valvular damage.<sup>1</sup> Embolism can occur in 20% to 40% of cases, but its incidence decreases to 9% to 21% after initiation of antibiotic treatment.<sup>2</sup>

Any patient with previous endocarditis is considered to be at high risk of developing endocarditis in the future.<sup>9</sup> Other high-risk patients include those with prosthetic valves and those with complex cyanotic congenital heart disease. The 2007 prophylaxis guidelines from the American Heart Association now recommend prophylaxis in such high-risk patients only before any dental procedure involving manipulation of the oral mucosa. The preferred prophylaxis regimen is 2 g of oral amoxicillin 1 hour before the procedure.<sup>10</sup> Other than prophylaxis, the main preventive strategy is to limit spontaneous bacteremia by reducing the global oral burden of bacteria through improved oral hygiene. This strategy requires dental examinations at least twice a year in high-risk patients, which family physicians can help to coordinate.<sup>10</sup>

### Interim Federal Health Program

Our patient's release from hospital was delayed because of difficulties planning her discharge medications and home-care services in the context of her insurance coverage. Whereas most patients with provincial insurance are automatically eligible for services from their provincial home-care providers, refugees who do not yet have provincial insurance can prove to be a management challenge. Such patients are covered by the IFHP, which is funded by Citizenship and Immigration Canada.<sup>11</sup> The IFHP provides patients with specific medical and pharmaceutical insurance for the first 12 months after their arrival in Canada. These benefits were substantially reduced in June 2012.<sup>11</sup> While refugees might be eligible for provincial or territorial health insurance plans immediately after arriving in Canada, processing delays might mean they are covered by the IFHP only for a period of time. Refugee claimants might not qualify for certain insurance plans until their refugee status has been confirmed.

Lack of familiarity with the covered treatments and services provided by the IFHP, as well as the correct method for reimbursement provided by IFHP, can be a barrier to the care of refugees. Our usual home-care service providers were unwilling to provide treatment, and we consulted social work as well as our home-care coordinator before eventually contacting the program administrators and finding the correct coverage information on their website. The IFHP might cover medications and home care provided by a private agency, so long as they are approved in writing by the Funds Administrative Service. Health care providers who work with patients covered by the IFHP should

familiarize themselves with the program by reading the IFHP health care provider manual.<sup>12</sup>

### Conclusion

Infective endocarditis is rarely encountered by family physicians. However, given the mortality rate of 20% to 25% and the importance of timely treatment, it is critical for family physicians to perform blood cultures and echocardiographic assessments on patients with history of fever, constitutional symptoms, and heart murmur, whether they are outpatients or inpatients. Family physicians should be aware that patients from regions with a high incidence of rheumatic fever are at increased risk of infective endocarditis.

Management of endocarditis requires knowledge of diagnosis, therapeutics, and prophylaxis guidelines. Appropriate management in new immigrants and refugees also requires knowledge of a patient's insurance coverage, which might be through the IFHP. 🌿

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#### Competing interests

None declared

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