Aortic valve endocarditis from *Enterococcus hirae* infection

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ABSTRACT

Staphylococci, streptococci, and enterococci are frequently associated with endocarditis, but numerous complex and diverse species exist among the three groups and identification of specific pathogens can aid in treatment. One particular organism, *Enterococcus hirae*, is rarely described as a human pathogen and is more commonly identified among certain bird groups. We present the first documented case of human *Enterococcus hirae* infective endocarditis in the USA, representing only the fourth case worldwide.

KEYWORDS Aortic valve endocarditis; critical care; *Enterococcus hirae*; infectious disease

Infective endocarditis represents a global health threat that is associated with in-hospital mortality rates approaching 20%.¹ The inciting pathogens responsible for 80% to 90% of these infections originate from three Gram-positive species: *Staphylococcus* (42%), *Streptococcus* (29%), and *Enterococcus* (10%).^{1,2} Enterococci exist as part of the normal gastrointestinal tract and include >30 complex species that are able to survive in hostile environments.^{3,4} *E. faecalis* and *E. faecium* are the most commonly isolated strains in humans, manifesting as bacteremia, endocarditis, urinary tract infections, hepatobiliary sepsis, and wound infections.^{5,6} *E. hirae* is a well-documented animal pathogen among the psittacine (relating to parrots) and poultry bird groups, but it is rare among humans and represents only 1% to 3% of all enterococcal isolates in clinical practice.^{7,8} We present the first documented case of *E. hirae* endocarditis in the USA, representing only the fourth case worldwide.

CASE DESCRIPTION

A 70-year-old man presented with 3 months of bilateral leg edema, dyspnea on exertion, and fatigue. He endorsed fevers and mild weight loss in the last year. He had recently returned to the USA after living in Vietnam for 2 years, with recent travel throughout Southeast Asia. Physical exam included a 3/6 precordial diastolic murmur, rales in the lung bases, and bilateral leg edema. Chest radiograph showed cardiomegaly, vascular congestion, and trace pleural effusions. Electrocardiogram

disclosed sinus rhythm with first-degree block, left axis deviation, and anteroseptal and inferior Q-waves. Transthoracic echocardiogram revealed a left ventricular ejection fraction of 40%, moderate anterolateral hypokinesis, mild aortic regurgitation, and thickening of the aortic valve cusps. Vancomycin was started after blood cultures grew *E. hirae*, which was identified to the species level using matrix-assisted laser desorption ionization time-of-flight mass spectroscopy. Transesophageal echocardiogram revealed mild aortic multicuspid prolapse, fusion of the right and left cusps, a 1-cm mobile echodensity on the noncoronary cusp, perforations of the right and noncoronary cusps, and severe aortic regurgitation.

Antibiotics were changed from vancomycin to ampicillin and ceftriaxone for synergy, and repeat blood cultures were negative after 3 days of treatment. Aortic valve replacement took place on hospital day 6. In addition to the cuspal vegetations, two purulent aortic root abscesses were excised, and the defect was repaired with autologous parietal pericardium patches. The postcardiopulmonary bypass period was complicated by coagulopathy and cardiogenic shock, leading to initiation of central veno-arterial extracorporeal membrane oxygenation. Cultures from his native aortic valve grew *E. hirae*. After 4 days, he was successfully decannulated from extracorporeal membrane oxygenation and his chest was closed. He was discharged home on postoperative day 17 with plans for 6 weeks of intravenous penicillin G and ceftriaxone, followed by indefinite chronic suppressive therapy with oral penicillin.

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DISCUSSION

In 1998, Gilad et al documented the first case of *E. hirae* as a human pathogen in a patient with septicemia.⁹ Since that time, 15 additional case reports have described the organism as a cause of urinary tract infections, bacteremia, cholangitis, pancreatitis, peritonitis, splenic abscesses, and spondylodiscitis. Three of the reports describe *E. hirae* aortic valve endocarditis that occurred in France (2002 and 2011) and Brazil (2013).^{10–12} Our report represents the first documented case of *E. hirae* endocarditis in the USA and only the fourth worldwide.

The organism's propensity to form biofilms is fundamental to its virulence and ability to produce invasive infections.⁶ Accurate species identification is challenging due to aberrant phenotypes and the fact that many laboratories do not routinely identify *Enterococcus* to the species level.¹³ *E. hirae* infections are severe, difficult to treat, and prone to recurrence. Our case is the first to describe the development of an aortic root abscess. In a large prospective cohort study of 2781 patients with infective endocarditis from any organism, abscess was noted to be the most common paravalvular complication (14.4%).¹ In conclusion, this report describes the successful management of a patient with *Enterococcus hirae*-associated aortic valve endocarditis.

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