Journal of Cardiology Cases 20 (2019) 129–131

Contents lists available at ScienceDirect

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

A rare infective endocarditis caused by *Vagococcus fluvialis*

Kartik Pandurang Jadhav (MD)*, Praveen G Pai (MD)

Department of Adult Cardiology, Amrita Institute of Medical Sciences, Kochi, Kerala, India

ARTICLE INFO

Article history:
Received 27 September 2018
Received in revised form 21 June 2019
Accepted 30 June 2019

Keywords:
Vagococcal infective endocarditis
Rare infective endocarditis
Vagococcus fluvialis endocarditis
Aggressive endocarditis

ABSTRACT

A 70-year-old male with a past history of coronary artery bypass grafting, presented with high-grade fever and rapidly progressive dyspnea for 3 days. He was febrile and a prominent diastolic murmur was noted in the aortic area. Transesophageal echocardiography showed severe aortic regurgitation with multiple mobile vegetations attached to both supra- and infravalvular surfaces of aortic valve. Blood cultures grew *Vagococcus fluvialis* which was confirmed with identification and antibiotic susceptibility test testing and S16 RNA sequencing. The patient underwent aortic valve replacement with a bioprosthetic valve. Repeat blood culture was sterile. He was continued on vancomycin injections for a total period of six weeks. Vagococcus is a unique genus of Gram-positive, catalase-negative, facultatively anaerobic cocci that was identified in 1989. The only other documented case of vagococcal endocarditis involving mitral and aortic valves had a similar rapidly progressive presentation with extensive valvular damage. *V. fluvialis* infection appears to have fulminant course with sudden deterioration requiring surgical intervention.

<**Learning objective:** : The objective in publishing this case report is multipronged. First is the rarity of the human infection by vagococci. The difficulty in accurate diagnosis of vagococcus from other lactobacilli. Vagococcus infection appears to have fulminant course with complete destruction of the valve involved, when compared to other lactobacilli. Therefore early and accurate diagnosis with surgical valvular replacement is the best way to manage this condition.>

Introduction

Vagococcus is a distinct genus, first described by Hashimoto et al. in 1974, later defined as a separate genus in 1989 by Collins et al. [1]. Vagococcus genus includes Gram-positive, catalase-negative, facultatively anaerobic, motile/non-motile cocci initially isolated from a common otter in 1999, in the United Kingdom [2]. The first case of human infection causing periodontal abscess was reported from France [3]. The first case of vagococcal endocarditis was detected and published in the USA involving mitral and aortic valves associated with stroke [1]. We are presenting a case report of a patient suffering from infective endocarditis affecting aortic valve caused by *Vagococcus fluvialis*, requiring surgical intervention.

Case report

This case involved a 70-year-old male patient with history of coronary bypass surgery for triple vessel disease one year previously, systemic hypertension, and dyslipidemia on medication.

He presented with high-grade fever of 5 days' duration, associated with headache, myalgia, and anorexia. He developed sudden onset dyspnea on exertion — New York Heart Association class III-IV on the 4th day. He was referred from a local hospital for further management.

On examination he had tachycardia of 128 beats per minute, regular with collapsing pulse and blood pressure of 130/30 mmHg with wide pulse pressure, pulse oximeter showing saturation of 90%, febrile (40.1 °C), and diastolic murmur of grade 4/6 in the aortic area was noted.

Blood laboratory results showed anemia (hemoglobin 8.0 g/dl), high counts (white blood cell total 13,300 cells/mm^3) with elevated inflammatory markers (C-reactive protein 124 mg/L). Echocardiography revealed severe aortic regurgitation with pressure half time of 138 ms at cycle length — 751 ms and freely

* Corresponding author at: Department of Adult Cardiology, Amrita Institute of Medical Sciences, Ponnekara, Kochi, Kerala, India.
E-mail addresses: kartikpj@aims.amrita.edu (K.P. Jadhav).

https://doi.org/10.1016/j.jccase.2019.07.001
1878-5409/

Fig. 1. Blood agar growing vagococci. Blood agar showed greenish hemolysis around the cocci which is characteristic of this species.

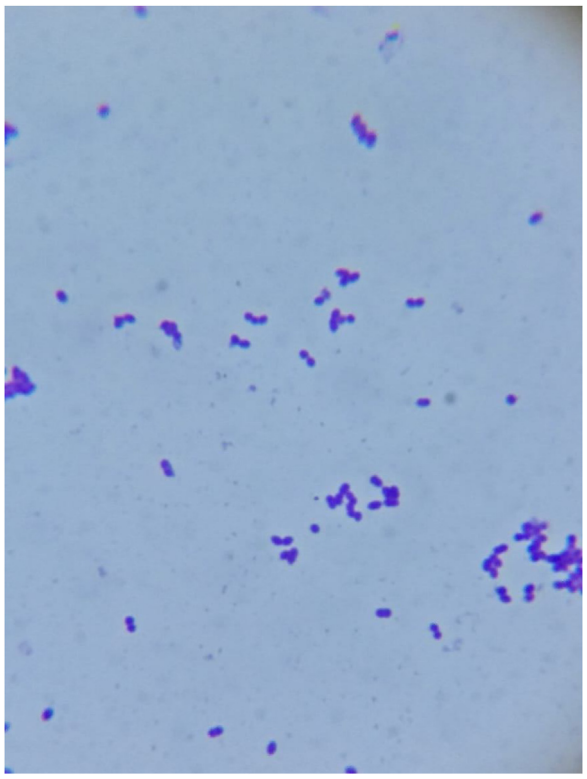

Fig. 2. Gram stain of vagococci. Gram-positive strain cocci in groups of 2 to 5 cells.

moving small vegetation of 1.0 cm attached to both supravalvular/infravalvular surface of aortic valve. Gram stain of the centrifuged sample showed Gram positive cocci in groups of 2–5 cells and blood agar showed greenish hemolysis around the cocci (Figs. 1 and 2). Blood cultures grew *V. fluvialis*, sensitive to penicillin G, gentamicin, vancomycin, and cefotaxim, but resistant to erythromycin, azithromycin, and ofloxacin. These catalase negative cocci also show positive reaction to alkaline phosphatase and produce acid from galactose. *Vagococcus fluvialis* was confirmed with identification and antibiotic susceptibility test VITEK 2 Systems version: 07.01 [BioMerieux, USA] and S16 RNA sequencing. Trans-esophageal echocardiography confirmed the trans-thoracic echocardiography findings (Fig. 3).

The patient was started on vancomycin and gentamycin injectables for infective endocarditis. Computed tomography coronary angiogram was done and bypass grafts were found to be patent. The patient underwent redo sternotomy for aortic valve replacement. Intra-operatively the aortic valve was found to be badly damaged and necrotic. The aortic tissue was removed piecemeal and samples were preserved. A histo–pathology was not possible due to failure to process the sample tissue. Tissue culture from the valve tissue revealed *V. fluvialis* growth. Microscopy with Gram staining of the same revealed 'Gram-positive cocci in pairs and short chains.' Post-operative recovery was uneventful. Repeat blood cultures were sterile. He was continued on vancomycin injections for a total period of six weeks with resolution of his symptoms on follow-up.

Discussion

The genus Vagococcus was proposed in 1989 [4] to accommodate the motile cocci resembling lactococci, which were once referred to as motile "lactic" streptococci and were shown to be distinct from all known lactococci [5]. With the help of 16S rRNA sequencing studies it was shown that vagococci had a different, well defined line of descent within the lactic acid bacteria and represented a new species, which was named *V. fluvialis* [4]. The supposedly vagococcal infection in humans is impeded by failure to accurately identify or overlooked in microbiology laboratories.

It was believed that vagococcal species were found mostly in salmonid fish or domestic animals such as pigs, but later multiple un-identified motile cocci similar to enterococci were isolated from human sources such as blood cultures and peritoneal fluid.

The exact source of human infection in our patient is unknown but we speculate that the infection originated from a food-mediated acquisition of the pathogen, particularly through fish and other seafood. In this region of the world (State of Kerala, India) seafood forms a part of daily diet. Our patient's diet history suggests daily intake of seafood (especially sardines).

Vagococcus fluvialis appears to have fulminant course with sudden deterioration requiring surgical intervention within one week of clinical presentation. A similar fulminant course was observed in the previous report [1].

This is a rare infection and to date only one cardiac case has been published. The accurate diagnosis of *V. fluvialis* is essential

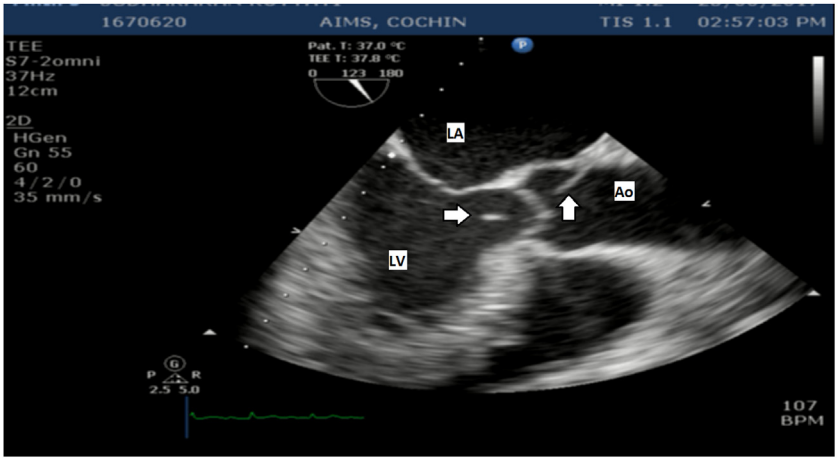

Fig. 3. Transesophageal echocardiography with mid-esophageal long-axis view, showing (white arrow) vegetation of size 1.3 × 0.9 mm with independent mobility attached to the under-surface of non-coronary cusp of aortic valve.

and to confirm the diagnosis along with usual biochemical tests additional tests such as S16 RNA sequencing is essential.

Conflict of interest

None.

Acknowledgment

We acknowledge the role and active participation of the Department of Microbiology and Department of Cardiovascular Thoracic Surgery in the management of the patient.

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