



# Infective Endocarditis in a Patient Presenting with Diarrhea and a History of Ozaki's Procedure: A Case Report

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## Abstract

We aim to present an 80 year old male who has a history of Ozaki's procedure and presented with 2 weeks of diarrhea and fever. The patient was screened for gastrointestinal diseases and in conclusion he was diagnosed with infective endocarditis according to modified Duke Criteria. The patient was started on appropriate intravenous antibiotics. Prolonged diarrhea could be a presenting symptom and should be further evaluated. Reconstructive cardiac valve surgery techniques which are used in the management of IE may be the cause of IE.

**Learning objective:** Diarrhea could be a presenting symptom for infective endocarditis and it should be further evaluated. Ozaki's procedure, which can be used as a treatment for infective endocarditis, could be the cause of IE.

**Keywords:** Post gastric bypass hypoglycemia; Late-dumping; Glp-1 receptor expression; 68Ga-dota-exendin-4; Glp-1 receptor imaging

## Abbreviations

(IE) Infective Endocarditis; (IV) Intravenous; (INR) International Normalized Ratio; (TTE) Trans-Thoracic Echocardiography; (TEE) Transesophageal Echocardiography; (IVDU) Intravenous Drug Use; (CT) Computed Tomography; (MRI) Magnetic Resonance Imaging; (PET) Positron Emission Tomography

## Introduction

Infective endocarditis is a disease which originates from infected endocardium of the heart and has systemic manifestations. Patients can present with various signs and symptoms. Management involves anti-biotherapy and surgical intervention may be used in some patients.

## Case Report

An 80 year old male presented with 14 days of diarrhea and fever. A painful sensation some time occurred on the epigastric area. He had a history of type II diabetes mellitus, hypertension, cirrhosis and he underwent an aortic valve reconstruction surgery named the Ozaki's procedure due to aortic stenosis in August 2020.

On admission, his heart rate was 80 beats per minute, there were no murmurs, his blood pressure was 102/60 mmHg, body temperature was 37.4°C. His lungs were clear to auscultation bilaterally, his abdomen was soft and he had mild epigastric tenderness with no guarding and rebound tenderness. He had normal dentition with no tooth decay. Skin examination showed no rash.

His complete blood count on admission revealed a normal white blood cell count of  $6.62 \times 10^9/L$  (3.6-10.5), anemia with a hemoglobin and hematocrit of 9.5 g/dL (12.5-17.2) and 30.4% (37-49) respectively, and thrombocytopenia with platelets  $77 \times 10^9/L$  (160-400). Electrolytes showed sodium of 135 mEq/L (132-146), potassium of 4.5 mEq/L (3.5-5.5), a urea of 66 mg/dL (19-49), a creatinine of 1.06 mg/dL (0.7-1.3). His C-reactive protein (CRP) was elevated at 8.32 mg/dL (normal <0.5 mg/dL), his procalcitonin was elevated at 0.20 µg/L (normal <0.16 µg/L). Rheumatoid factor was <3.5 IU/mL (0-15). His INR was elevated at 1.6 (0.8-1.2), D-dimer was elevated at 2.7 mg/L (normal <0.55). His iron level was low at 19 µg/dL (65-175). Peripheral blood smear revealed hypochromia without atypical cells.

His stool tests showed no erythrocytes, leukocytes, parasites and there was no pathologic bacterial growth on stool culture. His urine culture showed no bacterial growth. His blood culture on admission showed Gram positive cocci 4 hours after incubation. A nasopharyngeal swab tested negative for COVID-19 (SARS-Cov-2).

The patient was initially treated with intravenous (IV) ceftriaxone. Antibiotic therapy did not lead to improvement of his clinical status and the patient developed fever, and second blood cultures were obtained on hospital day 5. Ceftriaxone was replaced by piperacillin-tazobactam. His first blood culture later identified as *Enterococcus faecalis*. Antibiotic sensitivity profile showed sensitivity to ampicillin, therefore piperacillin-tazobactam regimen was continued. His second blood culture showed Gram positive cocci 10 hours after incubation, which later also identified as *Enterococcus faecalis*. Piperacillin-tazobactam was replaced by teicoplanin. The clinical status and diarrhea of the patient did not improve, the patient developed fever and his platelet counts gradually decreased to  $34 \times 10^9/L$  during this time. Third blood cultures were obtained on hospital day 9, which later identified as *Enterococcus faecalis*.

Abdominal ultrasound showed chronic parenchymal liver disease with mild splenomegaly and minimal free fluid in the abdomen. Portal venous doppler ultrasound showed no abnormal blood flow in portal vein, splenic vein, hepatic veins and inferior vena cava.

Endoscopy and colonoscopy were performed due to prolonged diarrhea. Endoscopy showed hyperemia and edema of the fundus and antrum mucosa, and areas of sub-epithelial hemorrhage were seen on proximal corpus of the stomach. Colonoscopy showed normal mucosal tissue and lumen except for first degree internal hemorrhoids and a single hypertrophic papilla in the anal canal.

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During this treatment course, after seeing no significant improvement in the patient's clinical status with continuation of diarrhea and fever, diagnoses of non-gastrointestinal illnesses were considered for differential diagnosis. Due to the patient's age, the fact that the patient had a bio-prosthetic heart valve and blood cultures showing growth of *Enterococcus faecalis*, further diagnostic tests were performed for the diagnosis of IE.

On hospital day 12, a TTE was performed and revealed 23 mm × 15 mm vegetation on right coronary cusp of the bio-prosthetic aortic valve that extended into the left ventricle outflow tract, left ventricle ejection fraction was 60%, aortic valve maximum gradient was 23 mmHg. TEE was performed and revealed vegetation on all three leaflets of the aortic valve, mobile 12 mm × 18 mm vegetation attached to the inter-ventricular septum. Fundoscopy showed Roth spots on bilateral peripheral retina and lesions consistent with retinitis on right macula.

The patient was diagnosed with IE, consulted with an infectious disease specialist and teicoplanin was replaced by ampicillin sulbactam and gentamicin.

The patient underwent a brain MRI for identification of any septic embolism. The MRI showed cortical atrophy and areas of limited diffusion due to an acute ischemic event in right cerebellar, bilateral occipital, left caudate nucleus and periventricular white matter.

The patient was then transferred to the infectious diseases department.

### Discussion

IE is a systemic disease which results from infection of the endocardium of the heart. Infection typically involves indwelling cardiac devices and prosthetic heart valves. Yearly incidence is about 3-10 per 100,000 people [1].

Risk factors for IE include advanced age, degenerative valve disease, and presence of prosthetic heart valves, diabetes, immunosuppression, congestive heart failure and extensive healthcare system contact [1,2]. Prosthetic valve endocarditis occurs in 3%-4% of patients within 5 years of index surgery and affects mechanical and bio-prosthetic valves equally [2,3]. Streptococci and staphylococci account for approximately 80% of infective endocarditis cases. Enterococci are the third leading cause of IE and associated with extensive healthcare contact [4].

Diagnosis of IE relies on Duke Criteria (Table 1) [5]. The clinical manifestations can involve every organ system. IE can affect kidneys, neurologic and vascular systems, lungs, skin and eyes. Management includes antimicrobial therapy, and a subset of patients may benefit from cardiovascular surgical intervention.

Major Criteria	Minor Criteria
Positive blood culture for IE with a typical organism from 2 separate blood cultures	Predisposition: predisposing heart condition or IVDU
Persistently positive blood cultures for any organism (at least 2 positive cultures of samples drawn >12 h apart)	Fever ≥ 38.0°C
Single positive blood culture for <i>Coxiella burnetii</i> or anti-phase I IgG antibody titer of >1:800	Vascular phenomena: arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhages, and Janeway lesions
Echocardiogram positive for IE including vegetation, abscess, new partial dehiscence of a prosthetic valve, or new valve regurgitation	Microbiological evidence that does not meet major criteria
	Positive blood culture not meeting major criteria
	Immunological phenomena (Osler nodes, Roth spots, rheumatoid factor, or glomerulonephritis)

IE: infective endocarditis; IVDU: intravenous drug use. Definite IE is defined as meeting 2 major clinical criteria, 1 major criterion with 3 minor criteria, or 5 minor criteria. Possible IE is defined as meeting 1 major criterion with 1 minor criterion or 3 minor criteria. A diagnosis of IE is rejected when a firm alternative diagnosis is present, when signs/symptoms resolve with ≤ 4 days of antibiotic therapy, when there is absence of pathological evidence for IE at the time of surgery (with antibiotic therapy of ≤ 4 days), and when criteria for possible IE are not met.

**Table 1:** Modified Duke Criteria for the Diagnosis of Infective Endocarditis

Echocardiography is the primary imaging modality for the diagnosis of IE. TTE should be performed on all patients with suspicion of IE [5]. TEE has an important role in the diagnosis when TTE is negative, as TEE is more sensitive in the diagnosis of IE [6,7]. The sensitivity of TTE for detecting a new cardiac abnormality ranges from 40% to 63% compared with 90% to 100% for TEE [8]. Alternative imaging modalities include cardiac CT scan, MRI, and PET scan [7].

The patient in our case had positive blood culture for IE with a typical organism (*Enterococcus faecalis*) from 2 separate blood cultures obtained and it was persistently positive from two samples drawn >12 h apart. The patient had a bio-prosthetic heart valve, which is a predisposing factor for IE. TTE and TEE revealed vegetation on the aortic valve. Roth spots, which are present in about 2% of patients with IE, were found on fundoscopic examination. Other immunologic phenomena were not present. Cerebral emboli are apparent in approximately 20% to 30% of patients with IE,

which were also present in our patient [9].

The patient in our report presented with diarrhea and fever. Therefore, IE was not suspected in the first place, and gastrointestinal diseases were excluded first. As far as we investigated, we did not find a case of IE which presented with diarrhea.

The patient underwent an aortic valve reconstruction surgery named the Ozaki's procedure. This procedure was first performed in 2007 and consists of using an autologous glutaraldehyde treated pericardium to construct an aortic valve and it can be used for the management of IE [10]. In our case, however, Ozaki's procedure and the resulting bio-prosthetic aortic valve seem like the source of the infection.

### Conclusion

In conclusion, IE should be suspected in patients with prolonged fever

and predisposing risk factors. Patients with prolonged diarrhea with risk factors predisposing to IE should be evaluated for IE, however further research should be done. Ozaki's procedure, which is used as a treatment method for IE, may be the cause of IE in patients.

### Conflict of Interest

The authors declare that there is no conflict of interest.

### Consent

Written informed consent was obtained from the patient for publication of this case report.

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