



ESCHERICHIA COLI ENDOCARDITIS AND CARDIAC ABSCESS: A RARE PRESENTATION IN A PATIENT WITH A PROSTHETIC AORTIC VALVE

Ishan J. Chavada¹, Ramsha Anwar¹, Michael W. Dumont², Mohammed Khutubuddin¹

¹ Acute Medicine Department, University Hospitals Coventry & Warwickshire, Coventry, UK

² Anaesthetics Department, University Hospitals Coventry & Warwickshire, Coventry, UK

Corresponding author: Michael Dumont e-mail: michael.dumont1@nhs.net

Received: 22/11/2023 Accepted: 27/11/2023 Published: 13/12/2023

Conflicts of Interests: The Authors declare that there are no competing interests.

Patient Consent: The authors confirm that the patient's family were counselled and gave their consent for the case report to include the details that have been documented and for these to be published as such.

This article is licensed under a [Commons Attribution Non-Commercial 4.0 License](#)

How to cite this article: Dumont MW, Chavada I, Anwar R, Khutubuddin M. Escherichia coli endocarditis and cardiac abscess: a rare presentation in a patient with a prosthetic aortic valve. *EJCRIM* 2023;10:doi:10.12890/2023_004203.

ABSTRACT

Introduction: There are very few documented cases of *Escherichia coli* endocarditis with cardiac abscesses in the literature. Here we describe a case presentation with diagnostic challenges and a multidisciplinary approach to management.

Case description: This is a rare presentation of *E. coli* endocarditis in a patient with a prosthetic aortic valve. Initial tests were inconclusive and further investigation with transoesophageal echocardiography was required to make the diagnosis. Despite initial improvement, the patient deteriorated and ultimately died of complications related to the presentation.

Discussion/conclusion: *E. coli* is a rare causative organism for endocarditis, which can itself be difficult to diagnose. A multidisciplinary approach to investigation and treatment is required when infective endocarditis is suspected. Transoesophageal echocardiography may be required to diagnose endocarditis when there is a strong clinical suspicion and risk factors present.

KEYWORDS

Endocarditis, *Escherichia coli*, echocardiogram

LEARNING POINTS

- Infective endocarditis should be thoroughly investigated for in cases where there is a high clinical suspicion, but atypical organisms grown in blood cultures.
- A transoesophageal echocardiogram (TOE) may be a better imaging modality when endocarditis is strongly suspected, in comparison to a transthoracic echocardiogram (TTE).
- *Escherichia coli* endocarditis carries a high mortality rate, and early intervention is key in managing patients presenting with suspected endocarditis.



INTRODUCTION

Infective endocarditis (IE) can be defined as an inflammatory process of the endocardial surface of the heart, including the heart valves, mural endocardium or the endocardium covering implanted material (e.g. prosthetic valves)^[1]. It is rarely associated with Gram-negative *Haemophilus*, *Aggregatibacter*, *Cardiobacterium*, *Eikenella*, *Kingella* (HACEK) organisms^[2]. Here we present a rare case of *Escherichia coli* endocarditis with associated cardiac abscess.

CASE DESCRIPTION

A 79-year-old man was readmitted to hospital, presenting with lethargy, fever, and a fall from bed. He had previously been discharged 2 days prior, after being treated for COVID-19 and a urinary tract infection, which he had contracted while travelling in Alaska (USA) two weeks before. He was diagnosed with COVID-19 infection while in Alaska and was repatriated to the UK. On his initial admission, he was treated with antibiotics after blood and urine cultures had grown *E. coli*. After clinical recovery, he was discharged with a continuing course of oral co-amoxiclav based on culture sensitivities.

The patient's comorbidities included essential hypertension, atrial fibrillation, and severe symptomatic aortic stenosis, for which he received a prosthetic aortic valve replacement in 2020.

On readmission to hospital, his heart rate was 105 beats per minute and blood pressure was 106/72 mmHg. His systemic examination was unremarkable. Initial laboratory tests (Table 1) showed a significant neutrophil predominant leucocytosis, elevated C-reactive protein and acute kidney injury stage 1. He also had a profound thrombocytopenia, without bleeding.

The initial clinical impression was sepsis and sepsis-induced thrombocytopenia. He was started on piperacillin-tazobactam and received a single dose of gentamicin after two sets of blood and urine cultures were taken.

IE was suspected, based on his past medical history and clinical deterioration despite initial appropriate antibiotic treatment on the previous admission. A transthoracic echocardiogram (TTE) was requested. A CT thorax-abdomen-pelvis was performed on day 2, which showed mediastinal gas locules in and out of the left atrial appendage and the aortic valve. This was suggestive of valve infection. The antibiotics were changed to ceftriaxone, metronidazole

Blood Test	Result	Normal range
Platelets	26.62 x 10 ⁹ /l	4.0 - 11.0 x 10 ⁹ /l
Platelets	12 x 10 ⁹ /l	150 - 400 x 10 ⁹ /l
C-reactive protein	272 mg/l	< 10 mg/l
Urea	19.1 mmol/l	2.5 - 7.8 mmol/l
Creatinine	190 mol/l	59 - 104 umol/l
Alkaline phosphatase	202 IU/l	30 - 130 IU/l

Table 1. Admission blood test results

<i>Escherichia coli</i>	
Amoxicillin	R
Co-amoxiclav	S
Cefotaxime	S
Gentamicin	S
Piperacillin/Tazobactam	S
<i>E. coli</i> O type	O6
<i>E. coli</i> H type	H31

Abbreviations - R: resistant, S: sensitive

Table 2. Blood culture identification and antibiotic sensitivities

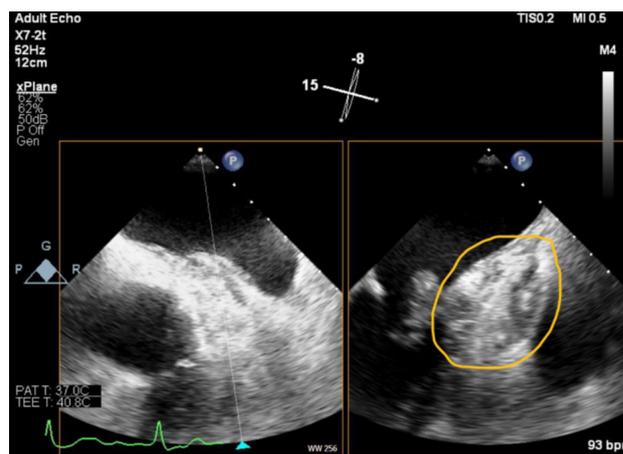


Figure 1. Transoesophageal echocardiogram showing aortic root abscess

and gentamicin after the blood cultures grew *E. coli* (Table 2). The TTE was performed on day 3 but reported as 'inconclusive', and did not show any valvular vegetations. The patient was treated for possible IE, after the Duke criteria^[2] were applied (positive blood culture, fever and predisposing heart condition). After discussion with the infectious disease team, an FDG-PET scan was performed on day 11. This showed an aortic valve annulus infection. The patient was clinically stable at this time. A transoesophageal echocardiogram (TOE) was performed on day 17, as per advice from the cardiology team. This confirmed the presence of a moderate sized vegetation in the aortic valve and a posterior aortic root abscess (Fig. 1 and 2). The patient's inflammatory markers began to rise again at this point (Fig. 3 and 4). The case was discussed at a cardiac multidisciplinary team meeting, which recommended surgery for this patient.

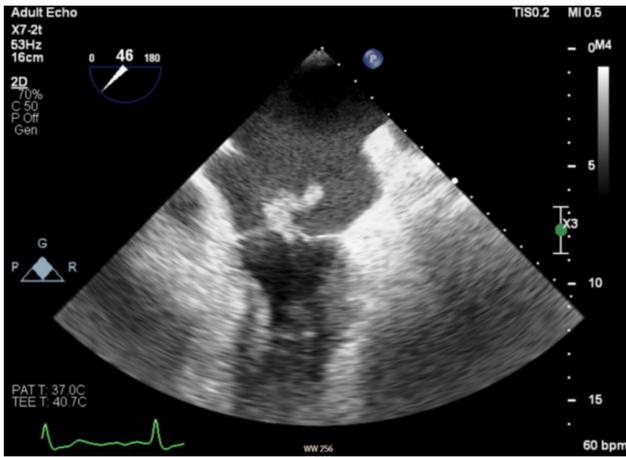


Figure 2. Transoesophageal echocardiogram showing aortic valve vegetation

A plan was put in place to transfer the patient to a specialist centre, but he deteriorated and developed sudden onset chest pain and hypotension. Due to his frailty, comorbidities and limited treatment options, the patient agreed that cardiopulmonary resuscitation (CPR) would likely be futile and a 'do not attempt CPR' form was signed. He died after suffering a cardiac arrest on day 22.

DISCUSSION

This is a rare case of *E. coli* endocarditis with a cardiac abscess. Only 0.51% of IE cases are caused by *E. coli* bacteria (a Gram-negative, non-HACEK organism), in

part due to the organism's low affinity to adhere to the endocardial endothelium^[3,4]. In this case, the TTE was inconclusive and a non-cardiac specific CT was suspicious for infection, but did not fulfil Duke Criteria. There was no echocardiographic evidence of vegetation until a TOE was performed, highlighting the importance of this modality in diagnosing IE^[6]. There is a suggestion that endocarditis should be investigated in patients with cardiac risk factors (e.g. a prosthetic valve) even if the blood cultures are positive for Gram-negative non-HACEK organisms^[2,5]. *E. coli* endocarditis carries a high mortality rate, and early surgery should be considered for cardiac abscesses^[2,6].

REFERENCES

1. Thuny F, Grisoli D, Cautela J, Riberi A, Raoult D, Habib G. Infective endocarditis: prevention, diagnosis, and management. *Can J Cardiol* 2014;**30**:1046–1057.
2. Peralta DP, Chang AY. *Escherichia coli*: a rare cause of prosthetic valve endocarditis. *Cureus* 2023;**15**:e38402.
3. Mercan ME, Arslan F, Alp SO, Atilla A, Seyman D, Guliyeva G, et al. Non-HACEK Gram-negative bacillus endocarditis. *Med Mal Infect* 2019;**49**:616–620.
4. Baddour LM, Wilson WR, Bayer AS, Fowler VG Jr, Tleyjeh IM, Rybak MJ, et al. Infective endocarditis in adults: diagnosis, antimicrobial therapy, and management of complications: a scientific statement for healthcare professionals from the American Heart Association. *Circulation* 2015;**132**:1435–1486.
5. Ramos Tuarez FJ, Yelamanchili VS, Law MA. Cardiac abscess. In StatPearls [Internet] Treasure Island, FL: StatPearls Publishing; 2020.
6. Soma J, Stakkevold TI, Henriksen AZ. *Escherichia coli* endocarditis of the aortic valve with formation of a paravalvular abscess cavity. *Echocardiography* 2005;**22**:129–131.

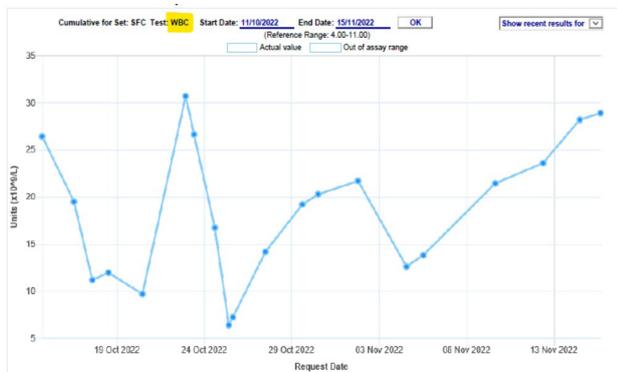


Figure 3. White blood cell trend during admission (normal range: $4.0\text{--}11.0 \times 10^9/l$)

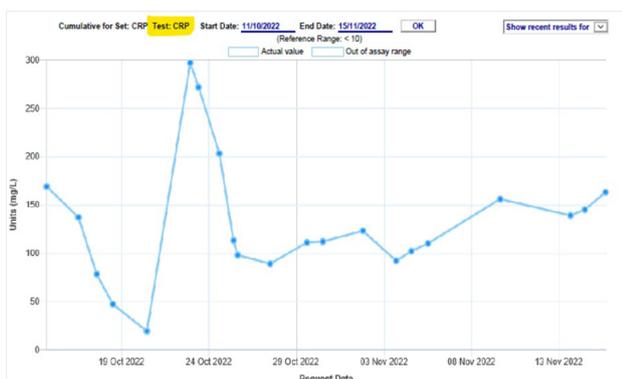


Figure 4. C-reactive protein trend during admission (normal range: $<10\text{ mg/l}$)