

CASE REPORT



## *E. coli* endocarditis of the tricuspid valve

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### ABSTRACT

Infective endocarditis (IE) is a focus of infection which effects the endocardium, specifically the heart valves or intra-cardiac devices.

A 64-year-old male with gastric carcinoma and no prior cardiac history presented to the emergency room with altered mental status. Initial investigations showed the patient had a leukocytosis with a left shift. Blood cultures taken upon arrival eventually grew *Escherichia coli*, thought to be from the urinary tract, although initial urinalysis was delayed until after initiation of antibiotics. Electrocardiogram showed sinus bradycardia with frequent premature atrial contractions. Chest X-Ray showed bilateral pleural effusions, which were eventually drained and found to be growing *E. coli*. Transthoracic echocardiogram was done which showed moderate-sized tricuspid valve vegetation with severe tricuspid regurgitation.

IE has been increasing in incidence throughout the years. In prior decades IE was a disease primarily affecting patients with known rheumatic heart disease, prosthetic heart valves, and intravenous drug abusers however more commonly it is becoming healthcare acquired. *E. coli* is not often seen to be a culprit of IE. We present a rare case of *E. coli* endocarditis of a native tricuspid valve.

### ARTICLE HISTORY

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### KEYWORDS

Endocarditis; native; tricuspid; valve; *E. coli*

## 1. Introduction

Infective endocarditis (IE) is a focus of infection which effects the endocardium, specifically the heart valves or intra-cardiac devices. In prior decades, IE was a disease primarily affecting patients with known rheumatic heart disease, prosthetic heart valves, and intravenous drug abusers. Recently, IE has been seen to health-care acquired in up to 25% of cases [1]. We present a rare case of *Escherichia coli* (*E. coli*) endocarditis of a native tricuspid valve.

## 2. Case presentation

A 64-year-old male with gastric carcinoma with partial gastrectomy, alcohol abuse with cirrhosis of the liver, hypothyroidism, and no prior cardiac history presented to the emergency room with altered mental status. On arrival, the patient was tachypneic with a respiratory rate of 27, hypoxic to 91% on 5L nasal cannula, hypothermic to 36°C rectally, tachycardic to 110 and hypotensive with a systolic blood pressure of 88. Initial investigations showed the patient had a leukocytosis with a left shift (WBC count of 14). Electrocardiogram showed sinus bradycardia with frequent premature atrial contractions (Figure 1). Chest X-ray showed bilateral pleural effusions. Broad spectrum antibiotics were started, and the patient was admitted to the ICU step down unit for



concerns of severe sepsis and started on vancomycin, piperacillin-tazobactam, and doxycycline.

On day 2 of admission, the patient had a CT Scan of the chest which showed a moderate left-sided pleural effusion (Figure 2), without any consolidation suggestive of pneumonia. Thoracentesis was performed and 1.7 L of serous fluid was removed. Analysis of the pleural fluid showed it to be exudative with 2574 white blood cells with 87 neutrophils. Fluid culture eventually would grow *E. coli*. Transthoracic echocardiogram was done which showed moderate-sized tricuspid valve vegetation with severe tricuspid regurgitation, not seen on prior echocardiogram (Figure 3).

On day 3 of admission, blood cultures taken on arrival grew pan-sensitive *E. coli*, thought to be from the urinary tract. The patient remained to be septic with worsening of his clinical condition on piperacillin-tazobactam therapy. Eventually, the patient went into fulminant septic shock, requiring multiple vaso-pressors. The palliative care team was consulted, and the patient opted to pursue hospice care based on his current condition as well as other co-morbidities.

## 3. Discussion

In the United States, the incidence of IE is 15 per 100,000 people [2], a number that has steadily been increasing of the past decade. Generally, risk factors

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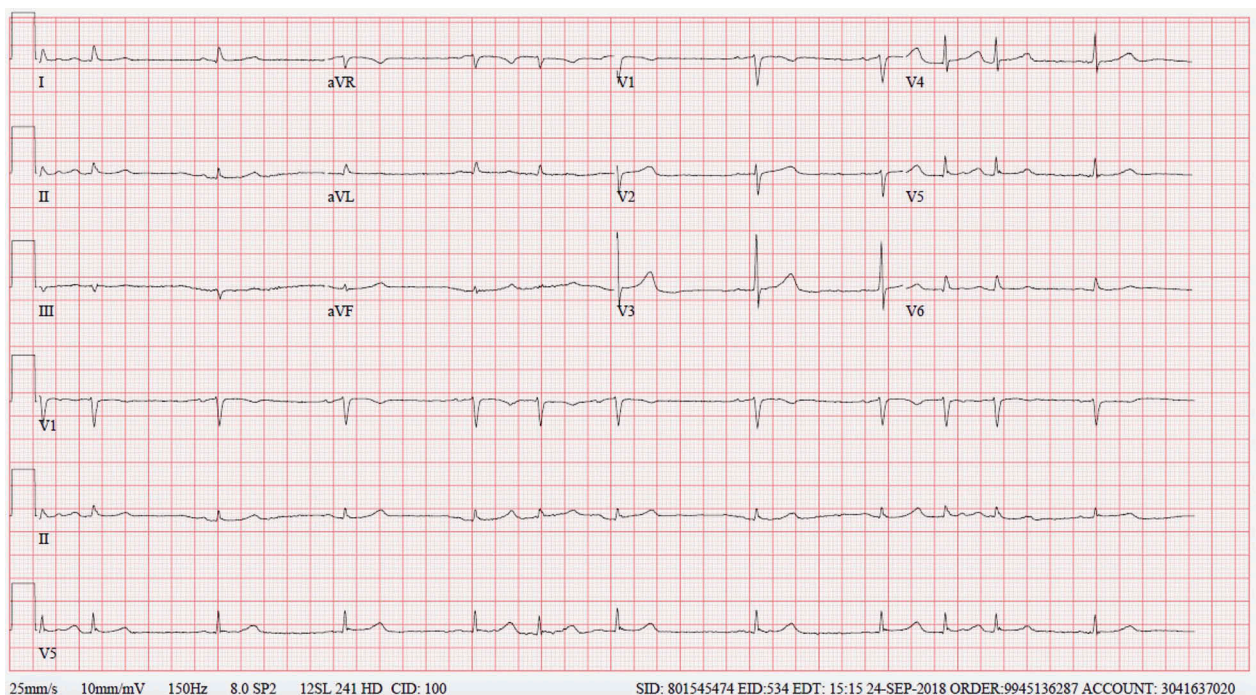


Figure 1. ECG.

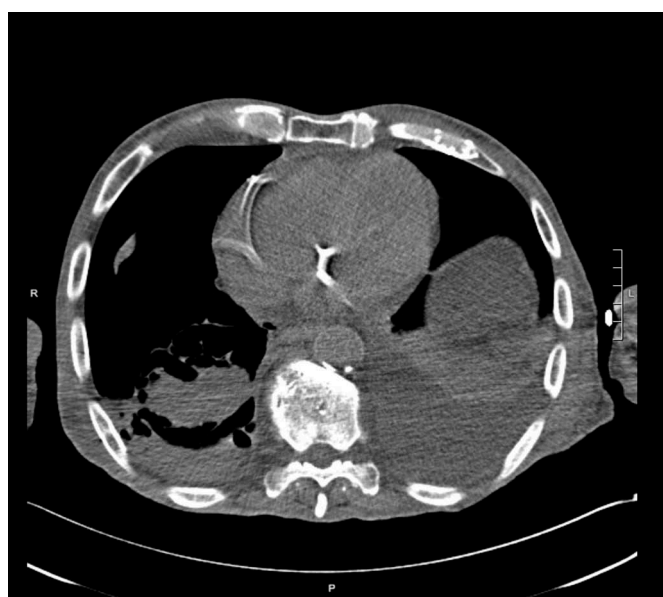


Figure 2. CT scan.

for IE include male sex, advanced age >60, injection drug use, and poor dentition. Patients with cardiac conditions such as structural, valvular, or congenital heart disease have been shown to have increased risk of developing IE.

In a prospective study of 2781 patients, Staph aureus was the most prevalent in non-IV drug abuser native valve endocarditis seen in 28%, followed by Streptococcus Viridians seen in 21%. Staphylococci account for health care associated IE, and streptococcus species are seen in community-acquired IE. The most common valves noted to be infected are the Mitral and Aortic in 41.1% and 37.6% of cases, respectively [3].

*E. coli* is a very rare cause of IE as the organism does not readily adhere to heart valves as do the more common organisms seen in IE. In a study of 179 cases of hospital onset gram-negative bacilli bacteremia, *E. coli* accounted for 18% of these patients [4], however between 1900 and 2018, there have been less than 50 cases report of *E. coli* endocarditis. *E. coli* accounts for .5% of all IE cases, however the mortality of *E. coli* IE is over 20% as opposed to other gram-negative bacteria which have a mortality of 4% [5]. Advanced age, female gender, diabetes and presence of prosthetic heart valves, none of which were seen in our patient, have all been noted to be independent

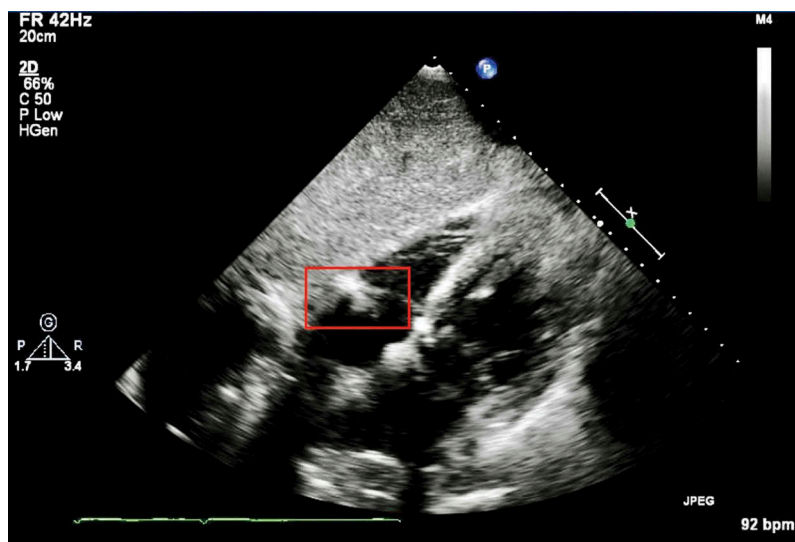


Figure 3. Echocardiogram.

risk factors for patients with *E. coli* IE. Interestingly, there is mounting evidence around the development of *E. coli* IE in patients with alcoholic liver cirrhosis [6]. Urinary tract infection is the most common precipitating event in patients whom develop IE due to *E. coli*.

A recent review showed the most common complications of *E. coli* IE to be peripheral embolization (24%), congestive heart failure (22%), left ventricular aneurysm (6%), and new atrioventricular block (6%) [7]. While these findings can be seen in the majority of cases of IE, regardless of organism, the rates at which complications occur demonstrate the severity of IE due to *E. coli*.

Management of patients with *E. coli* IE has been somewhat controversial through the years. For patients with non-HACEK gram-negative endocarditis, the American Heart Association recommends 6 weeks of combined therapy with a Beta-Lactam and Aminoglycoside or Fluoroquinolone [8]. Prior literature suggests that early emergent valve replacement should be discussed for patients with IE due to *E. coli* as this may reduce rate of mortality [9]. Patients with valvular regurgitation, heart failure, embolization, myocardial abscess, or persistent bacteremia [5] were thought to need surgical intervention. However, more recently, antibiotic agents alone have been used to treat *E. coli* IE [10].

#### 4. Conclusion

Although a rare cause for IE, due to the high incidence of *E. coli* bacteremia, IE should be considered as a complication in these patients. Due to the increased risk of mortality associated with IE patients with *E. coli* bacteremia early intervention is needed. Although there is still some debate regarding the

utility of early surgical intervention, prompt initiation of antibiotics therapy is necessary. More extensive research may be indicated to evaluate the exact efficacy of surgical intervention.

#### Disclosure statement

No potential conflict of interest was reported by the authors.

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