

A Rare Case of Cardiac Device Related Infective Endocarditis Caused by *Streptococcus Infantarius* Subspecies *Coli* (*S. Bovis* Biotype II/1)

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ABSTRACT/INTRODUCTION

Streptococcus bovis (formerly group D streptococci) is a catalase-negative, gram-positive cocci in pairs or chains that are resident of the gastrointestinal microbiota of humans. These opportunistic pathogens are associated with various human diseases, including infective endocarditis and colonic neoplasm.

We present the case of a 73-year-old male with significant cardiac history who presented after a syncopal episode following Implantable cardioverter defibrillator (ICD) multiple firing with blood cultures positive for *Streptococcus infantarius* subspecies *coli* (*S. bovis* biotype II/1) formerly known as *Streptococcus lutisens*. Transesophageal echocardiography showed echodensity attached to the ICD lead that was suspicious for vegetation. CT abdomen and pelvis findings suggested splenic infarction, indicating embolization secondary to Infective endocarditis.

Although previous studies have indicated that the *S.bovis* subspecies have varying propensities to cause IE, with *S.galloyticus* accounting for the majority of IE cases, there is still insufficient data about the incidence of IE with other subspecies of *S.bovis*. We will discuss the incidence of IE with *S.infantarius* subspecies *coli* of *S.bovis* and the importance of considering echocardiography in bacteremia with *S.infantarius*.

Keywords: *Streptococcus bovis*; *Streptococcus infantarius*; Infective endocarditis; Bacteremia; Implantable cardioverter defibrillator

CASE PRESENTATION

A 73-year-old male with a past medical history of Paroxysmal Atrial Fibrillation on Eliquis and amiodarone; Dual chamber pacemaker placement post-cardiac arrest, upgraded to ICD after Ventricular Fibrillation in 2010; Severe aortic stenosis status post open bioprosthetic aortic valve replacement surgery in 2017, hypertension,

diabetic mellitus type 2, benign prostatic hyperplasia, and hyperlipidemia presented to the ED from home via EMS due to syncopal episode that occurred early that morning after he was awakened from sleep by his internal defibrillator firing. The patient reported that he remembers sitting on the bedside commode after waking from sleep and then waking up on the floor. The patient denied nausea, vomiting, abdominal pain, diarrhea, or any other accompanying symptoms. At the time of admission, on physical examination, the following significant findings were noticed: temperature 101.7F, heart rate 78 beats per minute, blood pressure 110/70, respiratory rate 18, Oxygen saturation 97% on room air, systolic murmur best heard in the aortic area and left sternal border. On abdominal exam, normal abdominal sounds were appreciated, and there were no signs of peritoneal irritation.

The initial blood tests upon admission indicated the following results: Hemoglobin level of 8.6, white blood cell count of 9.2 with 89% neutrophils, and platelet count of 204. Additionally, the N-terminal pro-B-type natriuretic peptide was 10286, and the CEA of 4.5. Blood culture grew G + cocci × 2 bottles in less than 24 hours therefore, infectious disease was consulted. Treatment with IV vancomycin and ceftriaxone was empirically initiated in ED, after which the patient became afebrile.

Hemocultures were positive for *Streptococcus infantarius*. CT abdomen and pelvis and colonoscopy were ordered considering the association of streptococcus infantarius with malignant GI diseases. Subsequently, vancomycin was discontinued, and only ceftriaxone was continued, considering the sensitivity of the streptococcus species to ceftriaxone. Further investigation with transthoracic echography was done, which revealed moderately reduced left ventricular systolic function with an estimated EF of 40%. A transesophageal echocardiography was also performed to complete the investigations, which showed possible echodensity attached to the ICD lead that was suspicious for vegetation. (Figure 1)

CT abdomen and pelvis revealed a linear perfusion defect in the spleen with mild splenic enlargement and mild fluid surrounding the spleen, indicating splenomegaly with an associated splenic infarct (Figure 2). This finding explained the down-trending hemoglobin since admission, requiring blood transfusion. There was no evidence of pneumoperitoneum, and no additional findings were observed. The patient was clinically stable during the hospital stay. Per recommendations of the cardiothoracic surgeon and cardiology team, a transfer to the tertiary center was planned for further surgical intervention.

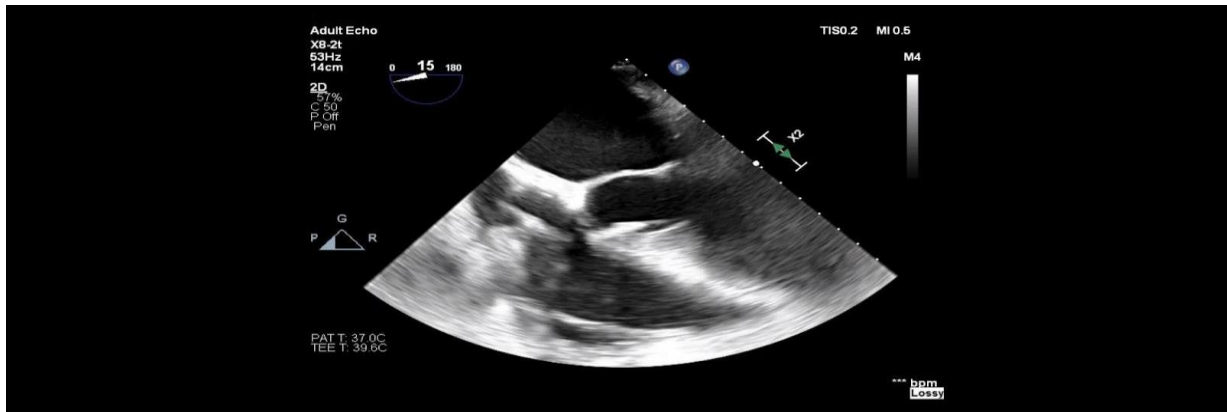


Figure 1: Transthoracic Echocardiography showing echodensity attached to the ICD.



Figure 2: CT abdomen showing splenomegaly with splenic infarct.

DISCUSSION

Streptococcus bovis / *streptococcus equinus* complex (formerly group D streptococci) are catalase- negative, gram-positive cocci in pairs or chains that usually express the Lancefield group D antigen. *Streptococcus bovis* complex has been delineated into distinct species based on the differences in their biochemical characteristics, which include *Streptococcus infantarius* and *Streptococcus gallolyticus*. Members of the *S.bovis* complex are described as commensals of the gastrointestinal tract of humans and other animals (Sykes & Tasker, 2014), (Herrera et al., 2009). Most cases of *S.bovis* are reported in elderly males and are associated with infective endocarditis and colonic malignancies. Approximately 5% of bloodstream isolates in hospitalized patients are due to *S.bovis* bacteremia (Sasi et al., 2022). A notable feature of *S. infantarius* (*S. bovis* biotype II) is its strong association with colorectal malignancies. It was shown that 25-80% of patients who presented with *S.bovis* bacteremia also had a colorectal tumor (Biarc et al., 2004). Patients with *S. gallolyticus* bacteremia are frequently screened for colorectal neoplasms due to the recognized link between these bacterial infections and underlying gastrointestinal pathology. It is imperative to investigate the gastrointestinal tract thoroughly in cases of *S. infantarius* infection, as early detection of colorectal lesions can significantly impact patient outcomes.

S.bovis group organisms are also important causes of bacteremia and endocarditis in humans accounting for 11% to 17% of all endocarditis cases. Literature has supported their effect on multiple valves and their association with embolic complications (Sykes & Tasker, 2014). Based on a previous study that evaluated the pathogenesis of *S. infantarius* subspecies coli causing endocarditis significant adherence to endothelial-derived cells was observed for 62% of isolates, 24% adhered to epithelial cell line in vitro (Counihan et al., 2015)

The presented case highlights a unique clinical scenario involving a patient with a significant cardiac history who presented after a syncopal episode following ICD firing with blood cultures positive for *Streptococcus infantarius* subspecies coli (*S. bovis* biotype II/1). The identification of *Streptococcus infantarius* in this patient prompts a comprehensive discussion on the clinical significance of this subspecies within the *Streptococcus bovis* group. It has been previously associated with infective endocarditis and bacteremia, often secondary to underlying gastrointestinal pathology. In this case, the patient's lack of gastrointestinal symptoms and the presence of bacteremia coupled with ICD firing prompted a cardiac workup in which TEE revealed vegetation attached to the ICD lead.

The diagnosis of infective endocarditis was established by two major Duke criteria, namely two positive hemocultures with *S. infantarius* subspecies and echo density attached to the ICD lead on transesophageal echocardiography. The optimal management of *S. infantarius* infections involves a combination of targeted antibiotic therapy and addressing the underlying colorectal pathology.

Antibiotic susceptibility patterns should guide treatment decisions, closely monitoring potential complications such as infective endocarditis.

Diagnosing *S. infantarius* infection often poses challenges. Microbiological cultures, molecular techniques, and advanced diagnostic imaging may be necessary for accurate identification and localization of infection. In this case, the patient's clinical presentation, along with the isolation of *S. infantarius*, underscores the importance of a multidisciplinary approach involving gastroenterologists, infectious disease specialists, and microbiologists in managing such cases. Infections related to cardiovascular implantable electronic devices (CIEDs) are a growing concern. The implantation of foreign material provides a substrate for microbial colonization, and infections can manifest as local pocket infections, lead-associated infections, or systemic bloodstream infections. Understanding the clinical implications of *S. infantarius* infections has broader public health implications. Recognition of the association between this subspecies and Infective endocarditis emphasizes the importance of echocardiography in patients with *S. infantarius* bacteremia. Early diagnosis and management are crucial to prevent complications such as infective endocarditis and device-related endocarditis.

CONCLUSION

The presented case of *Streptococcus infantarius* infection underscores the need for a comprehensive approach to managing patients with this subspecies. Further research is warranted to elucidate the precise mechanisms linking *S. infantarius* to colorectal pathology. In addition, this case report highlights the challenges associated with diagnosing and managing *Streptococcus infantarius* bloodstream infection in the context of CIEDs. Timely extraction of infected hardware, targeted antimicrobial therapy, and multidisciplinary collaboration is crucial for optimal outcomes in such cases. As the use of cardiovascular implantable devices continues to rise, awareness

of uncommon pathogens and tailored management strategies are essential for clinicians managing these infections.

Disclosures: None

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