CASE REPORT

Enterococcus casseliflavus septicaemia associated with hepatobiliary infection in a 75-year-old manRajanshu Verma,^{1,2} Allison L Baroco

¹Department of Hospital Medicine, Augusta Health, Fishersville, Virginia, USA
²Hospital Medicine, United Hospital, Allina Health, St Paul, Minnesota, USA

Correspondence to
 Dr Rajanshu Verma,
 rajanshu@gmail.com

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SUMMARY

Enterococcus casseliflavus is a rare non-faecium, non-faecalis, vancomycin-resistant enterococcus (VRE) that is responsible for up to 2% of all enterococcal infections. Septicaemia with this bacterium is usually seen in older patients with multiple comorbidities who have had several previous hospitalisations. Septicaemia with *E. casseliflavus* portends a poorer prognosis, and treatment usually involves administration of antienterococcal beta-lactams or anti-VRE medications such as linezolid or daptomycin. We present such a case of a 75-year-old man who developed *E. casseliflavus* septicaemia of presumably hepatobiliary origin and responded well to treatment with intravenous beta-lactams.

BACKGROUND

Enterococcus casseliflavus is a rare non-faecium, non-faecalis, vancomycin-resistant enterococcus (VRE) that colonises human intestines and hepatobiliary tracts. It is a rare cause of clinically significant infections in immunocompromised patients with previous exposure to antibiotics. Our case describes a non-immunocompromised man where septicaemia with *E. casseliflavus* of likely hepatobiliary origin was treated successfully with intravenous ampicillin. This case helps augment awareness in readers regarding bloodstream infection from this rare pathogen.

CASE PRESENTATION

A 75-year-old Caucasian man with multiple medical comorbidities presented to the emergency room with complaints of high fever (recorded up to 103°F at home), diaphoresis and altered mental status. He did not have any cough, shortness of breath, nausea, vomiting or abdominal pain; however, he had complaints of diarrhoea. A month prior to this presentation, the patient was diagnosed with *Escherichia coli* septicaemia in the setting of cholangitis and biliary sepsis, which required stenting of the common bile duct.

His history was significant for hypertension, gout, seizure disorder, *Clostridium difficile* colitis, cognitive impairment, haemorrhagic stroke resulting in right-sided hemiparesis, aphasia, dysphagia and recurrent aspiration pneumonias. He was a non-alcoholic, non-smoker and denied any illicit drug use.

On examination, he was found to have a temperature of 38°C (100.4°F), pulse of 101 beats/min, respiratory rate of 24/min and blood pressure of 142/81 mm Hg. Diminished breath sounds were

appreciated at both lung bases, and right-sided hemiparesis was noticed consistent with his history of stroke. The rest of the examination was unremarkable.

INVESTIGATIONS

Serum chemistries showed elevated white blood cell count of 12 800/mm³ (normal: 4000–11 000 mm³), aspartate aminotransferase of 101 IU/L (normal <50 IU/L), alanine aminotransferase of 99 IU/L (normal <60 IU/L), alkaline phosphatase of 420 IU/L (normal <150 IU/L) and total bilirubin of 0.9 mg/dL (normal <1.3 mg/dL). Prothrombin time/international normalised ratio (PT/INR) (1.1) and albumin (3.4 g/dL) were within normal range. Chest radiography done in the emergency room was normal. He was thought to have sepsis again from a biliary source, and so empiric broad spectrum antibiotics (vancomycin and piperacillin-tazobactam) were started and he was admitted to the hospital. CT scan of the abdomen/pelvis showed mild intrahepatic ductal dilatation, which had improved from a month ago, and common bile duct stent was seen. No other abnormality was detected on CT scan.

TREATMENT

Blood cultures collected in the emergency room turned positive the next day when all four blood culture bottles (both aerobic and anaerobic) showed growth of Gram-positive enterococcus in BacT/

Figure 1 Aerobic blood agar plate showing growth of greyish colonies of *Enterococcus casseliflavus*.

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Figure 2 Aerobic chocolate agar plate showing growth of greyish colonies of *Enterococcus casseliflavus*.

ALERT system (BioMérieux, Marcy l'Etoile, France). Positive blood culture aliquots were inoculated on blood, chocolate and MacConkey agars. Gram-positive grey-coloured colonies were seen on blood and chocolate agars but not on MacConkey agar (figures 1–9). The bacterium was further speciated as *E. casseliflavus* using VITEK 2 automated biochemical bacterial identification system (BioMérieux). The isolate was sensitive to ampicillin (minimum inhibitory concentration (MIC) <2), doxycycline (MIC <0.5), gentamicin, streptomycin synergy, intermediate to erythromycin (MIC 2) and resistant to vancomycin (MIC 4). Once susceptibilities were known, vancomycin and

Figure 3 Aerobic MacConkey agar plate showing no growth.

Figure 4 Anaerobic blood agar plate showing growth of greyish colonies of *Enterococcus casseliflavus*.

piperacillin-tazobactam were discontinued and he was switched to intravenous ampicillin. Our patient did not have any intravascular devices, for example, a central venous catheter, so catheter-associated septicaemia was ruled out. The patient underwent transoesophageal echocardiogram, which did not show any evidence of valvular vegetations. Given the presence of diarrhoea, his stool was tested for *C. difficile* stool toxin, which came back positive with North American pulsed-field gel electrophoresis type 1 epidemic strain. The patient was then started on oral vancomycin as well. Infectious disease services were consulted and he was treated with a 2-week course of intravenous ampicillin (2 g every 4 hours) for *E. casseliflavus* septicaemia and a 3-week course of oral vancomycin for *C. difficile* at a skilled nursing facility. Common bile duct stent was removed by

Figure 5 Anaerobic chocolate agar plate showing growth of greyish colonies of *Enterococcus casseliflavus*.

Figure 6 Anaerobic MacConkey agar plate showing no growth.

a gastroenterologist 10 days later as an outpatient after completion of antibiotic therapy.

OUTCOME AND FOLLOW-UP

The patient was seen a month later by his primary care physician as an outpatient when he had returned to his usual state of health.

DISCUSSION

E. casseliflavus is a non-faecium, non-faecalis VRE. It was earlier classified under yellow-pigmented group D Streptococci subgroup II until Collins *et al*¹ proposed a new nomenclature in 1984. *E. casseliflavus* is ubiquitous in nature; it is part of normal

Figure 7 Blood smear showing *Enterococcus casseliflavus* in diplococcus, short-chain forms (100× magnification).

Figure 8 Blood smear showing *Enterococcus casseliflavus* in short chains and cluster forms (100× magnification).

Figure 9 Gram stain showing the presence of Gram-positive *Enterococcus casseliflavus* on a slide (100× magnification).

Learning points

- ▶ *Enterococcus casseliflavus* is a rare vancomycin-resistant enterococcus (VRE) that can cause septicaemia and other clinically significant infections.
- ▶ Transthoracic or transoesophageal echocardiography is a required investigation in the work-up of enterococcal septicaemia owing to the risk of development of infective endocarditis.
- ▶ Antienterococcal beta-lactams and anti-VRE drugs (eg, linezolid, daptomycin) are usually used to treat *E. casseliflavus* infections. However, antibiotic choice should be made based on local susceptibility results given variable resistance patterns.

human intestinal flora and has been found in fruits and vegetables as well.² Some strains are motile, whereas others are non-motile. It is responsible for causing only 1%–2% of all enterococcal infections.³ Colonisation by *E. casseliflavus* has been reported in intensive care units in patients with nephropathy who have previously been exposed to carbapenems.⁴ Increased length of hospital stay, advanced age, underlying malignancy, central venous catheters, dialysis dependence and use of antibiotics against anaerobes were all identified as risk factors for colonisation with *E. casseliflavus*.^{5,6}

Biochemically it is catalase-negative and is facultatively anaerobic. *E. casseliflavus* colonies are known to produce a yellow pigment on trypticase soy agar plates; however, strains without pigment production are known as well. VanC-2/3 ligase gene is intrinsically found in *E. casseliflavus*, which provides it with a low level of resistance to vancomycin.⁷

E. casseliflavus has been implicated in causing endophthalmitis,⁸ spontaneous bacterial peritonitis,⁹ meningitis,¹⁰ endocarditis,¹¹ pericarditis,¹² cholangiolitis¹³ and empyema,¹⁴ in addition to causing septicaemia. Bacteraemia from *E. casseliflavus* is usually seen in immunocompromised patients, patients with cancer, patients with hepatobiliary and pancreatic diseases, and those with previous exposure to antibiotics.¹⁵

Treatment of *E. casseliflavus* should be based on local susceptibility results, although generally beta-lactams such as ampicillin/amoxicillin with gentamicin/streptomycin synergy, penicillin G, ceftriaxone, imipenem/cilastatin or drugs targeted at VRE such as linezolid, quinupristin/dalfopristin, tigecycline, telavancin, fosfomycin or daptomycin are effective in its treatment. *E. casseliflavus* has been reported to be resistant to fluoroquinolones,¹⁶ teicoplanin,¹⁷ gentamicin¹⁸ and metronidazole.¹⁹ In a British study, *E. casseliflavus* was found to be resistant to quinupristin/dalfopristin as well.²⁰

Although mortality risk increases with enterococcal septicaemia, our patient was fortunate to recover fully following antibiotic treatment. Our case adds to the rare though growing literature of vancomycin-resistant *E. casseliflavus*-associated septicaemia and outcomes resulting from such an infection.

Contributors Both RV and ALB took care of the patient. Both RV and ALB contributed to the manuscript, edited and approved the final draft.

Competing interests None declared.

Patient consent Obtained.

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