Hawai‘i’s First Published Case of *Eggerthella lenta* Sepsis

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Abstract

Human bacteremia with Eggerthella lenta *is rare. Upon review of the literature, the largest case series includes only about 100 cases, and optimal management of the condition is still unclear. This case report describes a patient diagnosed with* E. lenta *septicemia due to acute diverticulitis in 2019. This is the first published report of sepsis caused by* E. lenta *in the state of Hawai‘i.*

Abbreviations and Acronyms

GI = gastrointestinal
PCP = primary care physician
MRSA = methicillin-resistant Staphylococcus aureus

Introduction

Eggerthella lenta is a gram-positive, non-motile, non-spore-forming, obligate anaerobic bacillus that was first isolated from human feces by Arnold H. Eggerth in 1935.[1] Its optimal growth temperature is 37˚C with arginine stimulating its growth.[2] Originally termed *Eubacterium lentum*, it was reclassified into its own genus and renamed *Eggerthella lenta* based on 16S rRNA genetic sequencing performed by Kageyama and colleagues in 1999.[3] Belonging to the *Actinobacteria* genus and *Coriobacteriaceae* family, it is a normal resident of the human gastrointestinal tract microbiome.[4] *E. lenta*’s complete genomic sequence was published in 2009 and is closely related to the more recently described *Paraeggerthella hongkongensis* and *Eggerthella sinensis*.[5] Review of the literature revealed no previous published examples of *E. lenta* sepsis in the state of Hawai‘i and relatively few published case reports (the largest case series consisting of 107 cases). Most but not all of these cases occurred in patients with underlying gastrointestinal disease (eg, Crohn’s disease),[6] systemic immunosuppression, and malignancy.[4,7] *E. lenta* has also been implicated in periurethral abscess,[8] endometritis,[9] intrauterine device-related pelvic abscess,[10] post-appendectomy intra-abdominal abscesses,[11] brain and liver abscesses, necrotizing pneumonia, and osteomyelitis of the radial bone.[12,13] Bacteremia with *E. lenta,* when present, is always significant given its high associated mortality (22%–43%).[14,15]

Case Report

The patient is a 94-year-old Japanese male with a complex past medical history and recent admission for methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia who was in the usual state of poor health until the morning of admission. His other medical issues include diverticulitis, diabetes mellitus type II, essential hypertension, stage 3 chronic kidney disease, hyperlipidemia, benign prostatic hyperplasia, chronic gout, and bilateral hearing loss. He was brought to his primary care physician (PCP) by his son and certified nurse assistant due to rigors, cough productive of scant clear sputum, rhinorrhea, and 3 episodes of non-bilious, non-bloody emesis. In his PCP’s office, he had a temperature of 102˚F, heart rate of 103 beats per minute, respiratory rate of 22 breaths per minute, and right abdominal tenderness without rebound or guarding on exam. His PCP recommended further workup in the emergency department, which included a complete blood count significant for 14 500 white blood count cells/μL (normal range: 4000–11 000 cells/μL). Abdominal computed tomography without contrast revealed numerous colonic diverticula with pericecal inflammatory change. The patient was admitted for sepsis secondary to presumed acute diverticulitis. Blood and urine cultures were sent, and he was empirically started on an intravenous antibiotic regimen of vancomycin, ceftriaxone, and metronidazole.

Urine culture and sensitivity returned with MRSA. One of the 2 blood cultures was positive for *Eggerthella lenta*. His antibiotic regimen was changed on hospital day 3 from ceftriaxone and metronidazole to ertapenem for coverage of *E. lenta*. The patient subsequently developed hyperactive delirium and had a witnessed tonic-clonic seizure of approximately 1-minute duration. These events were presumed to be adverse reactions to the initiation of ertapenem; thus, ertapenem was discontinued after administration of a single dose. Vancomycin was continued to treat his MRSA-caused urinary tract infection, and the ceftriaxone/metronidazole combination was restarted to target *E. lenta* bacteremia and to maintain broad coverage given the patient’s age and hemodynamic instability. Vancomycin was discontinued after repeat urinalysis confirmed resolution of urinary tract infection on hospital day 7. Repeat blood cultures 3 and 9 days after admission confirmed eradication of *E. lenta* bacteremia. Given resolution of bacteremia and sustained hemodynamic stability, ceftriaxone and metronidazole were discontinued after a total of 12 days. The patient recovered to his pre-hospitalization baseline health status and was discharged home under the guidance of his certified nurse assistant and son. He is still alive at the time of composition and has continued to follow up regularly with his primary care physician, resuming his pre-hospitalization biannual examinations without subsequent reinfection or evidence of secondary complications, such as end-organ damage.

Discussion

Eggerthella lenta is a rare but serious cause of community-acquired bacteremia. The high associated mortality makes early identification and appropriate treatment essential. This patient's case highlights the importance of considering *E. lenta* in septic patients with known comorbid gastrointestinal pathology. On admission, this patient met the criteria for sepsis, met 4 out of 4 systemic inflammatory response syndrome criteria, had a presumed infectious etiology of acute diverticulitis, and had a quick Sequential Organ Failure Assessment Score of 1 out of 3. The diverticular source put this patient at risk for bacteremia with gastrointestinal (GI) flora, including *E. lenta.*

In the past, the most significant obstacle to diagnosis was the difficulty of isolating *E. lenta* from collected samples. *E. lenta* is fastidious and difficult to culture, which has likely led to its underreporting and underestimation of its prevalence. In the case of our patient, *E. lenta* was isolated from a set of routine blood cultures. The increasing laboratory application of 16S ribosomal RNA sequencing techniques has facilitated a more accurate and rapid identification.[14] With these new techniques, the most significant obstacle to diagnosis today is a failure to consider *E. lenta* bacteremia as a potential etiology. Although *E. lenta* may sometimes be isolated by routine blood cultures alone, RNA sequencing techniques are much more sensitive. As such, practitioners should maintain a high index of suspicion for *E. lenta* in patients with a presumed GI source of infection. In patients with a moderate or high probability for *E. lenta* bacteremia, such as a patient with sepsis secondary to a presumed GI source, we recommend that practitioners include *E. lenta* RNA sequencing, in addition to routine blood cultures, due to its associated high mortality rate.

Another challenge in the management of patients with *E. lenta* bacteremia is determining appropriate antibiotic therapy. The use of antimicrobial susceptibility testing for anaerobic bacteria, such as *E. lenta*, is restricted to specialized reference laboratories. Thus, in clinical practice, antibiotic selection is made empirically. Additionally, bacteremia secondary to gastrointestinal disease is frequently polymicrobial, necessitating an antibiotic regimen with broad antimicrobial coverage.

In 2001, Stinear, et al, identified the *vanB* locus via rapid-PCR sequencing of the *E. lenta* genome, demonstrating that the bacteria is capable of developing vancomycin resistance, through a mechanism similar to vancomycin-resistant enterococci.[16] There are limited published data on antimicrobial sensitivity of community-acquired *E. lenta* to guide clinical management. One notable study performed by Gardiner, et al, (2014), investigated 23 cases of *E. lenta* isolate-confirmed bacteremia and determined the following antimicrobial susceptibility testing profile: all were susceptible to amoxicillin-clavulanate, cefoxitin, metronidazole, piperacillin-tazobactam, ertapenem, and meropenem. Also, 91% were susceptible to clindamycin, 74% were susceptible to moxifloxacin, and 39% were susceptible to penicillin.[17] All of the isolates were resistant to ceftriaxone.[17] None of them were resistant to vancomycin, as evidenced by the presence of *van* genes A or B.[17] A retrospective cohort study in 2018 demonstrated increased mortality in patients with *E. lenta* bacteremia treated empirically with piperacillin-tazobactam monotherapy.[14] This finding is consistent with those from a previous study in Sweden.[18] Thus, we recommend that amoxicillin-clavulanate, cefoxitin, metronidazole, or the carbapenems be used as first-line therapy for *E. lenta bacteremia*, and monotherapy with piperacillin-tazobactam or ceftriaxone be avoided.

Conclusions

Eggerthella lenta is a rare but significant cause of community-acquired bacteremia that is frequently associated with underlying gastrointestinal disease. A high index of suspicion should be maintained for *E. lenta,* and specialized testing with RNA sequencing should be performed in high-risk patients. Isolation of *E. lenta* in blood cultures should be assumed significant and prompt a workup for gastrointestinal disease if no preexisting source pathology is known. Amoxicillin-clavulanate, cefoxitin, metronidazole, and the carbapenems appear to be reliable empiric antimicrobial options; ceftriaxone, however, is associated with high rates of resistance and should be avoided as monotherapy. Piperacillin-tazobactam should also be avoided as empiric monotherapy.

Conflict of Interest

None of the authors identify any conflict of interest.

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