

Bacteremia Caused by the *Eggerthella lenta* in a Previously Healthy 30-Year-Old Man with Acute Suppurative Appendicitis: A Case Report from China

This article was published in the following Dove Press journal:
Infection and Drug Resistance

Jie Jiang^{1,2,*}
Bo She^{3,4,*}
Rui Zheng^{1,2}

¹Department of Clinical Laboratory, The First People's Hospital of Yunnan Province, Kunming, Yunnan, People's Republic of China; ²Department of Clinical Laboratory, The Affiliated Hospital of Kunming University of Science and Technology, Kunming, Yunnan, People's Republic of China; ³PET/CT Center, The First People's Hospital of Yunnan Province, Kunming, Yunnan, People's Republic of China; ⁴PET/CT Center, The Affiliated Hospital of Kunming University of Science and Technology, Kunming, Yunnan, People's Republic of China

*These authors contributed equally to this work

Abstract: *Eggerthella lenta* is part of the normal bacterial flora of the intestinal tract, but may cause life-threatening infections. *E. lenta* has been isolated from blood, abscesses, wounds, skin ulcers, and intra-abdominal infections. However, due to historical difficulties with laboratory identification by conventional biochemical methods, some cases of *E. lenta* infection have previously gone undiagnosed, especially in China where *E. lenta* infections are very rare. Recently, matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS), a new type of technology, has made it possible to identify *E. lenta*. We report a case of postoperative infection caused by *E. lenta* which was treated successfully using meropenem.

Keywords: *Eggerthella lenta*, MALDI-TOF, intra-abdominal abscess, bloodstream infection, anaerobic bacteria

Introduction

Eggerthella lenta was first identified in 1935 by Arnold Eggerth.¹ It is sometimes vancomycin resistant and may represent the origin of vancomycin resistance.² This genus of gram-positive, anaerobic bacilli belongs to the *Eggerthellaceae* family, which includes several genera of bacteria commonly found in the healthy human digestive tract.³ As a gut microbiota, *E. lenta* plays a key role in pharmacology. For example, it harbors a cytochrome-encoding operon which responsible for digoxin inactivation.⁴

Various infections caused by *E. lenta* have been reported including pelvic abscess and bloodstream infection.⁵ *E. lenta* bloodstream infections are increasingly recognized, often caused by intra-abdominal infections, and associated with high mortality.⁶ Previous study shows that *E. lenta* was susceptible to amoxicillin-clavulanate, cefoxitin, metronidazole, piperacillin-tazobactam, ertapenem, meropenem and partly susceptible to clindamycin, moxifloxacin, and penicillin.^{6,7} There is another report showed that chloramphenicol and vancomycin were the most reliable antibiotic treatment options for *E. lenta*.⁵

Anaerobic bacteria are difficult to culture and identify in clinical laboratories, so are often not recovered from infected sites. Recently, *E. lenta* has become recognized as an important cause of anaerobic bloodstream infections, which are associated with

Correspondence: Rui Zheng
Tel +86-0871-63638430
Email ynkzmzheng@gmail.com

high mortality.⁶ Here, we report a case of bacteremia and acute suppurative appendicitis in a previously healthy 30-year-old man, which was caused by *E. lenta*. *E. lenta* was identified using matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS), an increasingly used new technology that has improved the detection of *E. lenta* in clinical laboratories.

Case Report

A 30-year-old man was transferred to our hospital from a local hospital in Wuding County in Yunnan Province, China, where he had initially presented with fever and had been diagnosed with acute purulent appendicitis. An appendectomy had been performed 7 days previously. On admission, he was febrile and had rigors. He had a temperature of 39.5°C, a heart rate of 99 beats/min, and a blood pressure of 108/78 mmHg. The rest of his physical examination was normal. On Days 2–4 after admission, his temperature ranged from 36.0°C to 40.0°C.

Laboratory investigations revealed an elevated white blood cell count of 17.70×10^9 cells/L (neutrophils: 86.4%) and an elevated procalcitonin (PCT) level of 25.91 ng/mL. Multiple blood samples were taken before antibiotics were

initiated, and were processed for aerobic and anaerobic culture. A contrast-enhanced computerized tomography scan of his abdomen, performed on admission, revealed an ileocecal abscess (Figure 1), the size of abscess was 2.3 cmX2.9 cm. Two sets of blood cultures were incubated in the BacT/Alert 3D 240 blood culture system (bioMérieux, Marcy l'Étoile, France) for generally up to 5 days. Before the results of his blood culture were obtained, he was treated empirically with intravenous moxifloxacin on account of his recent appendectomy.

On Day 3, gram-positive bacilli were identified in two sets of anaerobic blood cultures. These were inoculated onto Columbia blood agar base medium (Autobio, China) and incubated in 35°C 5% CO₂ and 35°C anaerobic conditions, respectively. On Day 4, an isolate was identified as *E. lenta* using MALDI-TOF MS (bioMérieux, Marcy l'Étoile, France), *E. coli* ATCC 8739TM and *K. aerogenes* ATCC13048 used as Calibration Strain and Quality control Strain. Once the result became available, his treatment was changed to intravenous meropenem at a dose of 1 g every 8 h. Although percutaneous or surgical drainage is an option for treating intra-abdominal abscesses,⁸ our patient responded promptly to meropenem



Figure 1 Abdominal contrast enhancement CT scan shows an abscess lesion of ileocecus (white arrow).

therapy, and his fever, PCT level, and leukocytosis resolved without surgical intervention. No microorganisms were identified in the follow-up blood cultures from Day 5. On Day 10, abdominal color Doppler ultrasonography was normal. After a further 6-day course of intravenous meropenem, he recovered and was discharged from hospital.

Discussion

Because of the fastidious nature of *E. lenta*, and historical difficulties with laboratory identification by conventional biochemical methods, some cases of *E. lenta* infection have previously gone undiagnosed, especially in China where cases of *E. lenta* infection are very rare. Recently, a new technology, matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS), has made it possible to accurately identify pathogens that are difficult to identify in clinical laboratories, including *E. lenta*.⁷ In this case, MALDI-TOF was a practical way to identify *E. lenta* at the species level.

The risk factors for infection caused by *E. lenta* include impaired immune function, recent chemotherapy, a gastrointestinal malignancy, diabetes mellitus, and chronic kidney disease, absence of fever at presentation and need for ICU stay are risk factors for 30-day mortality.^{7,9,10} Bacteremia due to this organism is always clinically significant, given its high mortality rate, and warrants a prompt search for a source. *E. lenta* can cause bacteremia due to abdominal or soft tissue sources. Patients are frequently bedridden and empiric piperacillin-tazobactam monotherapy is associated with a high mortality rate.^{6,10} *E. lenta* infections are associated with gastrointestinal infections, particularly perforated appendicitis.⁶ Our patient was 30 years old and was otherwise healthy, his peri-appendiceal abscess is the most likely source of his bacteremia and appendectomy is a risk factor for bacteremia.

Empiric therapy plays a crucial role in the treatment of anaerobic infections. A previous study showed that *E. lenta* isolates have variable susceptibility to moxifloxacin,⁷ However, after a 3-day course of moxifloxacin, our patient still had a fever, elevated PCT level (13.38 ng/mL), and leukocytosis (10.05×10^9 cells/L). Taking his culture results into account, his treatment was changed to meropenem and he had a good clinical response. There is currently a lack of consensus regarding the best antibiotic therapy for *E. lenta*. The good response to meropenem in our patient may have significance for the

empirical use of meropenem in the treatment of bacteremia caused by *E. lenta*.

Conclusion

This case illustrates that *E. lenta* is an opportunistic pathogen and can cause of hospital-acquired infection such as appendicitis, and be a source of bloodstream infection. In this case, advances in clinical microbiology made it easier to identify *E. lenta*. The number of *E. lenta* infections diagnosed in China is likely to increase as a result of new technology, and greater attention should be paid to this infection.

Abbreviation

MALDI-TOF MS, matrix-assisted laser desorption ionization-time of flight mass spectrometry.

Data Sharing Statement

The datasets used and/or analyzed in this study are available from the corresponding author on reasonable request.

Ethics Statement

The clinical isolates in this study were specifically isolated for this research. Ethical approval was obtained from the Institutional Ethics Committee (The First People's Hospital of Yunnan Province, Kunming, Yunnan, China). Written informed consent was received from each patient before sample collection that the study participants gave consent to publish.

Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Funding

This research was funded by Yunnan Science and Technology Commission from Yunnan provincial Science and Technology Department and Kunming Medical University, grant number 2018FE001(-115) and Health commission of Yunnan province talent program, grant number H-2017027.

Disclosure

Jie Jiang and Bo She are co-first authors for this study. The authors declare no conflict of interest.

References

1. Eggerth AH. The gram-positive non-spore-bearing anaerobic bacilli of human feces. *J Bacteriol.* 1935;30(3):277–299. doi:10.1128/JB.30.3.277-299.1935
2. Stinear TP, Olden DC, Johnson PD, Davies JK, Grayson ML. Enterococcal vanB resistance locus in anaerobic bacteria in human faeces. *Lancet.* 2001;357(9259):855–856. doi:10.1016/S0140-6736(00)04206-9
3. Almeida A, Mitchell A, Boland M, et al. A new genomic blueprint of the human gut microbiota. *Nature.* 2019;568(7753):499–504. doi:10.1038/s41586-019-0965-1
4. Haiser HJ, Seim KL, Balskus EP, Turnbaugh PJ. Mechanistic insight into digoxin inactivation by *Eggerthella lenta* augments our understanding of its pharmacokinetics. *Gut Microbes.* 2014;5(2):233–238. doi:10.4161/gmic.27915
5. Bo J, Wang S, Bi Y, Ma S, Wang M, Du Z. *Eggerthella lenta* bloodstream infections: two cases and review of the literature. *Future Microbiol.* 2020;15(11):981–985. doi:10.2217/fmb-2019-0338
6. Ugarte-Torres A, Gillrie MR, Griener TP, Church DL. *Eggerthella lenta* bloodstream infections are associated with increased mortality following empiric piperacillin-tazobactam (TZP) monotherapy: a population-based cohort study. *Clin Infect Dis.* 2018;67(2):221–228. doi:10.1093/cid/ciy057
7. Gardiner BJ, Tai AY, Kotsanas D, et al. Clinical and microbiological characteristics of *Eggerthella lenta* bacteremia. *J Clin Microbiol.* 2015;53(2):626–635. doi:10.1128/JCM.02926-14
8. Thota VR, Dacha S, Natarajan A, Nerad J. *Eggerthella lenta* bacteremia in a Crohn's disease patient after ileocecal resection. *Future Microbiol.* 2011;6(5):595–597. doi:10.2217/fmb.11.31
9. Wong D, Aoki F, Rubinstein E. Bacteremia caused by *Eggerthella lenta* in an elderly man with a gastrointestinal malignancy: a case report. *Can J Infect Dis Med Microbiol.* 2014;25(5):e85–86. doi:10.1155/2014/802481
10. Venugopal AA, Szpunar S, Johnson LB. Risk and prognostic factors among patients with bacteremia due to *Eggerthella lenta*. *Anaerobe.* 2012;18(4):475–478. doi:10.1016/j.anaerobe.2012.05.005

Infection and Drug Resistance

Dovepress

Publish your work in this journal

Infection and Drug Resistance is an international, peer-reviewed open-access journal that focuses on the optimal treatment of infection (bacterial, fungal and viral) and the development and institution of preventive strategies to minimize the development and spread of resistance. The journal is specifically concerned with the epidemiology of

antibiotic resistance and the mechanisms of resistance development and diffusion in both hospitals and the community. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/infection-and-drug-resistance-journal>