**Eggerthella lenta** bacteremia is uncommon and generally associated with abdominal sepsis. The organism and its clinical significance have not been well characterized due to historical difficulties with identification. We report a case of severe infection in a paraplegic man complicated by psoas abscess, osteomyelitis, and meningitis and discuss treatment challenges.

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**CASE REPORT**

A 70-year-old man with a long-standing history of complete T4 paraplegia secondary to transverse myelitis presented with fevers and night sweats. His past medical history included myocardial infarction and multiple complications from his paraplegia, including recurrent catheter-related urinary tract infections and constipation requiring traumatic manual disimpactions.

A computed tomography (CT) scan of his abdomen performed 1 month prior to presentation revealed abnormalities in the T6 and L1 and L2 (L1/2) vertebral bodies. A subsequent bone scan demonstrated increased osteoblastic activity in these areas, and a magnetic resonance imaging (MRI) scan of the lumbar spine (Fig. 1) revealed abnormal appearances in the L1/2 disc associated with deformity and destruction of the superior cortical end plate of L2, extending into the paravertebral tissues.

On admission, the patient was febrile but hemodynamically stable. Multiple blood cultures were taken, and a percutaneous CT-guided biopsy of the L1/2 disc was performed. Gram stain of the tissue from the biopsy specimen revealed scant polymorphs, with no organisms seen. Gram-positive bacilli were isolated from tissue after 48 h of incubation under anaerobic conditions and from multiple anaerobic blood culture bottles (BactAlert; bioMérieux, Marcy l’Etoile, France) within 48 h. Empirical antimicrobial therapy consisted of intravenous (i.v.) benzylpenicillin (b.i.d.) i.v. was added, CT-guided percutaneous drainage of the subdiaphragmatic and right psoas collections was performed, and again there was no growth after prolonged anaerobic culture. Due to the extent and severity of the infection with bony and likely meningeal involvement, a 3-month course of i.v. meropenem and oral linezolid was completed with good response.

On day 21, headache and neck stiffness developed and a lumbar puncture showed a pleocytosis (polymorphs, 2.4 g administered every 6 h. *Eggerthella lenta* (BioNumber 0000002000001) was identified by the use of a Vitek-2 ANC card (bioMérieux, Marcy l’Etoile, France) and confirmed by 16S rRNA gene sequencing using a MicroSEQ500 bacterial identification kit (Perkin-Elmer/ Applied Biosystems, Foster City, CA), with sequence analysis performed on 500 nucleotides using MicroSEQ 500 software (version 2.2) and BLAST version 2.0 (http://www.ncbi.nlm.nih.gov/BLAST). No other organisms were isolated. On day 8, oral clindamycin (450 mg every 8 h) was added. MICs obtained after 48 h of anaerobic incubation on prereduced horse blood agar (HBA) were as follows: benzylpenicillin, 2.3 g/ml; moxifloxacin, >32 µg/ml; metronidazole, 0.25 µg/ml; meropenem, 0.25 µg/ml; clindamycin, 0.5 µg/ml; piperacillin-tazobactam, 32 µg/ml (Etest, AB BIODISK-bioMérieux).

On day 12, when the susceptibility results became available, his treatment was changed to i.v. meropenem at 1 g every 8 h. A CT abdomen/pelvis scan (Fig. 2) revealed multiple prevertebral and paraspinal muscle abscesses and bilateral psoas collections contiguous with a large subdiaphragmatic collection. Blood cultures collected on day 1, 2, 4, 8, and 14 were positive; from day 17 onward, they remained negative.

On day 21, headache and neck stiffness developed and a lumbar puncture showed a pleocytosis (polymorphs, 770 × 10^6/liter [normal, 0 to 5 × 10^6/liter]; lymphocytes, 22 × 10^6/liter [0 to 5 × 10^6/liter]; red blood cells, 7,750 × 10^6/liter) with hypoglycorrhachia (<0.6 mmol/liter [2.5 to 5.0 mmol/liter]) and an elevated lactate level (4.6 mmol/liter [0 to 3.0 mmol/liter]). Gram stain revealed no organisms, and there was no growth after prolonged anaerobic culture. Linezolid administered at 600 mg twice a day (b.i.d.) i.v. was added, CT-guided percutaneous drainage of the subdiaphragmatic and right psoas collections was performed, and again there was no growth after prolonged anaerobic culture. Due to the extent and severity of the infection with bony and likely meningeal involvement, a 3-month course of i.v. meropenem and oral linezolid was completed with good response.

The patient was readmitted 3 weeks later with an ischiorrectal abscess and sacral osteomyelitis requiring debridement and treatment with a prolonged course of intravenous vancomycin and ciprofloxacin and then developed progressive spinal instability requiring posterior fusion of T11 to L5 (day 166). Specimens taken from the surgical site were culture negative, and there were no clinical signs of active infection at the time of surgery. Recovery over the subsequent months was further complicated by recurrent *Clostridium difficile* infection requiring several courses of oral vancomycin. At his most recent review, 3 years after his original presentation, the patient remained well with no signs of recurrence.

**Discussion.** *Eggerthella lenta* is an anaerobic, nonsporulating, Gram-positive bacillus in the *Coriobacteriaceae* family. *Eggerthella* spp. were first identified in 1935 by Arnold H. Eggerth, who published an early description of the characteristics of Gram-positive non-spor-forming bacilli isolated from human feces (1). The organism had been through a variety of name changes (initially *Bac-
**Eggerthella lenta** and then *Eubacterium lentum* before it was renamed *Eggerthella lenta* in 1999 after genetic analysis placed it in a new genus (2, 3). The complete genomic sequence was first described in 2009 (4, 5).

The spectrum of disease caused by this organism is not well described, with only 9 published case reports and one small case series of 3 patients. Along with other Gram-positive anaerobes such as *Clostridium*, *Propionibacterium*, *Bifidobacterium*, *Eubacterium*, and *Lactobacillus*, *E. lenta* is part of the normal human colonic microbiome (6) and as such has been most commonly associated with intra-abdominal infections (7–10), which are often polymicrobial. The overall mortality appears to be significant, ranging from 36% to 43% (11, 12). Infected decubitus ulcers (13) and more unusual presentations such as frontal sinusitis (14) and pyomyositis (15, 16) are also described. There has been one reported case of spondylodiscitis (17) and another with disseminated infection (18). Antimicrobial treatments differed, however, and generally consisted of an intravenous beta-lactam antibiotic with or without metronidazole. Ten of the 12 patients required surgical intervention, and only 1 patient died. It has also been implicated in the pathogenesis of bacterial vaginosis (19, 20) and linked to appendicitis in children (21).

Identification of anaerobic bacteria has traditionally been laborious, expensive, and time-consuming and as such has been restricted to specialized reference laboratories. As a consequence of this, and given that anaerobes are often part of a polymicrobial infection, these organisms have historically rarely been identified to the taxonomic level of species. However, the advent of modern automated identification systems and gene sequencing is making the identification of these organisms much easier, and they are therefore increasingly recognized.

Susceptibility testing of anaerobes is also difficult, with the gold standard of agar dilution not being widely available and other methodologies being less accurate (22). As a result, there is a paucity of published data with respect to antibiotic sensitivity testing of *Eggerthella lenta*, and it is difficult to draw conclusions from the data that do exist. Lee et al. (11) performed antimicrobial susceptibility testing using an agar dilution method on 8 blood culture isolates of *Eggerthella lenta* and found that all of the isolates were penicillin nonsusceptible, 5 of the 8 isolates were resistant to clindamycin, and 1 was resistant to moxifloxacin. All of the isolates were susceptible to ampicillin-sulbactam, metronidazole, and meropenem. An earlier *in vitro* study (23) described phenotypic characteristics and susceptibility patterns of 29 clinical isolates of *Eubacterium lentum* and identified 2 phenotypically distinct groups, with test results showing that one subpopulation of *E. lentum* was susceptible to ampicillin and cephalosporins but the other was resistant. All of the isolates, however, were susceptible to clindamycin, piperacillin, and imipenem. More recently, 10 isolates of *E. lenta* were tested and all were found to be susceptible to biapenem, meropenem, ampicillin-sulbactam, metronidazole, clindamycin, and cefoxitin but the piperacillin-tazobactam MICs were high (16 to 64 µg/ml) (24). *E. lenta* has been previously found to carry the *vanB* vancomycin resistance gene (25–27). The drug MICs for our isolate are consistent with these reported in the literature.

**Conclusion.** *Eggerthella lenta* is an emerging pathogen that is likely to be increasingly recognized in coming years. It has the propensity to cause disseminated disease, often with large abscesses requiring surgical drainage. The morbidity and mortality associated with this infection appear to be high, especially in patients with underlying medical comorbidities. We have described a case of spondylodiscitis, osteomyelitis, meningitis, and psoas abscess requiring a long course of intravenous antibiotics, percutaneous drainage, and surgical stabilization to achieve eventual cure. We suspect that the initial failure to control the infection was likely related to inadequate empirical therapy and the undrained focus of infection. Our case demonstrates how the difficulties associated with performing antibiotic susceptibility testing and the paucity of clinical and microbiological data available make clinical management of infections due to this organism extremely challenging.
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We declare that we have no conflicts of interest.

REFERENCES