

Case Report*Open Access, Volume 3***An unusual case of empyema with septicemia secondary to eggerthella lenta****A B M Arad Hussain^{1,4}; Hanady Hamdallah²; Aravind Ponnuswamy^{2*}**¹Postgraduate Student, University of Chester, Bache Hall, Chester, CH2 1BR, UK.²Senior Lecturer, Chester Medical School, University of Chester, Bache Hall, Chester, CH2 1BR, UK.³Consultant Physician, GIM and Respiratory Medicine, Countess of Chester Hospital NHS, trust, Countess of Chester Health Park, Liverpool Road CH2 1UL, UK.⁴Clinical Fellow, Alexandra Hospital, Worcestershire Acute Hospital NHS Trust, Redditch, B98 7UB, UK.***Corresponding Author: Aravind Ponnuswamy**

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Abstract

Eggerthella lenta is an anaerobic, non-spore-forming, nonmotile, gram-positive bacillus commensal in human intestine. It causes genitourinary tract infection, abscess, and wound infection but can lead to disseminated life-threatening septicemia. Risk factors to develop infection secondary to E. Lenta are immunocompromised and elderly patients with pre-existing co-morbidities such as cancer and diabetes mellitus.

A 53-year-old man otherwise fit and healthy presented with pleuritic chest pain, cough, and breathlessness associated with shivering and the patient had diminished air entry on his left side of his chest. Blood workup revealed raised WBC count elevated C reactive protein (CRP). Chest radiograph revealed opacification of the left hemithorax, two distinct fluid levels and a computed tomography (CT) scan of his chest revealed loculated left sided empyema. Diagnostic aspiration revealed Pleural fluid indicated the presence of streptococcus anginosus and E. Lenta. Blood culture yielded the unusual growth of E. lenta. The patient was admitted to the intensive care unit and required drainage of the left pleural cavity with an intercostal drain. He was treated empirically with intravenous benzylpenicillin and oral clarithromycin. intravenous piperacillin/tazobactam and metronidazole. Within three days of starting piperacillin/tazobactam and metronidazole, a good clinical response to the therapy was observed. Follow up in clinic confirmed good resolution of the left sided empyema. The case report highlights E. Lenta as potential cause of septicemia following Pneumonia and empyema responding well to intercostal drainage and broad-spectrum antibiotics.

Keywords: eggerthella lenta; empyema; septicemia.**Introduction**

Eggerthella lenta is an anaerobic, non-spore-forming, non-motile, gram-positive bacillus that is part of the normal intestinal flora, originally described by Arnold Eggerth in 1935 [1]. E. lenta has been isolated as the causative pathogen in genitouri-

nary tract infection, appendicitis, liver abscess, peritonitis, periurethral abscess, spondylodiscitis, sinusitis, meningitis, brain abscess, cutaneous abscess, and wound infection [2]. It is most frequently associated with gastrointestinal infections followed by disseminated life-threatening infections. It particularly af-

fects the immunocompromised, elderly patients with pre-existing co-morbidities such as cancer and diabetes mellitus [2,10]. However, the infectious burden of this organism has not been well recognized due to historical difficulties, limitations of phenotypic identification and obscurities to culture from infected sites [4].

Pneumonia is the most common aetiology of pleural infections that can progress to empyema characterized by pus or bacteria in the pleural space. The most common bacterial pathogens associated with empyema are streptococci in community-acquired pleural infections, and staphylococci and enterococci in hospital-acquired cases. However, in 8-75% of reported cases anaerobes have also been identified. The most prevalent isolates being *Fusobacterium* species, *Prevotella* species, *Bacteroides* species, *Peptostreptococcus* species, *Clostridium* species and some mixed anaerobes. This report presents a unique case of pleural empyema complicated with the rapid development of septicemia. Pleural fluid and blood culture results revealed the growth of *Eggerthella lenta*, a bacterium yet to be linked with empyema. The middle aged, immunocompetent man was treated successfully with metronidazole and piperacillin-tazobactam along with chest drains. The case highlights *E. Lenta* as an atypical causative organism as a source of bacteremia treated with metronidazole and piperacillin-tazobactam (Tazocin). This is the first case in western literature to our knowledge that links pleural empyema to *E. lenta* and septicemia

Case presentation

A 53-year-old man presented with pleuritic chest pain, cough, and breathlessness for six days pre admission. He was otherwise fit and healthy and had glandular fever at the age of 16 years. The patient 37 pack years and consumed 40-60 units per week. His symptoms commenced with shivering and chest pain soon after doing a painting job on a roof in a rainy day. On physical examination, the patient has diminished air entry on his left side of his chest. Blood workup revealed raised WBC count $18.3 \times 10^9/L$, haemoglobin was slightly low at 126 g/L, elevated C reactive protein (CRP) level of 239 mg/L. Serum electrolytes were also low with sodium at 128 mmol/L and potassium at 3.5 mmol/L. Creatinine and urea were within normal limits at 65 $\mu\text{mol/L}$ and 4.4 mmol/L, respectively.

Chest radiograph revealed opacification of the left hemithorax, two distinct fluid levels noted in the upper zone of left lung consistent with a large loculated hydropneumothorax, and slight pleural effusion at the base of the right lung. Subsequently, a contrast-enhanced computed tomography (CT) scan of his chest revealed loculated left sided empyema with locules within the oblique fissure, anteriorly at the left apex and in a left parasternal position. The CT scan also suggested persistent consolidation in the left lung particularly in the lingula and peribronchial region. Some large mediastinal lymph nodes were also present.

Diagnostic aspiration revealed Pleural fluid indicated the presence of streptococcus anginosus and *E. Lenta*. Blood culture yielded the unusual growth of *E. lenta*. Human immunodeficiency virus (HIV) came back negative, additional tests like immunoglobulin levels showed no immune deficiency which could have predisposed him to this condition.

The patient was admitted to the intensive care unit as his infection's markers were worsening and required drainage of the left pleural cavity with an intercostal drain. He was treated empirically with intravenous benzylpenicillin and oral clarithromycin. Consequently, benzylpenicillin and clarithromycin was stopped, and the patient was commenced on intravenous piperacillin/tazobactam and metronidazole. Within three days of starting piperacillin/tazobactam and metronidazole, a good clinical response to the therapy was observed. The patient stabilized haemodynamically, and he was transferred successfully from the critical care unit to the respiratory ward. The course of the intravenous antibiotics was completed in ten days with a good response. The patient was transferred to the regional cardiothoracic team for further management including surgical drainage if necessary. However, the left sided empyema was completely resolved without any surgical intervention like decortication. Consequently, in the surgical care unit the patient was only treated with intercostal drainage and a long course of antibiotics. Since discharge he stopped smoking and made good progress.

Discussion/conclusion

This case report highlights *E. lenta* causing Pleural empyema and septicemia in an immunocompetent 53-year-old with no significant comorbidities. The organism has been most reported in intra-abdominal infections exhibiting symptoms like diarrhoea, vomiting and abdominal pain. The spectrum of disease caused by this organism is unclear and been isolated from various clinical specimens including blood, abscesses, and wounds aspirates (See Table 1). Risk factors associated with *E. lenta* infections frequently indicate immune suppression in conditions like malignancies, diabetes, end-stage renal disease and pre-existing conditions such as Crohn's disease, ulcerative colitis, pelvic inflammatory disease, genitourinary tract infections, decubitus ulcers, abscesses, and gastrointestinal diseases. In contrast, the patient in this case did not exhibit any common symptoms and no recognized risk factors could be identified.

Although, bacteremia caused by *E. lenta* are reported to be rare yet there are studies which reported significant number of cases of infection caused by the organism [5]. A 4-year study conducted in Hong Kong showed that 63% of anaerobic bacteraemia were caused by *Eggerthella* species. Another study done in UK identified *E. lenta* causing bacteraemia as a complication of percutaneous nephrostomy. Therefore, reliable laboratory investigations are required for prompt identification of *E. lenta* to start optimal treatment as early as possible [12]. Even today the gold standard method for the diagnosis of *E. lenta* bacteremia is blood culture followed by bacterial identification with using matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) [12]. According to Table 1 all similar case reports of *E. lenta* used blood culture as the preferred method of diagnosis. Therefore, in the present case the best suitable method of diagnosis was blood culture since the patient presented with sepsis. In addition, pleural fluid samples also indicated the presence of anaerobic bacillus which could have been the source of septicaemia.

Table 1: The spectrum of disease caused by this organism is unclear and been isolated from various clinical specimens including blood, abscesses, and wounds aspirates.

Author and Year	Patient characteristics		Mode of diagnosis	Diagnosis	Procedure	Treatment		Outcome
	Age (years)	Sex				Antibiotics	Duration	
Chan & Mercer, (2008) (9)	68	F	Blood culture followed by 16S rRNA gene sequencing	Tube-ovarian abscess	Total abdominal hysterectomy, left salpingo-oophorectomy	Vancomycin, timen-tin and metronidazole	Unavailable	Discharge after recovery
Liderot et al., (2010) (3)	86	F	Blood culture followed by 16S rRNA PCR	Bloodstream infection derived from an airway infection	None	Cefuroxime and amoxicillin	Unavailable	Discharge after recovery
Thota, Dacha, Natarajan, & Nerad (2011) (14)	21	F	Blood culture	Crohn's disease with small bowel obstruction	Ileocecal resection	Vancomycin and meropenem and metronidazole	14 days	Discharge after recovery
Salameh et al., (2012) (8)	19	M	Blood culture	multiple brain abscesses, liver abscesses, necrotizing pneumonia, and osteomyelitis	None	Penicillin G and metronidazole	5 months	Recovered to normal health
Gardiner et al., (2014) (7)	70	M	Blood culture and biopsy of the L1/2 disc	Spondylodiscitis, Psoas Abscess, and Meningitis	None	Meropenem and oral linezolid	3 months	Recovered to normal health
H. J. Lee, Hong, Choi, & Kim, (2014) (15)	53	M	Blood culture	Rectal cancer	Ileostomy and left double-J stent insertion	Cefotaxime and amikacin	4 days	Discharge after recovery
Wong et al., (2014) (10)	86	M	Blood culture	Gastrointestinal malignancy with bacteremia	None	Vancomycin and piperacillin-tazobactam. Metronidazole	4 days 10 days	Recovered to normal health
Tsang, Leung, & Wong (2019) (16)	91	M	Blood culture	Bacteremia	None	Meropenem	Unavailable	Recovered to normal health
Cordoba et al., (2019) (5)	61	M	Blood culture	Septic shock with Periurethral abscess	Incision and drainage of the abscess	Vancomycin, Cefepime and Metronidazole, Followed by Augmentin, and Ciprofloxacin	16 days	Recovered to normal health
Peter-Bibb & Tokeshi (2020) (17)	94	M	Blood culture	Septicemia due to acute diverticulitis	None	Vancomycin, ceftriaxone, and metronidazole	12 days	Discharge after recovery
Alataby et al., (2020) (18)	67	M	Blood culture	Septic shock due to aortoiliac graft	None	Vancomycin and meropenem, then Tigecycline	7 days 14 days	Discharge after recovery
Fatima et al., (2020) (6)	53	F	Blood culture	Endometrial adenocarcinoma with metastasis	None	Vancomycin and meropenem	10 days	Death on day 10
Jiang, She, & Zheng, (2020) (13)	30	M	Blood culture using MALDI-TOF MS	Bacteremia with acute suppurative appendicitis	None	Meropenem	14 days	Discharge after recovery

Abbreviation: F: female; L1/2: 1st, and 2nd lumbar vertebra; M: male; MALDI-TOF MS: matrix-assisted laser desorption ionization-time of flight mass spectrometry; PCR: Polymerase chain reaction; rRNA: ribosomal ribonucleic acid.

Identification of antimicrobial susceptibility of anaerobes are challenging. Considering that to present date agar dilution method has been regarded as the gold standard for identifying antimicrobial susceptibility of anaerobes such as *E. lenta*. However, regarding the paucity of published data of antibiotic sensitivity testing of *E. lenta*, there is still no recognized clinical guidelines for choosing appropriate antibiotic therapy [5]. The patient in this case was initially started on intravenous benzylpenicillin and oral clarithromycin as his symptoms indicated a respiratory infection. Soon after *E. lenta* was identified the antibiotic regimen was switched to intravenous piperacillin/

tazobactam and metronidazole. The patient responded well to the combination of antibiotics will good clinical improvement. A recent large study of antimicrobial susceptibility testing demonstrated that all isolates of *E. lenta* was susceptibility metronidazole, and piperacillin- tazobactam had 94%. This indicated that the combination of intravenous piperacillin/tazobactam and metronidazole could be effective in the treatment of *E. lenta* infecting the respiratory system causing septicaemia. Although cases have reported with *E. Lenta* causing septicemia, our case had positive pleural fluid and blood culture positive for *E. Lenta*. Necrotizing pneumonia secondary to *E. Lenta* have been de-

scribed but empyema has not been reported before.

The risk factors for developing pleural infection are like those for pneumonia, however, causes of empyema also includes gastro-oesophageal reflux, alcohol misuse, diabetes mellitus, immunosuppression, corticosteroid, and intravenous drug abuse. It has been hypothesized that damage to the intestinal barrier such as cancer may have caused the translocation of the bacteria [11]. Our case did not have any discernible cause of immune deficiency which is unusual as *E. lenta* have previously been reported more commonly in immunocompromised patients.

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