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Case Report

Unravelling the unusual: *Enterococcus faecium* in aspiration pneumonia complicated with lung abscess in a severely comorbid patient

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ABSTRACT

Aspiration pneumonia is a common respiratory infection that can lead to complications, including lung abscess. While typical causative agents include *P. aeruginosa, K. pneumoniae,* and *S. aureus*, atypical agents must also be considered, especially in comorbid or elderly populations. This case report presents a rare instance of aspiration pneumonia caused by *E. faecium* that developed into a lung abscess in a patient with multiple comorbidities. The patient's medical history included left-sided hemiparesis, hypertension, and type-2 diabetes mellitus, as well as a thirty-year history of smoking and alcoholism. Radiological evaluation revealed a rounded opacity with an air-fluid level in the left lower zone, indicating a lung abscess. Microbiological evaluation confirmed the presence of *Enterococcus spp*. The case highlights the importance of considering atypical pathogens in aspiration pneumonia and the potential for severe complications in severely comorbid patients.

Keywords: Aspiration pneumonia, Comorbidities, Community-acquired pneumonia, *Enterococcus faecium,* Lung abscess

INTRODUCTION

India contributes 23% of the global pneumonia burden. The case fatality rates for community-acquired pneumonia (CAP) range from 14% to 30%, while severe CAP accounts for 47%.[1] Over the next few decades, CAP, particularly aspiration pneumonia (AP), is expected to contribute increasingly to mortality and morbidity, especially in the comorbid or elderly population. In frail patients, the prevalence of aspiration pneumonia is ten times higher.[2] Bacterial pneumonia can lead to various complications, such as pleural effusion, pneumatoceles, necrotising pneumonia, empyema, and lung abscesses.[1]

In South Asia, the causative agents for CAP are predominantly *P. aeruginosa*, *K. pneumoniae,* and *S. aureus*.[2] Clinical presentation and findings are usually non-specific to a particular bacterial agent. In such cases, the patient's history and clinical findings can provide clues to broaden the differential to include atypical causative agents.[3]

Enterococci are not typically considered as pulmonary pathogens. When found in respiratory samples, they are generally believed to be airway colonisers.[4] However, empyema, pneumonia, and lung abscesses due to *Enterococcus spp.* have been reported in patients with underlying co-morbidities (e.g., hypertension, stroke, HIV infection, kidney transplant) and risk factors (e.g., aspiration, smoking, alcoholism).[5]

We present a rare case of aspiration pneumonia caused by *Enterococcus faecium* that progressed to lung abscess in a patient with multiple comorbidities.

CASE REPORT

A 58-year-old male was admitted to a tertiary care hospital with chief complaints of insidious onset of fever

with chills, cough with purulent foul-odour sputum, and shortness of breath for 15 days. The patient had been experiencing a loss of appetite and decreased sleep for the past two weeks. There were no associated symptoms like haemoptysis, weight loss, chest pain, or night sweats. The patient had a significant medical history that included left-sided hemiparesis due to a cerebrovascular accident one year ago, as well as hypertension and type-2 diabetes mellitus for four years. He was compliant with all medications prescribed for these conditions. He was a chronic cigarette smoker (Pack year-22.5) and alcoholic for the past thirty years but quit after the stroke. There was no history of recent association with crowds.

On admission (Day 0), the patient appeared frail and sick. Clinical examination showed a fever (100^0 F), increased respiratory rate (32 breaths/min), and heart rate (109 beats/min), as well as adequate oxygen saturation in room air (97%). Chest examination revealed decreased air entry with crackles at the left infra-scapular and infra-axillary regions on auscultation and tenderness in the same area on palpation. No generalised lymphadenopathy and no significant findings were observed in other systems. A provisional clinical diagnosis was left lower zone pneumonia of bacterial aetiology under evaluation.

Haematological parameters (day+1) showed increased values of inflammatory markers: white blood cell count 16200/µl with neutrophil predominance (80%); c-reactive protein 50 mg/dL; and Sr. procalcitonin 2.5 ng/mL. Other biochemical (including renal and liver function) and haematological parameters values were within the normal range except for decreased Haemoglobin of 10 g/dl. In sputum's CBNAAT, *M. tuberculosis* was not detected. Viral markers for HIV, HBsAg, Dengue NS1, and HCV was negative by ELISA. COVID-19 and influenza negative by real-time RT-PCR.

Radiological evaluation (day +1) revealed a rounded opacity with an air-fluid level in the left lower zone on chest X-ray, suggesting a lung abscess. Pleural aspiration and bronchoalveolar lavage (BAL) were performed and sent for routine microscopy and culture.

On microbiological evaluation (day +1), direct gram staining of BAL showed plenty of pus cells with gram-positive cocci in pairs and short chains with angular arrangement. Zeihl-Neelsen staining for acid-fast bacilli and KOH mount for fungal elements were negative. A culture of BAL and pleural aspirate was performed on Blood agar, MacConkey agar, and Chocolate agar to evaluate bacterial growth. Sabouraud Dextrose agar (SDA) was used for fungal culture. In BAL, significant growth was observed on blood agar at $>10^5$ CFU/ml of non-hemolytic, grey translucent, tiny circular pinpoint, convex, smooth with entire edge colonies. Small pinpoint lactose-fermenting colonies were seen on MacConkey agar. Gram staining of culture smear revealed gram-positive cocci, spectacle-shaped, in pairs and short chains. The isolate was catalase-negative and hydrolyse bile esculin, suggesting *Enterococcus spp.* An isolated colony from the growth on blood agar was subjected to various biochemical tests for speciation and antimicrobial susceptibility testing (AST) by Kirby-Bauer disk diffusion. On second day, biochemical tests (Figure 2) confirmed strain as *E. faecium*. AST results (day +3) were interpreted using CLSI guidelines 2024, which showed the strain was sensitive to vancomycin, linezolid and teicoplanin and resistant to penicillin, high-level gentamicin, high-level streptomycin, and ampicillin. No growth was seen on SDA. The culture of pleural aspirate showed no growth.

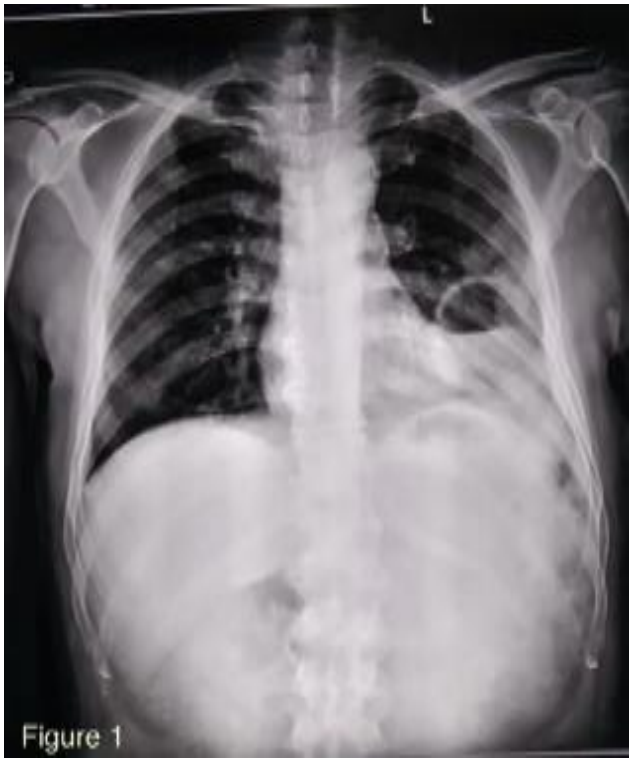

Figure 1: Chest X-ray (posteroanterior view) showing left lower cavitary lesion with air-fluid level.

Treatment

Upon admission, the patient was initiated on empirical treatment: Piperacillin-tazobactam (PIPTAZ) 3.375 gm IV every six hours, vancomycin 30 mg/kg daily IV in divided doses, and other supportive care. After a confirmatory diagnosis of *E. faecium* showing resistance to ampicillin, PIPTAZ was discontinued, and IV vancomycin was continued for ten days. On day +15, the patient was discharged with a plan to take oral linezolid (600 mg thrice daily) for ten days.

Follow-up and outcome

The patient's general condition improved from the 5^{th} day of antimicrobial treatment. On day +15, the patient was afebrile, and other symptoms subsided with Sr. procalcitonin, and CRP levels returned to normal.

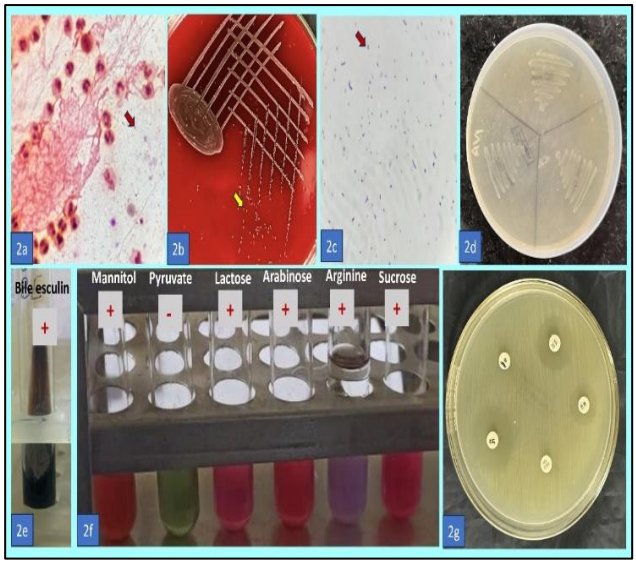

Figure 2: (a) Direct Gram stain from BAL showing numerous pus cells and gram-positive cocci in angular paired arrangement, (b) Grey translucent pinpoint, convex colonies of Enterococcus faecium on Blood agar, (c) Gram stain smear from isolated colony showing gram-positive cocci in angular paired arrangement, (d) Positive Heat tolerance test showing growth after exposure to 60oC for 10, 20 and 30 minutes, (e) Positive Bile esculin hydrolysis test, (f) Biochemical tests showing production of acid by fermentation of mannitol, lactose, arabinose, and sucrose; no decarboxylation of arginine dihydrolase. (g) Antimicrobial sensitivity testing using the Kirby-Bauer disk diffusion method

DISCUSSION

AP is a respiratory infection common among elderly and frail patients requiring inpatient care.[6] When there is clear evidence of aspiration events, diagnosing AP is simple. However, the diagnosis can be challenging in cases of silent and unobserved aspirations. Various risk factors for aspiration and oral bacterial colonization should be considered to define AP.[7] Impaired deglutition safety and aspirations have been reported in neurological disorders, stroke, and altered mental status, including decreased consciousness in cases of alcoholism, seizures or drug overdose.[6]

E. faecium is a gram-positive, facultatively anaerobic, commensal flora of the intestinal tract; it is usually associated with urinary and intra-abdominal infections, post-surgical infections, and, in some cases, sepsis.[8] It is rarely considered in the differential for respiratory infections. Recent studies reported it as a potential respiratory pathogen, especially in patients with multiple comorbid conditions that are prone to complications like lung abscess, empyema, etc.[4,5] In a study conducted by the CDC, which assessed the pathogens associated with healthcare-associated infections, 0.7% of ventilator-associated pneumonia over four years was caused by *Enterococcus spp*.

Comorbid conditions (hemiparesis, hypertension and type-2 diabetes) and various risk factors (smoking and alcoholism) in this patient may have been significant factors in silent aspiration events leading to the entry and invasion of gut or oral commensal flora (*E. faecium*) in the lung and more prone to the complications of AP, leading to lung abscess.

CONCLUSION

Enterococcus spp. has been neglected as a possible respiratory pathogen. Yet, many studies have implicated it as a significant respiratory pathogen, causing complications like lung abscesses and increased mortality. This remains especially concerning in high-risk patients in ICU or patients with multiple comorbidities. Prudent antibiotic treatment, essential to shorten the patient's hospital stay, relies on the expedient isolation of the causative organism, especially for uncommon pathogens. Laboratory isolation of *Enterococcus* spp. remains an essential crux in diagnosis. Integrating clinical history with laboratory isolation is vital in accurately diagnosing and managing such patients.

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