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Case Report

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Acinetobacter baumannii: A contributing factor for progression of 'Interstitial Lung Disease', a case study.

B. B. Ballal*[1], Renuka Ballal[2], Omkar Ghadge[1], Pooja Konde[1], Divya Chandrasekharan[1], M.G. Bodhankar[1].

[1]Department of Microbiology, Bharati Vidyapeeth Deemed University, Yashwantrao Mohite College of Arts, Science, and Commerce, Pune, Maharashtra, India.

[2]Department of Botany, Bharati Vidyapeeth Deemed University Interactive Research School in Health Affairs (IRSHA), Pune, Maharashtra, India.

*Corresponding author: *sbballal23@rediffmail.com*

Abstract

In the last decade, *Acinetobacter baumannii* has been established as one of the aggressive nosocomial pathogens. Multiple drug resistance of the pathogen and its unique colonization properties on biomedical instruments have dragged the attention of many researchers. The research was mainly focused on drug resistance and biofilm forming capacity of the pathogen. 'Interstitial lung disease' is a chronic disease having high mortality rate and the present study establishes *Acinetobacter baumannii* as a contributing factor for the progression of the disease.

Keywords: *Acinetobacter baumannii*, Interstitial Lung Disease, ILD, nosocomial infections, antibiotic resistance.

Introduction

Acinetobacter baumannii is catalase positive and oxidase negative. The pathogen had changed its taxonomic status from *Micrococcus calcoaceticus* to *Acinetobacter baumannii*.[**1**] G+C content of the pathogen varies from 39% to 47%.[**2]** It has been emerged as a nosocomial pathogen and reported for urinary tract infections, meningitis, wound infections and pneumonia.[**3**] The pathogen has predilection to mucosal membrane and develop tissue necrosis.[**4**] It is one of the deadliest multiple drug resistant pathogens and is the basis of recommended bacteriophage therapy called 'ESKAPE'.[**5]** The colonization property of the pathogen on medical devices and glass surfaces is one of the causes of severe infections in the immune deficient patients.[**6**] Outer membrane proteins (OMP-A) of the pathogen contributes the apoptosis of infected cells.[**7**] Other virulence factors include phospholipase-D,[**8**] phospholipase-C,[**9**] BAP (Biofilm Associated Protein),[**10**] Cell Surface Hydrophobicity (CSH) and plasmids.[**11]** 'Interstitial lung disease' is the result of abnormal healing response of lung towards tissue injury or infections where alveoli become thickened minimize their efficacy for oxygen exchange. In the present study, multiple drug resistant *Acinetobacter baumannii* was isolated from the patient of 'Interstitial Lung Disease'. Clinical symptoms of the patient were periodically recorded. Chest X-Ray of the patient was evaluated to establish the relationship of the pathogen with 'Interstitial Lung Disease'.

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Materials and Methods

1. Isolation and identification of *Acinetobacter baumannii* from sputum sample.
2. Aerobic culture sensitivity test and
3. Chest X-Ray evaluation of patient.

Eighty two years male patient with the history of persistent cough was selected for the study. Medical record of the patient revealed pulmonary dysfunction since 4 years with multiple episodes of hypoxia. The patient also had concomitant hyperchlorestaemia and the history of at least 23 years of statin therapy. The patient was treated with bronchodilators, steroids and antibiotics, but no relief was recorded. Due to sudden onset of pyrexia, the patient was admitted to the private healthcare centre. Sputum sample of the patient was collected in a sterile container and the saline suspension was transferred on 'HiChrome Acinetobacter Agar Base Medium'. Antimicrobial sensitivity was conducted in according to CLSI guidelines. Simultaneously chest X-Ray evaluation was conducted. The patient was hospitalized for 7 days and over the period was treated with Levofloxacin (500 mg) and Ceftriaxone (1000 mg) but no relief was observed. Eventually Rifamycin was started as antimicrobial of choice and following the therapy of Rifampicin, the patient developed 'fatal ventricular tachycardia storm'.

Observations and Results

Upon incubation, light purple pink coloured colonies were observed on 'HiChrome Acinetobacter Agar Base Medium'. Aerobic culture and sensitivity test of the isolated *Acinetobacter baumannii* revealed complete drug resistance towards Amikacin (MIC > 32), Ceftazidime (MIC > 16), Cefotaxime (MIC > 32), Cefapime (MIC > 16), Gentamicin (MIC > 8), Imipenem (MIC > 8), Levofloxacin (MIC > 4), Meropenem (MIC > 8), Piperacillin (MIC > 64), Trimethoprim sulfamethoxazole (MIC > 2/38), Tetracycline (MIC > 8), Piperacillin/Tazobactam (MIC> 64/4). Chest X-Ray revealed sternal sutures, prominent reticular markings in bilateral lung fields, predominantly in bilateral lower lobes and bilateral upper zones, blunting of left CP angle suggestive of pleural effusion.

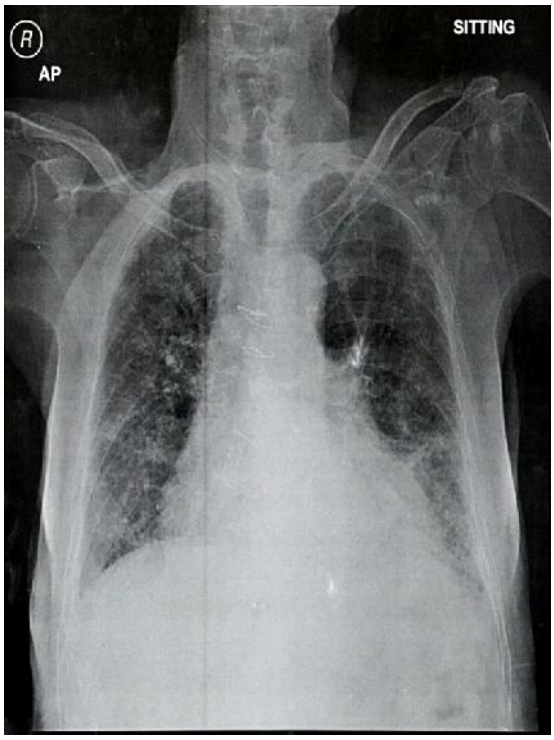

Fig.: Chest radiograph of the patient indicating sternal sutures, prominent reticular markings in bilateral lung fields, predominantly in bilateral lower lobes and bilateral upper zones, blunting of left CP angle suggestive of pleural effusion.

Discussion

Disease causing property of *Acinetobacter baumannii* is not fully understood.[**12**] It is the significant nosocomial pathogen reported for multiple health complications including urinary tract infections, meningitis, wound infections and pneumonia.[**3**] Contributory role of *Acinetobacter baumannii* in the 'Interstitial Lung Disease' is not recorded in literature. Present study highlights the possible role of *Acinetobacter baumannii* in the progression of 'Interstitial Lung Disease'. The correlation is significant as prolonged and vague antibiotic therapies develop fatal complications and such complications can be minimized by early diagnosis of *Acinetobacter baumannii*. The healthcare centers should seriously think about the inclusion of new therapies for controlling ESKAPE pathogen in their routine protocol and must convince the governing authorities including 'Food and Drug Administration'. The ethical issues regarding bacterial viruses should be positively discussed on the scientific dais.

Conclusion

Acinetobacter baumannii was isolated from the sputum sample of patient suffering from 'Interstitial Lung Disease'. The organism was studied for antimicrobial sensitivity. Chest X-Ray of the patient was evaluated for disease progression. The finding inclined the possible contributory role of *Acinetobacter baumannii* in the progression of 'Interstitial Lung Disease'. The issue is still open for the scientific discussion.

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