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Der Pharmacia Lettre, 2013, 5 (3):230-232  
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## Bacterial aetiology of Pneumonia in a Tertiary care hospital

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### ABSTRACT

A total of 122 sputum samples were collected from patients showing clinical diagnosis of pneumonia. The sputum samples were collected and subjected to Gram's stain, culture and biochemical reactions.

Out of 122 samples collected :-

80 samples (65.57%) - showed no bacterial growth

26 samples (21.31%) - *Klebsiella pneumoniae* were isolated

8 samples (6.55%) - *Staphylococcus aureus* were isolated

8 samples (6.55%) - *Pseudomonas aeruginosa* were isolate.

The patients' previous history among 80 samples collected which no bacterial growth had indicated that they already completed one or more courses of antibiotics. The commonest isolate found was *Klebsiella pneumoniae*, followed by *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

**Keywords:** Pneumonia, Sputum, *Klebsiella pneumoniae*

### INTRODUCTION

Pneumonia is a major cause of illness and death. There are two major categories of pneumonias those that are considered community acquired and those that include hospital or ventilator associated or health care associated pneumonia. Once a micro organism has successfully invaded the lung, disease can follow that includes the alveolar spaces and their supporting structures the interstitium and the terminal bronchioles.

In the United States, Pneumonia is the sixth leading cause of death and the number one cause of death from infectious diseases. It is estimated that as many as 2 to 3 million cases of community acquired pneumonia occur annually and roughly one fifth of these require hospitalization. 45000 deaths occur in the united states each year[1]. WHO data[2] suggest that there are 450 million cases of pneumonia each year and that it causes 3.9 million deaths. In the Sub-Saharan region of Africa, 1,022,000 die and 7,02000 die in South Asia.

Pneumococci are one of the most common bacteria causing pneumonia, both lobar and bronchopneumonia. They also cause acute tracheobronchitis and empyema.

Normal mucosal defence mechanisms such as entrapment, expulsion and the cough reflex, aided by the ciliary escalator effect prevent establishment of infection. When the normal defences are compromised by viral infection, anesthesia, chilling or other factors, pneumococci multiply, penetrate the bronchial mucosa and spread through the lung along peribronchial tissues and lymphatics. Bacteremia is common during the early stage of lobar pneumonia. Toxaemia is due to the diffusion of the capsular polysaccharide in to the blood and tissues.

*Klebsiella pneumoniae* was first isolated by Friedlander in 1883 from fatal cases of pneumonia. *Klebsiella pneumoniae* is a serious disease with high case fatality.

It occurs in middle aged or older persons who have medical problems such as alcoholism, chronic broncho pulmonary disease or diabetes mellitus.

The disease is characterised by massive mucoid inflammatory exudates of lobar or lobular distribution, involving one or more lobes of the lung. Necrosis and abscess formation are more frequent than in pneumococcal pneumonia.

### MATERIALS AND METHODS

Specimens :- Early morning expectorated sputum samples (preferably two) were collected in sterile containers for all patients . The quality of the sputum was assessed by both macroscopic and microscopic examination.

Any sample which was thin, watery without any purulent matter was considered unsuitable for further processing. A Gram's stain of the sputum in the area of maximal purulence was examined. Bartlett's scoring method was used for microscopic evaluation of sputum [3] . A sputum was considered unsuitable if it had a final score of 0 or less. All unsuitable specimens were discarded and a repeat specimen was collected.

Isolation of bacteria from sputum :

A proportion of another purulent area of the sputum was used for microbiologic analysis. For isolation and identification of Gram-positive organisms, blood agar was used; for Gram-negative bacteria, Mac Conkey agar was used. Plates were incubated at 37°C and 5% carbon dioxide. Plates were examined for growth after 24 h and 48 h of incubation. Culture isolates were identified according to standard techniques[4] .

Antibiotic sensitivity for the pathogenic organisms isolated in culture was done by Kirby-Bauer method according to CLSI standard[5].

### RESULTS

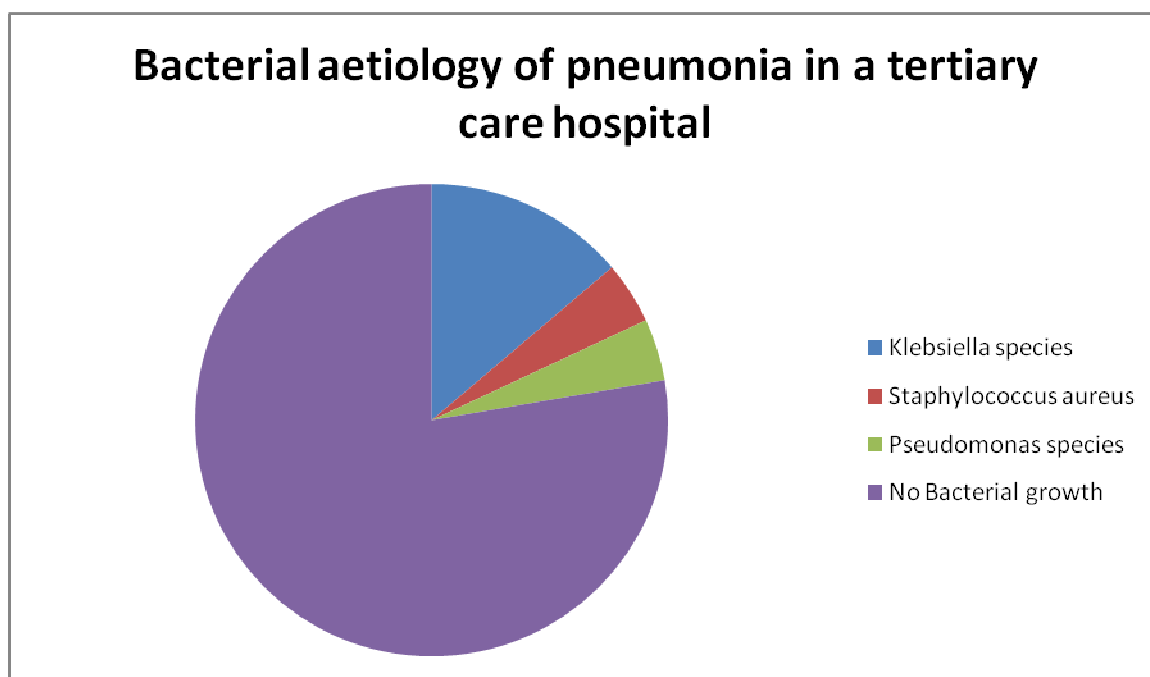
About 122 samples of sputum were collected from patients with clinical diagnosis of pneumonia. Out of 122 samples collected :-

80 samples(65.57%) - showed no bacterial growth

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8 samples (6.55%)-*Staphylococcus aureus* were isolated

8 samples (6.55%)-*Pseudomonas aeruginosa* were isolated



### DISCUSSION

In the present study, 122 samples of sputum were collected from patients with clinical diagnosis of pneumonia. All sputum samples were subjected to Gram's stain before culture. Most of the culture positive samples showed presence of bacteria on Gram's stain. Gram's stain usually predicted the positive cultures and large bacterial load, although it has been shown to be less reliable at detecting the presence of bacteria than sputum culture itself [6] but it require laboratory assessment, and thus limits its practical use.

In the present study Gram negative bacilli were more isolated than Gram positive cocci. The commonest isolate was *Klebsiella pneumoniae*(21.31%) followed by *Staphylococcus aureus* (6.55%), and *Pseudomonas aeruginosa* (6.55%).

The patients' previous history among 80 samples (65.57%) collected which had no bacterial growth indicated that they already completed one or more courses of antibiotics.

### CONCLUSION

The study shows aetiological bacteria of pneumonia and *Klebsiella pneumoniae* was the most common isolate in the aetiology of pneumonia. The other aetiological bacteria isolated in this study were *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

### REFERENCES

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