

Etiology and Patterns of Lungs Involvement in Community Acquired Pneumonia in Patients Presenting at Tertiary Care Centre in Lahore.

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As pneumonia is a group of specific infections, each having different epidemiology, pathogenesis, clinical presentations and clinical course. Objectives of this study were to determine the etiological organisms in patients with community acquired pneumonia (CAP) and also to find out the pattern of consolidation in lobar versus bronchopneumonia, sides of lungs involved and percentage of patients developing pleural effusion during course of the disease. Observational study with prospective data collection. This study was conducted in emergency department and West Medical Ward of Mayo Hospital, Lahore from 15th July 2000 to 30th Nov. 2000. Patients presenting in emergency, out patient departments of West Medical Ward Mayo Hospital, Lahore having features of lower respiratory tract infection clinically, were screened. Those who met inclusion and exclusion criteria were included, all concerned investigations especially x-ray chest, sputum gram staining and culture sensitivity were performed. All these patient were followed till complete recovery from pneumonia.

Total 38 patients with CAP were included in the study, 29 males 9 females. Mean age was 41.38 years, commonest symptom was cough 100%, 47% were smoker. Main outcome measure was positive sputum culture. All patients on gram staining of sputum showed gram positive cocci or predominantly gram + ve cocci with gram-ve rods. Sputum culture was positive in only 31.6% cases commonest organism was streptococcus pneumoniae (10.5%) followed by staph aureus (7.9%). H. influenzae, klebsiella, Pseudomonas, E. coli and Candida 2.6% each. Commonest pattern of consolidation was lobar 78.9%, bronchopneumonia 7.9% and mixed picture 13.2%. 21% developed pleural effusion during the course of illness. Lobar pneumonia is the commonest pattern of lung involvement, commonest etiological agent is strep. pneumoniae. One fifth of the patients developed para-pneumonic effusion.

Key words: Pneumonia, Lobar, Bronchopneumonia, pleural effusion.

Pneumonia is defined as an inflammation of lung substances.

Community acquired pneumonia is one that begins outside the hospital or is diagnosed with in 48 hours after admission to the hospital, in a patient who has not resided in long term health care facility for 14 days or more before the onset of symptoms¹.

In third world countries pneumonia is still one of the leading cause of death². In USA more than 3-4 million cases are reported annually³. The mortality rate in patients hospitalized with pneumonia ranges from 14-25%⁴. Overall mortality is about 3%⁵.

In 40-60% of patient with CAP no etiological organism is grown and in 5% cases more than two causes have been identified⁶. Streptococci are responsible in 40% of the cases mycoplasma in 3-23% hemophilis influenzae in 5-8% and legionella in 3-6% cases⁷. Recent studies have documented Chlamydial pneumonia in 4.5% to 26% cases above 65 years of age⁸.

Etiology of CAP varies in different parts of the world, there is paucity of local data regarding etiological agents, the purpose of our study is to determine etiology of CAP in our patients presenting in Mayo Hospital and to find out the pattern of lungs involvement.

Patients and methods

All patients suspected of having pneumonia presenting in Mayo Hospital Lahore during 15 July 2000 to 30 Nov.

2000 were screened. Inclusion and exclusion criteria were applied to diagnose CAP. If they were eligible for inclusion in the study, written informed consent was taken from patients or attendants.

Following inclusion exclusion criteria were applied

Inclusion Criteria

To be eligible for this study each patient must meet all of the following criteria.

1. Clinical picture compatible with pneumonia with at least two of the following signs and symptoms.
 - a. Cough
 - b. Production of sputum or worsening in character of sputum.
 - c. Auscultatory findings suggestive of pulmonary consolidation.
 - d. Dyspnoea, tachypnoea or hypoxemia.
2. Each patient must have at least one of the following.
 - a. Fever defined as body temperature > 100.4 F orally.
 - b. Elevated total WBC > 10,000/mm³ or leukopenia with total count < 4000/mm³.
3. A chest X-ray at baseline consistent with diagnosis of pneumonia (new or progressive infiltrates, consolidation or pleural effusion)

4. Each patient should be able to provide a respiratory specimen like sputum or pleural fluid. Sputum should meet following criteria.
WBC's > 25 per low power field. Squamous cells < 10 per low power field.

Exclusion criteria

1. Patients having known or suspected active pulmonary tuberculosis.
2. Suspected to have Bronchogenic carcinoma.
3. Suspected to have lung metastasis.

Following investigation were performed at baseline

- a. Sputum for gram staining and culture and sensitivity
- b. Blood C/E, ESR.
- c. Urea, S. Creatinine
- d. Blood Culture
- e. X-ray chest PA and Lat. view.
- f. Pleural fluid examination if applicable.
- g. Mycodot and PCR for mycobacterium tuberculosis.

Results

Ninety two patients were screened and 38 were eligible for enrolment in the study. Maximum number admitted during Oct and Nov. 2000. Out of 38 patients 29 were male and 9 were female.

Age distribution is given in table 1. Age ranged from 14-84 years, mean 41.38 years.

Symptoms at presentation are given in table 2.

Various etiological agents on sputum culture are given in table 3. Seventy eight percent had lobar pneumonia 7.9% had bronchopneumonia and 13.2% had mixed picture (Table 4). Side of lung involved is given in table 5A.

Overall 21% patient developed pleural effusion during the course of the disease among them 7.9% developed empyema (Table 5B)

Discussion

Mean age of 38 patients presenting with CAP was 41 years suggesting majority of the sufferer were adult or elderly, 40% patient were above the age of 50 (table 1) similar figure has been quoted in previous studies⁹.

Pneumonia has got a varied presentation ranging from absence of fever and cough to classical pneumonia syndrome. In our study 10.6% patient were not having fever (table 2) Similar data had been quoted by Tan from Singapore¹⁰.

Etiology remained undetermined in 68.4% of the cases. Another local study conducted at Sheikh Zayed Hospital Lahore enrolling 22 patients quoted microbiological diagnosis possible in only 27% cases¹¹. They isolated klebsiella, Pseudomonas and enterobacter where as pneumococci, H. influenzae were not isolated. Serological tests for mycoplasma and Legionella were not

carried out in that study, same is the case with our study. Some other studies on CAP reported diagnostic yield of sputum around 20-24%¹², which is even lower than our figures of 31.6%.

Whereas the studies giving diagnostic yield of 40-60% have also included serological test for atypical organism like Legionella, Chlamydia and mycoplasma¹³.

One reason for low yield of sputum in our study is prior use of antibiotics by most of the patients. Rosson stated that more than half of the patient with CAP had history of prior antibiotic use¹⁴.

Diagnostic yield of sputum can be increased if collected by more invasive techniques like transtracheal, transthoracic or bronchoscopic aspiration. Detection of pneumococcal antigen in the sputum or in the blood may be employed. PCR for streptococcus pneumoniae for whole blood or sputum has sensitivity of 55% and specificity of 100%¹⁵.

The commonest organism isolated in our study was streptococcus pneumoniae 10.5%, similar figures had been quoted in another study on CAP where incidence was 12.2%¹⁶.

Staphylococcus aureus is the second commonest organism 7.9%. Staph. is traditionally associated with nosocomial pneumonias but there are many studies to support the evidence that staph are one of the leading cause of CAP¹⁷. One study conducted in 37 hospital of USA and Canada showed staph as causative organism in 22% cases¹⁸.

In our study right sided pneumonia is more common than left sided (Table 5A) 25 versus 12, because the tendency of infective aerosol to get deposited on the right side which is more in line with trachea¹⁹.

In our study 21% patients developed pleural effusion where as another local study has quoted the incidence of 24.7%, almost same incidence²⁰. (table 5B)

Conclusion

Microbiological diagnosis based on sputum culture has low yield. Lobar pattern of consolidation is more frequent than bronchopneumonia and streptococci pneumonia are the commonest organism involved in CAP

Table 1 Age distribution of 38 patients of pneumonia

Age group	n=	%age.
14-20	8	21
21-30	3	7.9
31-40	6	15.8
41-50	6	15.8
51-60	6	15.8
61-70	6	15.8
71-84	3	7.9
Total	38	100

Sum = 1738.00, Mean = 41.38 Standard deviation = 20.78

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Table 2 Modes of presentation in pneumonia (frequency of different symptoms in patients with pneumonia)

Mode of Presentation (Symptom)	n=	%age
Cough	38	100
Fever. *	34	89.4
Sputum	33	86.8
Pleuritic chest pain	21	52.2
Dyspnoea	14	36.8
Haemoptysis	8	21

NOTE: * Temperature more than 100.4 ° F orally.

Table 3 Distribution of 38 patients according to etiology

Pattern	n=	%age
Undetermined	26	68.4
Streptococcus Pneumoniae	4	10.5
Staphylococcus aureus	3	7.9
Haemophilus influenzae	1	2.6
Klebsilla pneumonia	1	2.6
Pseudomonas Auriginosa	1	2.6
E. Coli.	1	2.6
Candida	1	2.6
Total	38	100

Table 4 Chest radiographic findings 1 - pattern of consolidation (n = 38)

Pattern	n=	%age
Lobar	30	78.9
Broncho/patchy	3	7.9
Mixed	5	13.2
Total	38	100

Table 5A Side of involvement (n = 38)

Side Of Involvement	n=	%age
Right	25	65.7
Left	12	31.5
Bilateral	1	2.6
Total	38	100%

Table 5B Percentage of parapneumonic effusions (n=38)

Type of Effusion	n=	%age
Un-complicated	5	13.1
Complicated	3	7.9
Total	8	21

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