

# Diagnostic Dilemma in the Routine Diagnosis of Non-Resolving Pneumonia in Elderly Patients: a Cross-sectional Study

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## ABSTRACT

**Objective:** To explore the etiology of non-resolving pneumonia (NRP) in elderly patients in daily pulmonology practice.

**Methods:** Total 170 patients were recruited in this study to determine the etiology of non-resolving Pneumonia at Department of Respiratory Medicine, Gulab Devi Chest Hospital, Lahore. The data was entered and analyzed in SPSS.

**Results:** Malignancy was found in 20.5% cases, bacterial infections (other than TB) were reported in 43.5% cases, tuberculosis was reported in 11.12%, ILD was reported in 0.58% cases while, 24.1% cases showed no growth on culture. Among them, 33.52% cases were associated with pleural effusion.

**Conclusion:** Bacterial infections (other than tuberculosis) are major cause of non-resolving pneumonia in elderly patients followed by malignancies and tuberculosis.

**Keywords:** Non-resolving pneumonia, elderly patients, malignancies, tuberculosis, bacterial infections.

## INTRODUCTION

Non-resolving pneumonia (NRP), also known as slow resolving pneumonia is a diagnostic challenge in daily pulmonology practice. Richard interbauer et al<sup>(1)</sup> defined it as either less than 50% clearing at two weeks or less than complete resolution at four weeks in immuno-competent patients who had showed symptomatic improvement with antibiotic treatment. It is very difficult to define normal resolution. It depends upon the type of infecting organism and the immunity of the host. Generally, those showing slow resolution radio-graphically in spite of adequate antibiotic treatment are classified in this group. This can be due to the presence of unusual organism, resistant bacteria, weak immunity or diseases that mimic pneumonia. As NRP is associated with increased mortality, it is essential to isolate these patients. Various non-infectious diseases mimic as bacterial pneumonia like ILD, malignancy, pulmonary embolism and vasculitis. Every case has its own merits for the choice of investigations and interventions.

## MATERIALS AND METHODS

This study was done in the male ward, Respiratory Medicine, Gulab Devi Chest Hospital and included

170 patients of CAP, which did not show adequate radiological improvement after 04-weeks of antibiotics.

**Inclusion criteria:** Male patients 14-years & above with pneumonia, not showing adequate radiological improvement after 04-weeks of antibiotics were included in the study.

**Exclusion criteria:** Patients under 14 years of age, sputum positive TB cases, known cases of bronchiectasis, COPD, lung abscess, congenital lung disorders, empyema, nosocomial pneumonia, atypical pneumonia and those with anaerobic etiology were excluded from the study.

**Data collection:** Detailed history, physical findings, co-morbidities, past history of treatment, occupations and investigations were taken into account. All the admitted patients with pneumonia were investigated with baseline Chest X-ray, sputum smear for pyogenic and mycobacterial species, Culture and sensitivity for pyogenic and fungal infections was done. Cytology of sputum was also utilized to reach proper diagnosis. FOB and CT scan was employed. Percutaneous lung biopsy and FNAC were used in suspected mass

lesions. Cases where Chest X-ray were suggestive of TB but no other diagnosis could be made in spite of all possible measures, were started an empirical an anti-TB treatment on departmental consensus. Data of all the patients was collected, tabulated, analyzed and results were drawn.

**RESULTS**

Total 170 patients were enrolled in this age having median age 52 years (age range = 14—64 years). According to the history, 170 (100%) patients had cough, 160 (94.11%) expectoration, 158 ( 92.94%) fever, 142 ( 83.52%) weight loss, 122 (71.76 %) shortness of breath, 86 (50.58%) chest pain and 55 (32.35%) had hemoptysis as shown in Table 1.

Among the risk factors, diabetic cases were 70 (41.7%), cigarette smokers were 92 (54.11%) cases, drug abusers were 17 (13%). Pleural effusion was also seen in 57 (33.52%) cases as shown in Table 2. Out of 170 cases, 135 (79.41 %) were non-malignant while 35 (20.58%) were cases of malignancy. Results revealed, out of the 135 non-malignant cases, 74 (54.81%) were acute infection, 41(30.37%) non-specific inflammation, 19 (14.07%) tuberculosis and 01 case (0.74%) of interstitial pneumonia was found as shown in Figure 1.

Total 35 malignant cases were reported including, NSC lung cancer 23 (65.71 %), small cell CA 05 (14.28%), lymphoma 05(14.28%), leukemia 01(2.85%), Ewing Sarcoma 01 (2.85%). 23 NSCL cancers consisted squamous cell carcinoma 09 (39.13%), adenocarcinoma 07 (30.43%) and metastatic poorly differentiated carcinoma 07 (30.43%) as shown by Figure 2 and 3. Out of the 05 lymphoma cases, Non Hodgkin were 02, Hodgkin were 03, nodular sclerosis 01 and mixed cellularity 02 cases. Out of the 74 bacterial isolates, there were 38 (51.35%) Gram negative bacteria while, 32 (43.24%), were Gram positive, and 04 (5.40%) cultures resulted in mixed growth. Out of the total 38 Gram negative isolates, 22 (57.89%) were *Pseudomonas aeruginosa*, 10(26.31%) *Klebsiella sp.*, 04 (10.52%) other Gram negative rods, 01 (2.63%) coliform and 01 (2.63%) *Proteus sp.*

Among 32 Gram positive sputum isolates, 26 (81.25%) were *Streptococcus pneumoniae* (*S. pneumoniae*) 03 (9.37%) cases of *Staphylococcus aureus* (*S. aureus*) including 01 case of MRSA, and 03 cases (9.37%) of *S. pyogenese* were found. These are shown by Figure 4, 5 and Table 3.

**DISCUSSION**

A total of 172 patients fulfilling the criteria for non-resolving pneumoniae. All the patients had history

**Table 1:** Clinical presentation.

Clinical Presentation	Frequency (%)
Cough	170 (100)
Expectoration	160 (94.1)
Fever	158 (92.94)
Weight Loss	142 (83.52)
Shortness of Breath	122 (71.76)
Chest Pain	86 (50.58)
Haemoptysis	55 (32.35)
Pallor	95 (55.88)
Clubbing	42 (24.70)

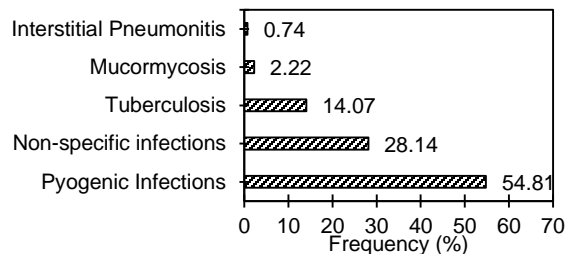
**Table 2:** Identified risk factors.

Risk Factors	Frequency (%)
Smoking	92 (54.11)
Diabetes Mellitus	70 (41.7)
Pleural Effusion	57 (33.52)
Drug Abuse	17 (13)
HIV Infection	03 (1.76)

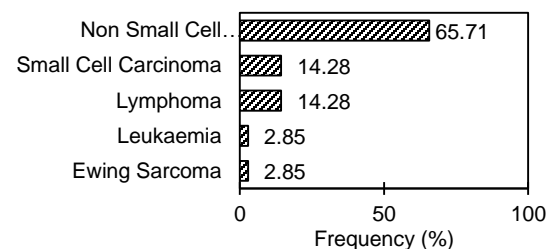
**Table 3:** Pyogenic Sputum Culture Isolates

Bacterial Isolate	Frequency (%)
Gram negative	38 (51.35)
Gram positive	32 (43.24)
Mixed growth	04 (5.40)

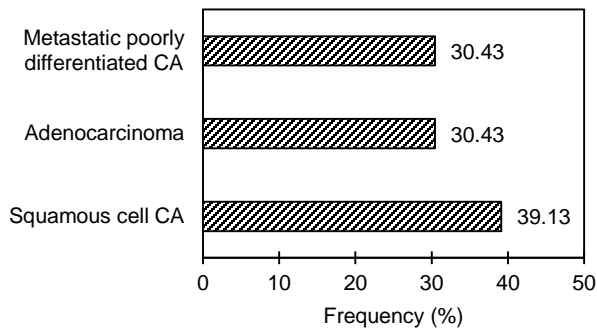
**Figure 1:** NRP—Non-malignant cases.



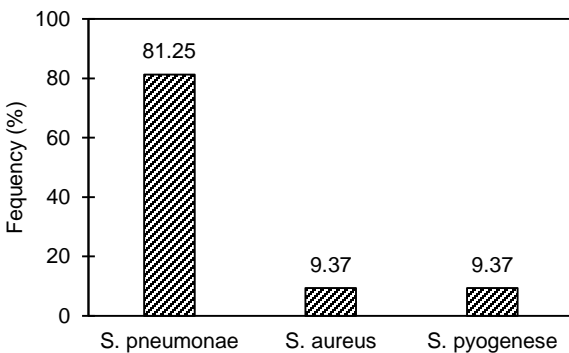
**Figure 2:** NRP-Malignant pathologies.



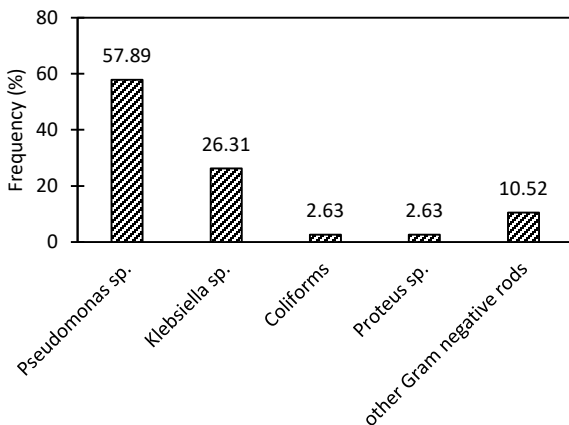
**Figure 3:** Non-small cell lung cancers.



**Figure 4:** Gram-positive bacterial isolates.



**Figure 5:** Gram-negative sputum isolates.



of illness of more than 01 month, showing the chronicity of the process. On the other hand, in Arancibia et al. study, out of 444 admitted cases of CAP, 30 patients had NRP while 19 were with progressive pneumonia<sup>(39)</sup>.

In our study, patients having age 50 years and above were 60.4%. Median age was 52 years. Jay. S reported the old age as a cause of slow resolution<sup>(5)</sup>. Roson. B et al also recognized the old

age as a significant factor for slow resolution in their study<sup>6</sup>.

Data analysis showed pyogenic bacterial causes on the top 74 cases (43.52%). Malignancy occupies the 2<sup>nd</sup> position 35 cases (20.58%), while tuberculosis 19(14.07%) is at 3<sup>rd</sup> position in this study. The TB was diagnosed after excluding other causes of non-resolution by using conventional as well as available modern modalities like correct CXR reporting by qualified radiologist, sputum examination, lung FNAC and CT scan, CT guided biopsy and Lymph Node biopsy. Sputum negative for AFB cases were discussed in departmental conference and anti-tuberculous treatment was initiated after a thorough discussion. The response to treatment was noted.

60% of the patients were cigarette smokers. Drug abuse was found in 13%. Diabetes mellitus was noted in 41.7%. Jay. S also reported the drug abuse as a cause of slow resolution<sup>(5)</sup>. Avijgan has reported diabetes mellitus as a major association in delayed resolution. *Klebsiella pneumoniae* and *Mycobacterium tuberculosis* were the two most common etiologies in diabetic patient. Begamy also reported increased occurrence of *Klebsiella pneumoniae* in chest infections in diabetic patients. About 54% patients were having body weight in the range of 40—47Kg. General debility and poor socio-economic status in the elderly can be responsible factor for TB in such patients.

The literature shows the infective process as the most common etiology for NRP<sup>(39)</sup>. In this study, pyogenic infection was diagnosed as etiological agents in 74 (43.52%) cases. Gram-negative bacteria were found to be the predominant pathogens, accounting for 51.35% cases and among them Klebsiella sp. (26.31%) and Pseudomonas sp. (57.89%) were the common pathogens. Roson. B et al also reported the Gram-negative etiology as a cause of slow resolution<sup>(6)</sup>. Fein also reported increased occurrence of gram-negative etiology of pneumonia in elderly patients with co-morbidities<sup>(29,30)</sup>. Gram-negative pneumonia and Staphylococcal pneumonia were also recognized to be responsible for slow recovery<sup>(38, 16)</sup>. According to the literature, these organisms are more common in North America & Asia<sup>(15)</sup>. One case of MRSA found in our study is also supported by other authors<sup>(40)</sup>.

Tuberculosis was diagnosed in 14.07% cases in the present study. Silver et al. found tuberculosis in 5.7% cases as a cause of non-resolving pneumonia<sup>(4, 30)</sup>. TB and Malignancy are the most

common mimics of pneumonia<sup>(16)</sup>. This study shows high malignancy rate (20.58%) as compared to western studies where malignancy is reported 11% as NRP<sup>(4)</sup>. Bronchogenic carcinoma was found in 35 patients (20.58%), of which squamous cell carcinoma was the commonest variety followed by adenocarcinoma. 62.5% patients were heavy smokers among the patients with malignancy. Silver et al also proved malignancy as a cause for non-resolution in 11.4% cases in their study of 35 patients<sup>(4, 30)</sup>.

The presence of 57 (33.52%) cases with pleural effusion is a significant factor for NRP also reported by other authors<sup>(16, 17, 38)</sup>.

## CONCLUSIONS

Non-Resolving Pneumonia is often a clinical challenge. Pyogenic infections are the commonest etiology, but microbiological profile is different in elderly. Gram-negative pathogens especially *Pseudomonas* predominates in elderly. A high suspicion of Tuberculosis & malignancy should be kept in mind such situations. Therefore, old age, co-infections and co-morbidities are risk factors for NRP.

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