

# Etiological Evaluation of Non-resolving Pneumonia: Our Experience in a Tertiary Care Center of Telangana

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## Abstract

**Introduction:** Non-resolving or slowly resolving pneumonia is not uncommon, affecting 10–20% of patients admitted with community-acquired pneumonia (CAP). Non-resolving pneumonia is a challenging clinical problem. Incidence of non-resolving pneumonia was found to be 10–15% among hospitalized patients with CAP and of them 6% developed progressive pneumonia. This study aims to evaluate the patients of non-resolving or slowly resolving pneumonias to establish the cause of it.

**Methodology:** It is a prospective, observational study taken up by the Department of Pulmonary Medicine of SVS Medical College and Hospital, Mahabubnagar, Telangana. All the enrolled cases of non-resolving or slowly resolving pneumonia which satisfy the inclusive criteria were taken into the study from June 2017 to December 2018. A total of 28 patients were satisfying the inclusion criteria and were further studied for evaluating the causative factors. The study was started after taking the approval of the Institutional Ethics Committee, SVS Medical College and Hospital, Mahabubnagar, Telangana.

**Observation and Results:** The mean age of the patients was 48.2 years. Of 28 patients, 18 (64.2%) were male and 10 (35.7%) were female with a male:female ratio – 1.8:1. Fever (81%) and cough (86%) were the most common symptoms. Smoking was the most common comorbidity noted (60.7%) followed by alcoholism (46.6%), diabetes (39.28%), hypertension (25%), and chronic obstructive pulmonary disease (21.4%). The most common cause of non-resolution of pneumonia in this study was tuberculosis 11 (39.28%) followed by bacterial pneumonias 9 (32.1%) which were caused by drug-resistant organisms. Other causes were malignancy 6 (21.4%), foreign body 1 (3.57%), and fungal pneumonia 1 (3.57%).

**Key words:** Non-resolving pneumonia, Fiberoptic bronchoscope, CT scan chest

## INTRODUCTION

Pneumonia is defined as inflammation and solidification of lung parenchyma due to an infectious agent. Normal resolution of pneumonia is variable and depends on the causative agent and host response to the invading

agent. In as many as half of cases, the pathogen remains unidentified which greatly hampers the evaluation of slowly resolving/non-resolving pneumonia. Non-resolving or slowly resolving pneumonia is not uncommon, affecting 10–20% of patients admitted with community-acquired pneumonia (CAP).<sup>[1]</sup>

There is lack of uniformity regarding the definition for neonatal resuscitation program (NRP). The term NRP has been used to refer to “Persistence of radiological abnormalities beyond expected time of course.” Most of the researchers defined slow resolving pneumonia (SRP) as pulmonary consolidation persisting for more than 21 days.<sup>[2]</sup>

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Kirtland and Winterbauer defined SRP in immune competent patients based on radiological criteria; <50% clearing by 2 weeks or less than complete clearing by 4 weeks.<sup>[3]</sup>

Non-resolving pneumonia is also defined as pneumonia with a slow resolution of radiologic infiltrates or clinical symptoms despite adequate antibiotic therapy.<sup>[4]</sup>

Non-resolving pneumonia is a challenging clinical problem. Incidence of non-resolving pneumonia was found to be 10–15% among hospitalized patients with CAP and of them 6% developed progressive pneumonia.<sup>[5]</sup>

### Aim

This study aims to evaluate the patients of non-resolving or slowly resolving pneumonias to establish the cause of it.

### METHODOLOGY

It is a prospective, observational study taken up by the Department of Pulmonary Medicine of SVS Medical College and Hospital, Mahabubnagar, Telangana. All the enrolled cases of non-resolving or slowly resolving pneumonia which satisfy the inclusive criteria were taken into the study from June 2017 to December 2018. A total of 28 patients were satisfying the inclusion criteria and were further studied for evaluating the causative factors. The study was started after taking the approval of the Institutional Ethics Committee, SVS Medical College and Hospital, Mahabubnagar, Telangana.

### Inclusion Criteria

Any case of pneumonia, not responding to the treatment and fitting into the operational case definition of non-resolving pneumonia and willing to participate in the study, was taken into the study. Non-resolving or slowly resolving pneumonia was defined in this study by the presence of persistence of clinical symptoms and signs, failure of resolution of the radiographic features by 50% in 2 weeks or completely in 4 weeks on serial chest X-ray, in spite of antibiotic therapy for a minimum period of 10–14 days and sputum for acid-fast bacilli (AFB) smear negative, cartridge-based nucleic acid amplification (CBNAAT) – no *Mycobacterium tuberculosis* detected.

### Exclusion Criteria

Any patient of pneumonia who was critically ill with poor general condition, who was already suffering with malignancies, who was positive for tuberculosis and HIV/AIDS, and the patients who were not willing to participate in the study were not enrolled into the study.

### PROCEDURE

The patient underwent complete physical examination with written informed consent after complete demographic and detailed clinical history was taken. All the routine baseline investigations such as complete blood count, random blood sugar, blood urea, and serum creatinine and sputum for microbiological tests (AFB smear, Gram stain, pyogenic culture and sensitivity, fungal smear and culture, and sensitivity) were done. Chest X-rays were taken and were repeated again after 2 weeks of empirical antibiotics therapy. Contrast-enhanced computed tomography (CT) chest was done in necessary patients.

Fiber-optic bronchoscopy was done in all patients, by which macroscopic appearance of trachea-bronchial tree was noted. Bronchial wash, brushings, and biopsy were taken whenever they were found necessary. Those samples were sent for microbiological and cytological analysis.

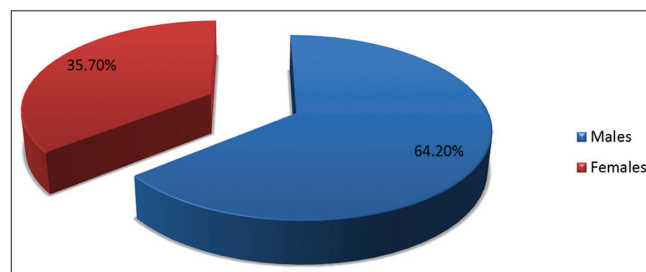


Figure 1: The gender distribution of the study population

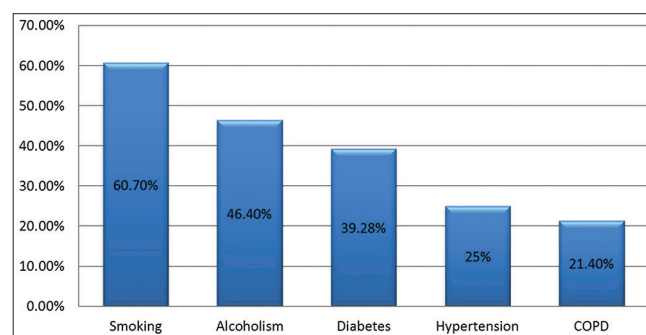


Figure 2: The comorbidities of the study population

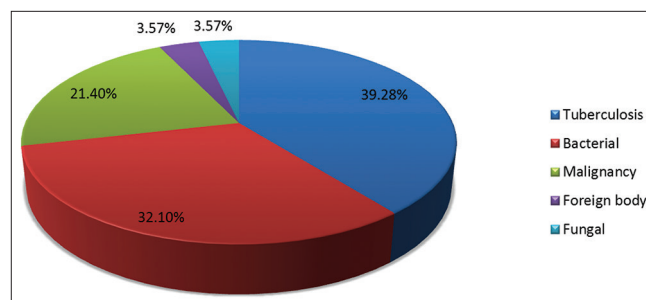


Figure 3: The etiology of non-resolving pneumonia

**Table 1: The comorbidities of the study population**

Comorbidities	Frequency (%)**
Smoking	17 (60.7)
Alcohol abuse	13 (46.4)
Diabetes	11 (39.28)
Hypertension	7 (25)
COPD	6 (21.4)

\*\*Total percentage exceeds 100% as many patients had more than one comorbidities. COPD: Chronic obstructive pulmonary disease

**Table 2: The etiology of non-resolving pneumonia**

Etiology	Frequency (%)
Tuberculosis	11 (39.28)
Bacterial	9 (32.1)
Malignancy	6 (21.4)
Foreign body	1 (3.57)
Fungal pneumonia	1 (3.57)

In suspected cases of tuberculosis, bronchoalveolar lavage was done and was sent for CBNAAT, AFB culture.

## OBSERVATION AND RESULTS

A total of 28 patients who were satisfying the inclusion criteria were enrolled in the study. The mean age of the patients was 48.2 years. Of 28 patients, 18 (64.2%) were male and 10 (35.7%) were female with a male:female ratio – 1.8:1. Fever (81%) and cough (86%) were the most common symptoms.

Smoking was the most common comorbidity noted (60.7%). Among 17 smokers, 12 were male and 5 were female. Smoking was followed by alcoholism (46.6%), diabetes (39.28%), hypertension (25%), and chronic obstructive pulmonary disease (21.4%). Smoking was more common among patients suffering with malignant etiology. Diabetes mellitus was noted in patients with infective etiology. Tuberculosis was the most common etiology among diabetics.

The most common cause of non-resolution of pneumonia in this study was tuberculosis 11 (39.28%) followed by bacterial pneumonias 9 (32.1%) which were caused by drug-resistant organisms. Other causes were malignancy 6 (21.4%), foreign body 1 (3.57%), and fungal pneumonia 1 (3.57%).

## DISCUSSION

It is a prospective, observational study taken up by the Department of Pulmonary Medicine of SVS Medical College and Hospital, Mahabubnagar, Telangana. A total of 28 patients were satisfying the inclusion criteria and were further studied for evaluating the causative factors. Patients

with non-resolving pneumonia are usually subjected to many investigations for diagnostic evaluation. Hence, knowledge regarding the spectrum of diseases which cause non-resolution and the frequency of their occurrence, so as to consider the investigative path will be of enormous value for the treating physician.

In our study, tuberculosis (39.28%) was the leading cause of non-resolution of pneumonias. Among 11 tuberculosis patients, seven patients had good clinical and radiological response and four patients had good clinical but partial radiological response. In a study was done by Jayaprakash *et al.*,<sup>[6]</sup> tuberculosis was the most common cause of non-resolving pneumonia. Chaudhuri *et al.*<sup>[7]</sup> reported that 16.7% of the causes of non-resolving pneumonia are due to tuberculosis. Ramesh and Saravanan<sup>[8]</sup> reported that bacterial pneumonias are major cause of non-resolving pneumonia.

The second most common cause was bacterial pneumonias (32.1%) caused by Gram-negative bacilli. *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* were the two most common organisms isolated. *Klebsiella* was isolated more among diabetics. Begamy has also reported increased occurrence of *Klebsiella pneumoniae* in thoracic infections in diabetic patients.<sup>[9]</sup> Fein also shared similar observation of increased occurrence of Gram-negative etiology of pneumonia in elderly patients with comorbidities.<sup>[10]</sup>

Incidence of malignancy was found to be high among smokers compared to non-smokers. Among malignancy, squamous cell carcinoma was common. Chaudhuri *et al.*<sup>[7]</sup> reported that squamous cell cancer was common among all the other types of lung malignancies causing non-resolving pneumonias.

Performing CT chest before fiber-optic bronchoscopy was extremely useful in localizing the segment involved and to know the extent of the disease.

## CONCLUSION

Non-resolving pneumonia is a problem not only for the patient but also to the treating physician because establishing the cause for the non-resolution of pneumonia takes time and requires invasive investigations. Tuberculosis and CAP not responding to empirical antibiotics and malignancy contribute major cause for non-resolution. So, coming to a particular diagnosis is very crucial for appropriate treatment in non-resolving pneumonia.

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