

## CLINICAL EVALUATION OF NON-RESOLVING PNEUMONIA AT TERTIARY CARE CENTRE

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### ABSTRACT

**Background:** The diagnosis of pneumonia is done on the basis of clinical sign and symptoms, however chest x-ray findings of consolidation of one segments or more or even lobes of the lung is still the gold standard. Among patients of community acquired pneumonia (CAP) non-resolving pneumonia or slowly resolving pneumonia is also seen, which accounts for 10-20% of admitted cases. Normal resolution of community acquired pneumonia is depends upon the patient's immunity status and the infective nature of pathogen.**Material & Methods:** A total of 50 patients who were visited the medicine department at our hospital between March 2017 and August 2017. Patients of non-resolving pneumonia with signs and symptoms along with a chest X-ray reporting less than 50% of resolution even after 2 weeks of antibiotic course. These diagnosed patients were enrolled for study by simple random sampling.**Results:** On CT scan chest, 40 patients with consolidation pattern on X-ray chest, reported additional findings of mediastinal adenopathy in 10 patients (20%), pleural effusion in 6 (12%) patients and collapse observed in 2 (4%) patients. Nearly all the patients presented with cough (96%), fever (86%), hemoptysis (40%), shortness of breath (60%), constitutional symptoms (36%), palpable lymph node (16%) and clubbing (22%).**Conclusion:** Apart from tuberculosis and malignancy as the common cause for non-resolving pneumonia, Age itself act as major risk factor. Other most common risk factors were smoking, diabetes and alcoholism. We should incorporate newer modalities of diagnosis like fiber-optic bronchoscopy; CT scan guided FNAC/biopsy in non-resolving pneumonia.

**Key words:** Non-resolving pneumonia, Fibre-optic bronchoscopy, tuberculosis.

### INTRODUCTION

Community acquired pneumonia is an most important cause of mortality as well as morbidity among adults all around the world (1). The diagnosis of pneumonia is done on the basis of clinical sign and symptoms, however chest x-ray findings of consolidation of one segments or more or even lobes of the lung is still the

gold standard (2). Sometimes it is difficult to identify the causative microorganism or pathogenesis in a particular patient than in such cases traditional antibiotic regimen is the mainstay of treatment (3). Maximum cases of community acquired pneumonia respond to initial traditional antibiotic treatment

protocol very quickly and also do not show any complications but in few cases there is non-responsiveness to empirical therapy and there is requirement of detailed investigations and newer treatment approaches (4).

Among patients of community acquired pneumonia (CAP) non-resolving pneumonia or slowly resolving pneumonia is also seen, which accounts for 10-20% of admitted cases (5). Normal resolution of community acquired pneumonia is depends upon the patient's immunity status and the infective nature of pathogen (6). In previous researches the resolution and non-resolution of pneumonia is not clearly defined. Multiple risk factors and theories postulated for the etiopathogenesis involved for the non-resolving pneumonia including various factors such as advanced age, host immunity, infectivity of pathogen, smoking, alcoholism, microbial resistance of infecting pathogen, chronic diseases and morbidities like COPD, diabetes mellitus, other diseases mimicking pneumonia, HIV infection and tumors(7). Contrast enhanced CT scan of chest along with fiber-optic bronchoscopy (FOB) are newer diagnostic modalities which plays major role in the diagnosis of the non-resolving pneumonia (8). In some researches, FOB reported to aid in the diagnosis of CAP near around 80% (9).

We conducted the present study to evaluate the role of fiber-optic bronchoscopy in achieving accuracy in the diagnosis of non-resolving pneumonia.

## MATERIALS & METHODS

The present prospective cross-sectional study was conducted at tertiary care hospital. A total of 50 patients who were visited the medicine department at our hospital between March 2017 and August 2017. Patients of non-resolving pneumonia with signs and symptoms along with a chest X-ray reporting less than 50% of resolution even after 2 weeks of antibiotic course. These diagnosed patients were enrolled for study by simple random sampling. Institutional Ethics Committee Clearance was taken before start of study and written informed consent for the study purpose was obtained from all the patients. All the patients were subjected to a detailed clinical

examination in accordance with pretested proforma and detailed history was taken from patients of both the groups. Patients who were less than 18 years of age, known case of pulmonary TB, HIV infection, and known case of lung malignancy and with poor general condition were excluded from the study. Routine lab investigations like complete blood count, random blood sugar, serum urea and creatinine, sputum for all microbiological tests and chest X-ray were done. CECT chest was advised only in necessary patients, while FOB was advised in all patients. CT guided FNAC was advised in only necessary cases. The data were analyzed using MS Excel 2010, Epi Info v7 and SPSS v22.

## RESULTS

In the present study 50 patients were enrolled, during the six month of period. Among them, 40 patients were male and 10 patients were female. Mean age of distribution was 48 years. 62% (31 patients) were above or 40 years of age. Age wise distribution was presented in Table 1. Mean duration of presenting symptoms was 19.78 days. 23 patients were smokers (46 %) and 9 patients (18%) were alcoholic, with 100% male preponderance. Diabetes was detected in 19 patients (38%). Out of the 19 diabetics, 16 patients were male, remaining 3 were female. (Table 1).

**Table 1: Demographic characters of enrolled patients**

Demographic characters	No. of patients (n=50) (%)	
Age (in years)	<20	6 (12)
	21-30	6 (12)
	31-40	7 (14)
	41-50	13 (26)
	51-60	11 (22)
	>60	7 (14)
Sex	Male	40 (80)
	Female	10 (20)

**Table 2: Signs and symptoms presented by patients**

Signs and symptoms	No. of patients (%)
<b>Signs: Chest X-ray</b>	
Consolidation	40 (80)
Consolidation with cavities	8 (16)
Only cavity	2 (4)
<b>Signs: CT chest</b>	
Mediastinaladenopathy	10 (20)
Pleural effusion	6 (12)
Collapse	2 (4)
<b>Symptoms</b>	
Cough	48 (96)
Fever	43 (86)
Hemoptysis	20 (40)
Shortness of breath	30 (60)
Constitutional symptoms	18 (36)
Palpable lymph node	8 (16)
Clubbing	11 (22)

On chest x-ray findings consolidation present in 40 (80%) patients, consolidation with cavities in 8 (16%) patients and only cavities found in 2 (4%) patients. Right lung involvement occurred in 25 patients (50%), left lung involvement seen in 16 patients (32%) and bilateral involvement in 9 (18%) patients. On CT scan chest, 40 patients with consolidation pattern on X-ray chest, reported additional findings of mediastinaladenopathy in 10 patients (20%), pleural effusion in 6 (12%) patients and collapse observed in

2 (4%) patients. Nearly all the patients presented with cough (96%), fever (86%), hemoptysis (40%), shortness of breath (60%), constitutional symptoms (36%), palpable lymph node (16%) and clubbing (22%) (Table2).

**Table 3: Diagnostic results of the patients.**

Diagnosis	No. of patients (%)
Bacterial pneumonia not responding to empirical antibiotics	21 (42)
Pulmonary tuberculosis	12 (24)
Malignancy	10 (20)
Sarcoidosis	1 (2)
Mucoid impaction	1 (2)

In the present study, non- resolving pneumonia not responding to traditional antibiotics was diagnosed in 21 (42%) patients, pulmonary tuberculosis in 12 (24%) patients, malignancy found in 10 patients (20%), mucus impaction seen in 1 patient and sarcoidosis seen in 1 patient (Table 3). Pulmonary tuberculosis was diagnosed by Gene Xpert, out of 12, 7 patients had AFB smear positive, 1 patient showed organism on biopsy. FOB was advised in all patients and 60% patients had inflammation with secretions. Among 21 patients with non-resolving pneumonia, Klebsiella was isolated in 15 patients, Staphylococcus in 3 patients, Pseudomonas in 1 patient, Streptococcus in 1 patient and fungal infection in 1 patient.

## DISCUSSION

Non resolving pneumonia has multiple risk factors. Most of the patients were having conditions or risk factors which leads to altered immune mechanisms. older age, smoking and chronic disease are among significant risk factor in them (10). A study conducted by Jayaprakash et al, found that 84% of patients are more than 40 years of age (11) and another study by Chaudhuri et al reported that 80%

are more than 40 years of age (12). In our study 62% (31) were above 40 years. A study conducted by El Solh et al reported that, age alone serve as risk factor for non-resolving of pneumonia. They found that chest X-ray clearance was observed to be 35% by 3 weeks and 60% by 6 weeks in patients more than 70 years of age (13).

Several other studies stated that smoking is also a common risk factor other than age. In present study we found smoking as the common risk factor (n=23). Among them, 8 patients had malignancy and 14 patients had community acquired pneumonia which was not responding to empirical antibiotic therapy. A study conducted by Jayaprakash et al, also found that smoking was the most common risk factor (11).

Several other studies stated that male patients were at greater risk of developing pneumonia. This was in similarities with the findings of present study in which we found males (80%) were more affected than females (20%). Diabetes was the other most common morbidity reported in present study (38%). Similar findings were also reported in study conducted by Chathamparamb et al., and found diabetes was the most common comorbidity of non-resolving pneumonia (40%) (14). A study conducted by Chaudhuri et al, also found diabetes to be next common comorbidity among 34% of cases (12).

Among 21 patients with non-resolving pneumonia, Klebsiella was isolated in 15 patients, Staphylococcus in 3 patients, Pseudomonas in 1 patient, Streptococcus in 1 patient and fungal infection in 1 patient. A study conducted by Kundu et al found that Klebsiella as the most common pathogen (15). In our study, most common symptom was cough, reported in 48 (96%) patients, followed by fever 43 (86 %), hemoptysis in 20 patients and shortness of breath (36%). Hemoptysis and chest pain were common in patients with lung malignancy. A study conducted by Chaudhuri et al, also found cough in 100%, followed by fever 97%, hemoptysis 54%, chest pain 39% and shortness of breath in 34% patients (12). In our study, Mean duration of presenting symptoms was 19.78 days and right lung was involved in 50% patients, left lung in 32%

patients and bilateral involvement in 18% patients. Bilateral lung involvement was predominantly seen in patients of tuberculosis and with community acquired pneumonias.

In the present study most common causes of non-resolving pneumonia were Klebsiella pneumonia, smoking, tuberculosis and malignancy. Other causes were Pseudomonas, Staphylococcus, Streptococci and fungal infection. A study conducted by Jayaprakash et al, also found that causes of pneumonia were tuberculosis 26%, malignancy 28%, bronchiectasis 9%, empirical antibiotics resistant pneumonia in 15% patients (most common pathogens were Klebsiella and Pseudomonas sp.) (11). In the present study tuberculosis was found in 12 (24%) patients. A study conducted by Chaudhuri et al (12) and Feinsilver reported that 17% of cases and 6% of cases had tuberculosis respectively (16). In our study, malignancy was found in 10 patients in these cases most of them identified with squamous cell carcinoma. These findings were nearly similar to the results of study conducted by Chathamparamb et al (14).

## CONCLUSION

We concluded from the present study that apart from tuberculosis and malignancy as the common cause for non-resolving pneumonia, Age itself act as major risk factor. Other most common risk factors were smoking, diabetes and alcoholism. We should incorporate newer modalities of diagnosis like fiberoptic bronchoscopy; CT scan guided FNAC/biopsy in non-resolving pneumonia.

## REFERENCES

1. Torres A. Community-acquired pneumonia: Changing paradigms about mortality. Community Acquir Infect [Internet]. 2014;1(1):1. Available from: <http://www.caijournal.com/text>
2. Steel HC, Cockeran R, Anderson R, Feldman C. Overview of community-acquired pneumonia and the role of inflammatory mechanisms in the immunopathogenesis of severe pneumococcal disease. Mediators Inflamm

- [Internet].2013;2013:490346. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24453422>
3. Arnold FW, Wiemken TL, Peyrani P, Ramirez JA, Brock GN. Mortality differences among hospitalized patients with community-acquired pneumonia in three world regions: Results from the Community-Acquired Pneumonia Organization (CAPO) International Cohort Study. *Respir Med* [Internet]. 2013 Jul 1;107(7):1101–11. Available from: <https://www.sciencedirect.com/science/article/pii/S0954611113001327>
  4. Buzzo AR, Roberts C, Mollinedo LG, QuevedoJM, Casas GL, Soldevilla JMS. Morbidity and mortality of pneumonia in adults in six Latin American countries. *Int J Infect Dis* [Internet]. 2013 Sep 1;17(9):e673–7. Available from: <https://www.sciencedirect.com/science/article/pii/S1201971213000878>
  5. Ramesh PM, Saravanan M. A clinical study on non-resolving pneumonia in tertiary care centre. 2018;5(3):604–7.
  6. ZarHJ, Madhi SA, Aston SJ, Gordon SB. Pneumonia in low and middle income countries: progress and challenges. *Thorax* [Internet]. 2013 Nov 1;68(11):1052–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23956020>
  7. Restrepo MI, Faverio P, Anzueto A. Long-term prognosis in community-acquired pneumonia. *Curr Opin Infect Dis* [Internet]. 2013 Apr;26(2):151–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23426328>
  8. Magazine R, Rao S. Utility of flexible fiber optic bronchoscopy: Experience from a tertiary care teaching hospital. *J Dr NTRUniv Heal Sci* [Internet]. 2013;2(4):249. Available from: <http://www.jdrntruhs.org/text.asp?2013/2/4/249/122159>
  9. Andronikou S, Goussard P, Sorantin E. Computed tomography in children with community-acquired pneumonia. *PediatrRadiol* [Internet]. 2017 Oct;47(11):1431–40. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/29043419>
  10. Grumelli S, Corry DB, Song L-Z, Song L, Green L, Huh J, et al. An Immune Basis for Lung Parenchymal Destruction in Chronic Obstructive Pulmonary Disease and Emphysema. Barnes PJ, editor. *PLoS Med* [Internet]. 2004 Oct 19;1(1):e8. Available from: <http://dx.plos.org/10.1371/journal.pmed.0010008>
  11. Jayaprakash B, Varkey V, Anithakumari K. Etiology and clinical outcome of non-resolving pneumonia in a tertiary care centre. *J Assoc Physicians India* [Internet]. 2012 Feb;60:98–101. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22715555>
  12. Chaudhuri AD, Mukherjee S, Nandi S, Bhuniya S, Tapadar SR, Saha M. A study on non-resolving pneumonia with special reference to role of fiberoptic bronchoscopy. *Lung India* [Internet]. 2013 Jan;30(1):27–32. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23661913>
  13. El Solh AA, Aquilina AT, Gunen H, Ramadan F. Radiographic resolution of community-acquired bacterial pneumonia in the elderly. *J Am Geriatr Soc* [Internet]. 2004 Feb;52(2):224–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14728631>
  14. Chathamparamb B, Antony A, Nivarthil SU, Paul AM, Kallikadavil MA, Joshi M. Original Article non-resolving pneumonia aetiology and clinical profile: a prospective study. 2016;5(19):954–8.
  15. Kundu S, Mitra S, Mukherjee S, Das S. Adult thoracic empyema: A comparative analysis of tuberculous and nontuberculous etiology in 75 patients. *Lung India* [Internet]. 2010 Oct;27(4):196–201. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21139713>
  16. FeinsilverSH, Fein AM, Niederman MS, Schultz DE, Faegenburg DH. Utility of fiberoptic bronchoscopy in nonresolving pneumonia. *Chest* [Internet]. 1990 Dec;98(6):1322–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2245668>