



“TO STUDY THE CLINICAL PROFILE AND UTILITY OF FIBER-OPTIC BRONCHOSCOPY IN SUSPECTED CASES OF NON RESOLVING PNEUMONIA IN IDENTIFYING ITS ETIOLOGY AT TERTIARY HEALTH CARE CENTRE”

Respiratory Medicine

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ABSTRACT

Introduction- Non-resolving pneumonia is always a challenging clinical scenario where Various diagnostic modalities are greatly required to reach the diagnosis. We aimed to study The role of fiberoptic bronchoscopy in non-resolving pneumonia along with the various comorbidities associated with the disease condition. **Methodology-** A prospective observational study in a tertiary care hospital was undertaken. A total of 40 patients diagnosed with non-resolving pneumonia were recruited for diagnostic fiberoptic bronchoscopy. **Results-** The overall diagnostic yield of fiberoptic bronchoscopy in non-resolving pneumonia was 87.5%. The causes of non-resolving pneumonia were Tuberculosis(22.5%), bacterial pneumonia(45%), malignancy(15%), fungal pneumonia(5%). 12.5% patients were undiagnosed. Patients had a significant past history which also revealed associated comorbid conditions. Diabetes(14(33%)) and COPD(11(27.5%)) were leading comorbid conditions. **Conclusion-** Fiberoptic Bronchoscopy is a great utility tool in reaching the diagnosis in patients with non-resolving pneumonia.

KEYWORDS

Fiberoptic Bronchoscopy, Non-resolving Pneumonia, Tuberculosis, Malignancy, Diabetes, COPD.

INTRODUCTION

Pneumonia is defined as inflammation of the pulmonary parenchyma caused by an infectious agent.

Pulmonary physicians are often confronted with the dilemma of slowly resolving or non-resolving pulmonary radiological infiltrates for suspected community acquired pneumonia patients started on antibiotics.

Non-resolving pneumonia is estimated to be accountable for approximately 15% of inpatient admissions in the department of respiratory medicine and 8% bronchoscopies performed.

Slow resolution or non-resolution of pneumonia may in turn reflect inadequate antibiotic therapy, impaired defence of the host, resistance to antibiotics or extremely virulent organisms, non-bacterial causes, endo-bronchial lesions which causes obstruction in the trachea-bronchial tree and a series of non-infectious causes.

About 20% of non-resolving pneumonia is due to non-infectious causes. In this study, we aimed to establish the role of fiberoptic bronchoscopy in evaluating the etiological diagnosis of non-resolving pneumonia.

METHODOLOGY

Study Design-

This study was a prospective observational study, performed in the department of respiratory medicine at a tertiary care hospital over a period of 18 months.

Study Population-

40 consecutive cases of non-resolving pneumonia of both genders, attending the respiratory medicine during the study period, were selected by adhering to the inclusion and exclusion criteria.

Inclusion Criteria –

Patient consenting for the study. Adult patients aged 18 years and above. Patients with presence of persistence of clinical symptoms and signs (cough, sputum production, with/ without fever more than 100 degree F etc), failure of resolution of the radiographic features by 50% in 2 weeks or completely in 4 weeks on serial chest x-ray, sputum for AFB smear negative for two consecutive days.

Exclusion Criteria-

Patient not consenting for the study. Person who is a known or

suspected case of HIV & HbsAg infection. Patients with bleeding diathesis. Patients with history of recent myocardial infarction, arrhythmias and who are contraindicated for fiberoptic bronchoscopy. Patient already diagnosed with lung cancers, sputum positive pulmonary koch's. Patient having very poor general condition and very severe breathlessness.

Study Population-

The study was initiated after approval from institutional ethics committee. After application of inclusion and exclusion criteria, with prior informed consent, the patients were included in the study.

Detailed demographic and clinical parameters including age, sex, smoking history, clinical symptoms with duration (cough, fever > 100 degree F, sputum production, hemoptysis, chest pain, breathlessness) and clinical signs were evaluated in all the patients. Presence of comorbidity were documented.

Blood for complete hemogram, blood glucose, urea, creatinine, liver function test, coagulation profile were done. Chest x-ray (PA & lateral view) and contrast enhanced CT chest (CECT) were done at the time of inclusion into the study. Sputum smear examination for Acid fast bacilli (AFB) – two samples (One spot and one early morning sample) by ZN staining technique and induced sputum smear examination for AFB (IF previous negative), Electrocardiogram, HIV and HbsAg Testing.

Study Investigation-

Fiberoptic bronchoscopy (FOB) was done in all patients. It was done as per British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults using Olympus fiberoptic bronchoscope.

Bronchial washing from involved segments was done and specimen obtained was sent for AFB smear, Non-tuberculous bacterial culture, cytology, cell count, fungal smear and Genexpert (CBNAAT).

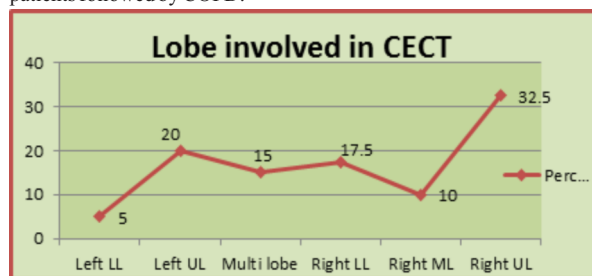
Endo bronchial biopsy, TBNA (Transbronchial Needle Aspiration) and Transbronchial lung biopsy if indicated. Post bronchoscopy sputum samples were collected and sent for AFB smear and cytology.

Further evaluation with CT guided or USG guided biopsy was done in diagnosing the cause of non-resolving pneumonia in patients with inconclusive results from Fiber-optic bronchoscopy (FOB) procedure. The etiology for non-resolving pneumonia was diagnosed and the patient treated accordingly.

RESULTS

For FOB for non-resolving pneumonia 40 patients were studied and the mean age of patients was 45 years (n=18). 75% of patients (n=30) were males while only 25% (n=10) were females. Most of the patients (57%)(n=23) were having symptoms less than 8 weeks duration.

Most common symptom was cough with expectoration(55%) followed by fever (20%), hemoptysis(17%) and chest pain (5%). Clubbing was present in 47.5% of patients. Out of 40 patients, 30% of the patients were smokers and 45% patients were alcoholic. 30% of the patients were having past history of anti-tubercular medications and 60% of the patients were having past history of respiratory illness. Most common co-morbidities associated was diabetes in 33% of patients followed by COPD.



In present study Out of 40 patients, The highest patients i.e. 32.5% (n=13) had Right Upper Lobe involved followed by 20%(n=8) who had Left Upper Lobe involved, 17.5%(n=7) were having Right Lower Lobe involved, 15% (n=6) had Multiple Lobes involved, 10% (n=4) had Right Middle Lobe while, the least i.e. only 5% (n=2) were having Left Lower Lobe involvement in CECT Thorax.

Findings	Frequency	Percentage
HYPEREMIA	14	35.0 %
MUCOPURULENT SECRETION	13	32.5 %
GROWTH (MASS/NODULES)	7	17.5 %
NARROWING/STENOSIS	6	15.0 %
MUCOSAL INFLAMMATION	7	17.5 %
MUCOID SECRETION	4	10.0 %

In present study Among 40 patients, Hyperaemia and Mucopurulent secretions seen in maximum 14 and 13 patients respectively, followed by growth is seen in bronchial lumen in 7 patients, narrowing/stenosis of bronchial lumen in 6 patients, mucosal inflammation seen in 7 patients also mucoid secretions seen in 4 patients.

BAL was negative for AFB in 92.5% of patients, while in only 7.5% of the patients BAL positive for AFB. In 77.5% of patient BAL CBNAAT was negative and only 22.5% patients in which BAL CBNAAT was positive. (MTB detected Rifampicin Sensitive)

BAL cytology results showed that maximum number of patients shows acute inflammatory pathology about 70%(n=28) and among malignant BAL cytology reports, the carcinoma reports were adenocarcinoma, squamous cell carcinoma and undifferentiated carcinoma. Out of 40 patients, Endobronchial biopsy was done in 10 patients and was contributory to the diagnosis in 7 of them. 5 cases were diagnosed as carcinoma, 1 as tubercular Caseating granuloma and 1 as fungal pneumonia(mucormycosis). TBNA was done in 2 patients out of 1 patient had shown adenocarcinoma and 1 other patient no malignancy was detected.

Out of 40 patients the above table shows the distribution of patients based on post FOB sputum CBNAAT results they had. The higher percentage of patients i.e. 87.5% had result of Mtb not detected in post FOB sputum CBNAAT while, only in 12.5% had MTB detected.

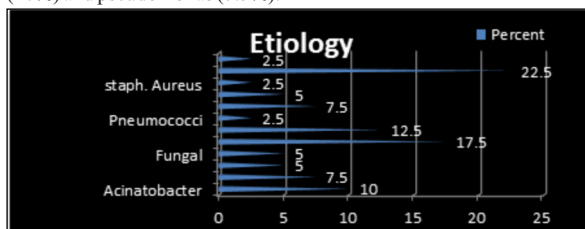
Distribution Of Patients According To Etiology Identified With FOB

Etiology	Frequency	Percentage
Acinetobacter	4	10.0 %
Adenocarcinoma	3	7.5 %
E.coli	2	5.0 %
Fungal	2	5.0 %
Klebsiella	7	17.5 %
Undiagnosed	5	12.5 %
Pneumococci	1	2.5 %

Pseudomonas	3	7.5 %
squamous cell carcinoma	2	5.0 %
staphylococcus Aureus	1	2.5 %
Tuberculosis	9	22.5 %
Undifferentiated carcinoma	1	2.5 %
Total	40	100.0 %

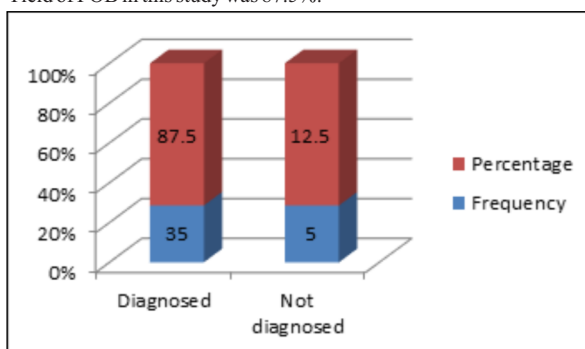
Etiology diagnosed were infectious 72.5%(n=29), malignancy 15%(n=6). Patient had other etiology 12.5% (n=5) diagnosed with further investigation with other modalities after FOB was inconclusive and they were Wegener's, acute lupus pneumonitis and 2 patients had malignancy.

Most common infection were with pyogenic infection 62.2% (n=18) followed by Tuberculosis which account for 31%(n=9) and rest were fungal infection in around 6.8% (n=2). In pyogenic infections, most common organism was Klebsiella (17.5%) followed by Acinetobacter (10%) and Pseudomonas (7.5%).



The majority percentage of patients i.e. 97.5% had no complications while only 2.5% had bronchospasm post FOB.

Yield of FOB in this study was 87.5%.



DISCUSSIONS

Yield of FOB in non-resolving pneumonia is 87.5%. In the study done by Chaudhri et al¹, yield of FOB in NRP was 85.7%. In the study done by Bhupendra Kumar Jain et al⁴, diagnostic yield of FOB was 81%. Mean age of total 40 patients in our study was 40.40±11.22 years. The age of the patients ranged from 21-65 years. In Chaudhri et al¹ study, overall mean age of the patients was 51.33±1.71 years and most of the patients (81%) were above the age of 40 years. Out of 40 patients in our study, 75% of patients were males and rest 25% were females.

Out of 40 patients in our study, 30% were smokers and 70% were non-smokers. A study done by Chaudhri et al¹ in 60 patients, 25 patients (41.6%) were smokers. Out of 40 patients in our study, 35 patients had history of co-morbidities such as Diabetes (33%), COPD(27.5%), Chronic Kidney Disease (10%), Bronchiectasis (7.5%), Asthma (5%), Leukemia (2.5%). In Chaudhri et al¹ in 60 patients, most common co-morbidity was diabetes in 20 patients (33.33%).

In our study, all the patients were assessed using CT chest and the most common involvement was right upper lobe (32.5%) followed by left upper lobe(20%), right lower lobe(17.5%), multilobe involvement(15%), right middle lobe (10%), left lower lobe(5%). In Chaudhri et al¹ in 60 patients, most common involvement was right upper lobe (25%), right lower lobe (23%), left lower lobe(21%), left upper lobe (15%) and multilobe involvement (16%).

In our study, most common etiology found by FOB was Tuberculosis(22.5%) followed by 17.5% with Klebsiella, 10% with Acinetobacter, equal 7.5% had Adenocarcinoma and Pseudomonas, 5% had Escherichia coli, fungal and squamous cell carcinoma and rest 2.5% patient had Pneumococci, undifferentiated carcinoma and

staphylococcus aureus and 12.5% patients were diagnosed. In Chaudhari et al³ in 60 patients, the etiology diagnosed was bacterial pneumonia in 32 patients (53.3%), bronchogenic carcinoma in 16 patients (26.67%), tuberculosis in 10 patients (16.67%), wegener's granulomatosis in 1 patient (1.67%) and undiagnosed in 1 patient(1.67%).

A study done by B Jayprakash et al² to study the etiology and clinical outcome of non-resolving pneumonia in 70 patients, the etiology was Tuberculosis in 11 patients(15.71%). Probable tuberculosis in 14 patients(20%), Malignancy in 19 patients(27.1%), Bronchiectasis in 6 patients(8.6%), Pneumocystic pneumonia in 5 patients (7.1%), Bronchiolitis obliterans organizing pneumonia in 4 patients (5.7%), resistance to empirical antibiotics in 10 patients (14.3%) and others in 1 patient(1.4%).

In another study by Bhupendra Kumar Jain et al¹, in 65 patients, the etiology was Pyogenic infection in 24 patients(37%), Pulmonary tuberculosis in 19 patients (29.2%), Bronchogenic carcinoma in 15 patients(23%), Foreign body in 2 patients(3%), Segmental bronchial stenosis in 1 patient(3%), Multiple blood clots in 1 patient(1.5%), Wegeners granulomatosis in 1 patient(1.5%) and undiagnosed in 2 patients(3%).

Out of 40 patients, in patients where infection was diagnosed, the most common presenting symptom was cough with expectoration followed by fever. Out of 40 patients, in patients where carcinoma was diagnosed, the most common presenting symptom was hemoptysis followed by cough with expectoration. Out of 14 patients with diabetes, only 1 patient diagnosed with tuberculosis. Out of 11 patients with COPD, 54%(n=6) of them were diagnosed with carcinoma.

Out of 40 patients, in patients of infections were diagnosed, the most common lobe involved was right upper lobe followed by left upper lobe, right lower lobe, multilobe, right middle lobe, left lower lobe. Out of 40 patients, in patients where carcinoma was diagnosed the most common lobe involved was right middle lobe followed by equal involvement of right lower lobe, left lower lobe, multilobe and right upper lobe. Out of 40 patients, in patients where other diseases were diagnosed, the most common lobe involved was multilobe followed by equal involvement of left upper lobe, right lower lobe, right upper lobe. Out of 40 patients, in patients where infections were diagnosed the most common FOB finding was mucopurulent secretions followed by hyperaemia, mucosal inflammation, irregular lumen/stenosis and mucosal secretions. Out of 40 patients, in patients where carcinoma was diagnosed the most common FOB finding was intraluminal mass followed by irregular lumen/stenosis. Out of 40 patients, in 6 patients where carcinoma was diagnosed, all of them were smokers.

CONCLUSION

- Bronchoscopy have a definitive role (Yield 87.5%) in the finding etiology of Non resolving pneumonia.
- Most common age group involved was 41-50 years.
- Youngest patient was 21 year old and oldest patient was 65 year old in present study.
- Males were affected three times than females.
- Most of patients had addiction of alcohol and smoking.
- Cough was most common symptom overall.
- Most of patients present between 4-8 weeks of onset of symptoms.
- Hyperemia and mucopurulent secretions were most common FOB findings observed.
- Infectious etiology (72.5%) was most common cause of No resolving pneumonia.
- Among infectious etiology pyogenic infections (62.8%) were most common etiology of no resolving pneumonia followed by tuberculosis (31.0%)
- Among diabetics most common organism found in etiology was klebsiella.
- Bronchoscopy is quite safe procedure in diagnosing the etiology of no resolving pneumonia as minimum complication seen after FOB (2.5%) with no mortality.

ABBREVIATIONS

- FOB – FIBEROPTIC BRONCHOSCOPY
- NRP – NON-RESOLVING PNEUMONIA
- CBNAAT – CARTRIDGE BASED NUCLEIC ACID AMPLIFICATION TEST
- AFB – ACID FAST BACILLI

- COPD- CHRONIC OBSTRUCTIVE PULMONARY DISEASE
- BAL- BRONCHO ALVEOLAR LAVAGE
- MTB- MYCOBACTERIUM TUBERCULOSIS

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