



TO STUDY MICROBIOLOGICAL SPECTRUM OF BRONCHOALVEOLAR LAVAGE IN PATIENTS WITH NON-RESOLVING CONSOLIDATION

Dr. Mithilesh Kulkarni	Resident, Department of Respiratory Medicine, Dr. Shankarrao Chavhan Government Medical College, Nanded, Maharashtra
Dr. Vikas Patel*	Resident, Department of Respiratory Medicine, Dr. Shankarrao Chavhan Government Medical College, Nanded, Maharashtra *Corresponding Author
Dr. Vijay Kapse	Associate Professor, Department of Respiratory Medicine, Dr. Shankarrao Chavhan Government Medical College, Nanded, Maharashtra

ABSTRACT Bronchoscopy is defined as a “diagnostic and therapeutic procedure that permits for direct visualization of tracheo-bronchial lumen with the help of Bronchoscope, a specialized optical device. Flexible television endoscopes with a small camera on its tip were developed allowing for improved imaging quality and electronic data. This observational prospective study was carried out in 33 patients recruited over 18 months duration in specialized Pulmonary unit of tertiary level Government Medical college & Hospital having well equipped intensive respiratory unit and Fiberoptic Bronchoscopy unit with video assistance to obtain microbiological spectrum of BAL in patients with Non-Resolving consolidation. In this study, there were 33 cases of non-resolving consolidation. BAL was positive for specific organisms in case of 12 patients and thus the total yield was 36.36%. The organisms found were *Staphylococcus*, *Klebsiella*, *Pseudomonas*, *Citrobacter*, *E. coli*, *Mycobacterium tuberculosis* and *Aspergillus fumigatus*.

KEYWORDS : BAL, Bronchoscopy, *Staphylococcus*, *Klebsiella*, tracheobronchial tree

INTRODUCTION:

Bronchoscopy is defined as a “diagnostic and therapeutic procedure that permits for direct visualization of tracheo-bronchial lumen with the help of Bronchoscope a specialized optical device.” Fiberoptic Bronchoscope is one of the most important advances in the field of pulmonary medicine. Rigid Bronchoscope was invented by *Gustav Killian* in 1897¹. He observed lower trachea and bronchus with it. Gustav Killian is known as father of Bronchoscopy.² Since then pulmonary endoscopy has become one of corner stone of pulmonary medicine. Technique of Bronchoscopy has evolved rapidly and chest physicians, anesthetists and cardiothoracic surgeons worldwide routinely perform bronchoscopy in variety of clinical conditions.³ Bronchoscopy has rapidly progressed with continuous improvement in instrument and technique. Endo-bronchial examination of tracheo-bronchial tree has progressed from the rigid technique originally described by Killian to flexible fiberoptic technique described by Dr. Ikeda. Near end of 1980s as a result of rapid progress in electronics Flexible television endoscopes with a small camera on its tip were developed allowing for improved imaging quality and electronic data. The same electronic evolution allowed for the invention of other modalities like Bronchoscopic Ultrasound and Autofluorescence Bronchoscopy. Dr Ikeda in February 1987 introduced videobronchoscopy. The Videobronchoscope offers the potential to become the next generation instrument for visualizing the tracheo-bronchial tree².

Non-resolving Pneumonia: It is signaled by little or no change in the chest roentgenogram. Non-resolving infiltrates often results from other pathological entities that mimic the presentation of pneumonia.

MATERIALS AND METHODS:

This prospective study was carried out in specialized Pulmonary unit of tertiary level Government Medical college & Hospital having well equipped intensive respiratory unit, pulmonary function testing (PFT) lab with facilities of DLCO and Fiberoptic Bronchoscopy unit with video assistance.

This study was carried out in 95 patients recruited over one and half year's duration.

Cases were selected from patients attending outpatient department, patients admitted in wards, intensive respiratory units and patients referred to us by various departments with variety of respiratory complaints. Patients were recruited with following inclusion and exclusion criteria.

Inclusion criteria:

- Age > 13 yrs

- Non resolving consolidation (defined as no radiological improvement in 4 weeks despite appropriate antibiotic therapy)

Exclusion criteria

- Age < 13 years
- Resting hypoxemia
- Myocardial infarction, angina, unresolving arrhythmia
- Patients with acute respiratory failure requiring ventilator support
- Acute exacerbation of COPD
- Bleeding diathesis
- Congestive cardiac failure

After all investigations, preanaesthetic checkup and written, informed consent, patients were prepared for bronchoscopy. Bronchoalveolar Lavage was collected from the affected bronchopulmonary segment. BAL was subjected for Microbiological and cytological evaluation. Microbiological evaluation included Gram stain, ZN stain, Bacterial and Mycobacterial culture.

RESULTS:

In present study, there were 33 cases of non-resolving consolidation. BAL was positive for specific organisms in case of 12 patients and thus the total yield was 36.36%. The organisms found were *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Citrobacter*, and *E. coli*, *Mycobacterium Tuberculosis* and *Aspergillus Fumigatus*. In rest 21 cases, BAL was sterile. Amongst 12 cases of Non resolving pneumonia which were positive for specific organism, 3(25%) patients had *Klebsiella Pneumoniae*, 2(16.66%) had *Staphylococcus aureus*, 2(16.66%) had *Pseudomonas aeruginosa*, 1(8.3%) had *Citrobacter* and *E. coli*. each, 3(25%) had *Mycobacterium tuberculosis*, 1(8.33%) had *aspergillus fumigatus*.

DISCUSSION:

In this study, out of all 33 cases of Non-resolving pneumonia Microbiological yield of BAL was 36.36%. Organisms isolated in decreasing order of frequency were *Keibsiella pneumoniae* (25%), *Mycobacterium tuberculosis* (25%), *Staphylococcus aureus* (16.6%), *Pseudomonas aeruginosa* (16.66%), *E. coli* (8.33%), *Citrobacter* 9.83%.

Rolin et al. (2012)³ also found similar yield of 37.7% in patients with lung cancer. Thus more than a third of patients investigated for lung cancer had evidence of bronchial colonisation with potentially pathogenic bacteria at the time of diagnosis. This suggests that lavage ought to remain a routine aspect of bronchoscopy for cancer, as identification of bacteria at this early stage might be used to guide the choice of effective antibiotics for the treatment of subsequent pulmonary infections.

Yield of bronchoscopic BAL in our study is better than that in study of Singh R, et al.⁴ who reported the yield of 28%.

In the study by Mona M Ahmad et al.⁵, 15 (15%) cases with nonconclusive histopathology for malignancy (inflammatory) were compatible with infection. Bacteriological studies have shown that three cases out of 15 (20%) were *Pseudomonas aeruginosa*, two (13.33%) cases were *Klebsiella pneumoniae*, one (6.67%) case was TB infection, one (6.67%) case had *Aspergillus fumigatus*, and in eight (53.33%) cases, there was no growth. So the Microbiological yield was 47.77%.

This study illustrates that Bronchoscopy with BAL is a important tool to evaluate patients with non resolving pneumonia and is one of most common indication for bronchoscopy.

Gupta et al (2015)⁶ reported that most common indication for performing bronchoscopy was malignancy (32.2%) followed by infections (18.8%), interstitial lung disease (11%), hemoptysis (11%), pleural effusion (3.6%), mediastinal lymphadenopathy and hoarseness of voice (20.1%), foreign body extraction (0.26%). In another study, Ming LC, et al.⁷ in 1990 reported that the patient with suspected malignancy was the most common indication for performing bronchoscopy followed by consolidation collapse in 27%, unresolved pneumonia in 19.4% and pleural effusion in 10.9% of the patients.

CONCLUSION:

This study proves that Bronchoscopy along with BAL is a useful investigation to evaluate patients with Non resolving Pneumonia. It helps to find out etiological agent and rule out malignancy.

REFERENCES:

1. Fishman's Pulmonary Diseases and Disorders. Fourth Edition. Page No. 630.
2. Professor Rajan Santosham. Evolution of Bronchoscopy in the world and in India Indian J Bronchology. 2006 Jan-Apr; 1:6.
3. Rolin SA, Waite DJ. Yield of microbiology samples taken during bronchoscopy performed for the diagnosis of lung cancer. *Thorax* 2012;67(Suppl 2):A1-A204A73)
4. Singh R, Kaur H, Singh G. Diagnostic Yield of Fiberoptic Bronchoscopy in a Teaching Hospital. *JK Science* Vol. 10 No. 4, Oct-Dec 2008: 178-180.
5. Ahmad MM, Abdelfattah EB, Mohamed RG. Indications and outcome of bronchoscopy in Bronchoscopy Unit, Chest Department, Ain Shams University Hospital: a 6-month report. *Egypt J Chest Dis Tuberc* 2018;67:136-45
6. Gupta AA, Sehgal IS, Dhooria S, et al. Indications for performing flexible bronchoscopy: Trends over 34 years at a tertiary care hospital. *Lung India : Official Organ of Indian Chest Society*. 2015;32(3):211-215. doi:10.4103/0970-2113.156213.
7. Lum Chor Ming, Chan Ming Huong, Lee Yun Cheong Fiberoptic Bronchoscopy in the Chinese elderly the review jour of Hong Kong Geriatric society 2000.