

## Original Research Article

# Role of bronchoscopy in pleural effusion bacterial infection

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### ABSTRACT

**Background:** In the present study was to investigate that the role of Bronchoscopy in pleural effusion in bacterial growth condition. Pleural effusion is one of the commonest problems with which patients present to the hospital. Pleural effusion is always abnormal and indicates the presence of an underlying disease. Despite the fact that there are many causes of pleural effusion, it is estimated that 90% of all pleural effusions are the result of only 5 disease processes: malignancy, pneumonia, pulmonary embolism viral infection, congestive heart failure.

**Methods:** This is a Prospective and Observational Study. All patients diagnosed to have pleural effusion by x-ray, clinical examination and ultrasound examination of pleura if needed will undergo informed.

**Results:** All 80 patients were included of whom 60(70%) were males and 20(30%) were females. Out of 80 patients, 5 patients are having bacterial growth (6.3%). All 5 patients who had exudative effusion, 4 were males and 1 female, 4 cases were right side effusion and 1 left sided effusion.

**Conclusions:** Authors conclude that bronchoscopy has a definite role in the etiological diagnosis of pleural effusion in bacterial infection.

**Keywords:** Bronchoscopy, Pleural effusion and bacterial infection, X-ray

## INTRODUCTION

Pleural effusion is one of the commonest problems with which patients present to the hospital. The pleural space is bounded by the parietal and visceral membranes covered by a continuous layer of pleural mesothelial cells.<sup>1</sup> Pleural fluid is formed from the systemic vessels of the pleural membranes at an approximate rate of 0.6 ml/h and is absorbed at a similar rate by the parietal pleural lymphatic system. Normally, the pleural spaces contain approximately 0.25 ml/kg of low protein liquid. Disturbances in either formation or absorption result in the accumulation of excess pleural fluid.<sup>2</sup>

Empyema or empyema-like fluid occurs due to bacterial infection in the pleural space. An effusion is called an

empyema when the concentration of leucocytes becomes macroscopically evident as a thick and turbid fluid with pus. Empyema are diagnosed by exudate/pus with polymorphonuclear predominance; Gram stain showing organisms; low glucose; elevated lactate dehydrogenase (more than 1000; and pH less than 7.2). Accumulation of exudative pleural fluid associated with an ipsilateral pulmonary infection that does not look like pus but satisfies the above is called empyema-like fluid. Only 50% of empyema cases are associated with pneumonia.<sup>3,4</sup>

Flexible bronchoscopy is the most common type of bronchoscopy. The flexible bronchoscope is an instrument that is inserted through the mouth, a nasal orifice, an endotracheal tube, a tracheostomy tube, or a tracheostomy stoma and then used to visualize the vocal

cords or tracheobronchial tree, and segmental airways out to the third generation of airways.<sup>5</sup> In the present study authors used bronchoscope to find out the causes of pleural effusion in bacterial infection.

## METHODS

### Experimental design

Eighty patients in the age group of 20-70 admitted in the unit of T.B and Pulmonary Medicine, Sri Ramachandra University, Porur, Chennai, Tamil Nadu for the study. The conducted study was a Prospective, Observational Study. This includes 60 were males and 20 were females. Out of 80 patients, 5 patients are having bacterial growth (6.3%). All 5 patients who had exudative effusion, 4 were males and 1 female, 4 cases were right side effusion and 1 left sided effusion. Patients demographic data, including sex, age, and mild to moderate effusion were recorded.

### Statistical analysis

Data were analyzed using the SPSS software package, version 17.0. Quantitative data were expressed using range, mean, SD, and median, whereas qualitative data were expressed as frequency and percentage. p value was assumed to be statistically significant at 0.05.

### Ethical concern

Ethical clearance was obtained from the Ethical committee meeting conducted at Sri Ramachandra Medical College, Chennai, Tamil Nadu.

## RESULTS

### Presentation according to age in pleural effusion bacterial growth

Table 1 shows the presentation according to age in Pleural effusion bacterial growth. This table clearly mentioned that Bacterial Growth was found to be more common in age between 50-60 years (Mean 55.21±5.5).

**Table 1: Age in pleural effusion bacterial growth.**

	N	Min.	Max.	Mean	Std deviation
Age	80	23	85	55.21	5.5
Valid N (list wise)	80				

### Presentation according to gender in pleural effusion bacterial growth

Table 2 indicates that the gender in pleural effusion bacterial growth. Out of 80 patients, 60 were male (75%) and 20 were female (25%). Five patients were present in bacterial growth out of eighty patients. Out of 5 patients,

4 males are having bacterial growth, 1 female have bacterial growth.

**Table 2: Gender in Pleural effusion bacterial growth.**

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	60	75.0	75.0	75.0
Female	20	25.0	25.0	100.0
Total	80	100.0	100.0	

### Presentation according to side of effusion in pleural effusion bacterial growth

Table 3 shows the presentation according to side of effusion in pleural effusion bacterial growth patients. This table demonstrates the percentage of side of effusion in pleural effusion cancer patients.

The percentage of presentation according to Right side and Left side were respectively 80% and 20%. Out of 5, 4 right side effusion have bacterial growth and 1 left side effusion have bacterial growth.

**Table 3: Side of effusion in pleural effusion bacterial growth.**

	Frequency	Percent	Valid percent	Cumulative percent
Valid				
Right	4	80	80	80
Left	1	20	20	20
Total	5	100	100	

### Chest X-Ray findings in view of bacterial growth

#### Chest X-Ray no mediastinal shift

Table 4 indicates that, out of 80 patients, 3(3.8%) patients had no mediastinal shift in chest x-ray.

**Table 4: Chest x-ray no mediastinal shift.**

	Frequency	Percent	Valid percent	Cumulative percent
Valid				
Positive	3	3.8	3.8	3.8
Negative	77	96.3	96.3	100
Total	80	100	100	

#### Chest x-ray mediastinal shift (OPP): bacterial growth

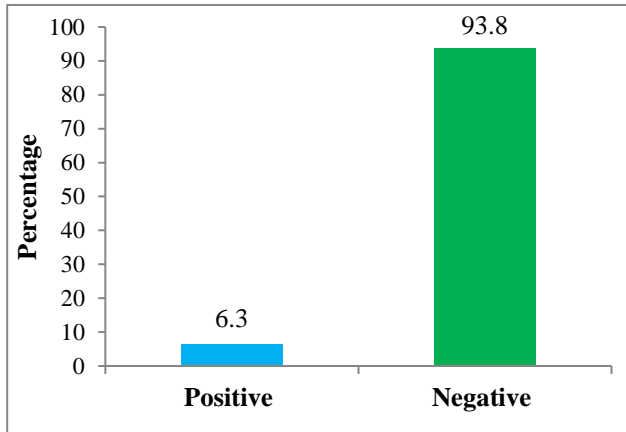
Table 5 shows that the out of 80 patients, 4(5%) patients had Mediastinal shift to opposite side in chest x-ray.

#### Bacterial growth- final definitive diagnosis

Figure 1 indicates that the out of 80 patients, 5 patients are having bacterial growth (6.3%).

**Table 5: Chest x-ray mediastinal shift (OPP): bacterial growth.**

	Frequency	Percent	Valid percent	Cumulative percent
Valid				
Positive	4	5.0	5.0	5.0
Negative	76	95	95	100
Total	80	100	100	

**Figure 1: Final definitive diagnosis.**

## DISCUSSION

In This prospective study totally 80 patients were included of whom 60 (70%) were males and 20 (30%) were females. Interestingly all the male patients were smokers and female patient's non-smokers. Right sided pleural effusion was present in 50 patients and left sided effusion was present in 30 patients.

Out of 80 patients, 32 patients diagnosed as malignancy (40%) and 16 patients diagnosed as tuberculosis (20%) and 5 patients are having bacterial growth (6.3%) Shi-Chuan chang et al, found that patients with unknown pleural effusion, fiberoptic bronchoscopy was more likely Discussion 113 to yield a diagnosis than thoracocentesis with closed pleural biopsy in those who had haemoptysis or pulmonary abnormality in chest x-ray films.<sup>6</sup>

The present study describes that out of 80 patients who underwent bronchoscopy and bronchial wash culture and sensitivity showed 5 patients showed non-tubercle bacilli growth. All 5 patients who had exudative effusion, 4 were males and 1 female, 4 cases were right side effusion and 1 left sided effusion. Burgess et al, showed that the comparative analysis of the biochemical parameters used to distinguish between pleural transudates and exudates in pleural fluid in bacterial infection.<sup>7</sup>

Out of 80 patients, 5 were positive for bacterial growth, 3 patients had no mediastinal shift and 2 patients had mediastinal shift to opposite side in chest x-ray. p value: 0.000, statically significant.

Present study highlights, importance of chest x-ray finding of mediastinal shift which plays main role in diagnosing pulmonary disease. The above new findings were not observed in previous studies.

The results of this study coincide with article, which also highlights malignancy as main cause. In a retrospective study Steven H. Feinsilver et al, and Light RW et al, found that the yield of diagnosing malignancies by FOB in patients with malignant pleural effusion is slightly higher.<sup>8,9</sup> Hence it is helpful in searching the primary tumor.

Arnab maji et al, have included total of 568 patients, carcinoma of lung was the most commonest cause of malignant pleural effusion and bronchoscopy guided biopsy was given the highest yield of histological diagnosis (84.6%).<sup>10</sup>

## CONCLUSION

Authors conclude that bronchoscopy has a definite role in the etiological diagnosis of pleural effusion. In the present era of evidence based medicine authors can go for a safer intervention like fiberoptic bronchoscopy if the cases of pleural fluid analysis are inconclusive.

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