



## CLINICO-PATHOLOGICAL PROFILE OF ENDOBRONCHIAL LESIONS

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**ABSTRACT** **Aim:** The objective of the present study was to identify the spectrum of diseases presenting as endobronchial lesions, their pathological aspect and the role of fiberoptic bronchoscopy in diagnosing these lesions. **Methods:** The present study was conducted on 33 patients with endobronchial lesions at GSL Medical College, Rajahmundry for the period of two years. **Results:** The age group most commonly involved in the study was 41-60 years (54.5%). The youngest was aged ten years, and the oldest was 85 year. Mean age was 52 years (S.D.±17.14). Out of the total of 33 patients involved in the study, 18 (54.5%) were males while 15 (45.4%) were females. From the analysis of the symptoms among the study population, the most common symptom was cough (87.8%), followed by dyspnea (60.6%), expectoration (48.4%), fever (33.3%) and chest pain (33.3%) and the least common was hemoptysis (27.2%). Analysis of the radiological findings in the study population showed that the majority of the cases (60.6%) had right lung involvement while 13 patients (39.3%) had left lung involvement. Analysis of the radiological findings among the study participants showed that 14 (42.4%) patients had mass, 9 (27.7%) had pneumonia, and 10 (30.3%) had collapse. Among the 33 patients studied, the etiological diagnosis was known in 31 (93.9%), malignancy was diagnosed in 22 (66.6%) patients, benign lesions like Endobronchial Tuberculosis in 6 (18.1%), Squamous cell Papilloma in 1 (3%), Pneumonia in 2 (6%) and inconclusive in 2 (6%) patients. In all 33 cases, bronchial biopsy and bronchial washings were taken. Out of the 31 (93.9%) cases diagnosed, 23 (74.19%) patients had a positive report for biopsy, and 14 (45.16%) patients had a favourable report for bronchial washings. **Conclusion:** Based on the symptoms of the patients, endobronchial growth may be diagnosed if supported with investigations like a chest x-ray and C.T. thorax. Fob is an essential tool to get an adequate pathological and microbiological specimen. As from the symptoms the presence of endobronchial lesions, particularly malignancies, can be suspected.

**KEYWORDS :** Endobronchial lesions, fiberoptic bronchoscopy

### INTRODUCTION

Endobronchial lesions are lesions arising from the bronchial wall. Hence, clinical and radiological features of such lesions might not differentiate between different aetiologies, and hence sampling is required to distinguish between benign and malignant lesions.<sup>1,2</sup> As well-known from the available literature, apart from malignancy, various other aetiologies are responsible for endobronchial diseases such as endobronchial tuberculosis, endobronchial carcinoid, endobronchial sarcoidosis, endobronchial aspergilloma, fungal infections such as mycetoma and rhizomucor, viral infections such as CMV, bacterial infections such as Actinomyces meryeri, etc.<sup>3,4</sup>

All these endobronchial diseases have been reported with a certain endobronchial profile.<sup>5,6</sup> These diseases may present as cough and recurrent wheezing and may be misdiagnosed as COPD or asthma, but a keen observation of their endobronchial profile as well as histopathology is helpful for ruling in or ruling out such a wide spectrum of aetiologies.<sup>7,8</sup> Other rare endobronchial diseases are endobronchial hamartoma, synovial sarcoma, endobronchial metastasis, endobronchial lipoma, endobronchial haemangioma, endobronchial fibroma, inflammatory myofibroblastic tumor, fibroepithelial polyp, etc.<sup>9,10</sup>

A chest CT scan, which is used to detect and characterise suspected lung lesions, provides a wealth of information, including morphological features, disease staging, and predictability<sup>11</sup>, with high sensitivity and specificity rates.<sup>12</sup> But chest CT also has certain limitations, like it can easily miss endobronchial lesions, which is why bronchoscopy is used, which plays a very important role in the evaluation of lung lesions, including those suspicious for bronchogenic carcinoma.<sup>13</sup> It gives us information like morphology of lesions, extent of disease, the degree of involvement of the airway, staging and to decide the mode of therapy for carcinoma. The yield of bronchoscopy is highest for endobronchially visible lesions, with a diagnostic yield of approximately 90%.<sup>14,15</sup> Bronchoscopy also aids in the confirmation of the absence of any radiographically occult lesion.

Plain chest radiograph for routine screening, though an excellent tool for analysing the endobronchial pathologies, is often unable to detect the lesion. Other sophisticated imaging techniques like Computed Tomography (C.T.) are required for reaching a diagnosis. After the advent of Fiberoptic Bronchoscopy (FOB), visualisation of lesions inside bronchus has become more comfortable and more convenient to take a sample for histopathological examination. As FOB is available only in tertiary care centres, most clinicians solely depend on chest radiograph and Computed Tomography. FOB plays a vital role to diagnose these lesions with the help of pathological examination.<sup>16</sup> Careful inspection of the bronchial tree for any signs of endobronchial lesions, narrowing, or any abnormal mucosa along with taking sufficient brushings, biopsies and deep respiratory secretions is possible through this procedure. This is quite useful in the diagnosis of various conditions like neoplasms, infections or other non-infectious causes. The samples have a high bacteriological and histological yield that helps to arrive at a definite diagnosis.<sup>17</sup>

The objective of the present study was to identify the spectrum of diseases presenting as intrabronchial lesions, their pathological aspect and the role of fiberoptic bronchoscopy in diagnosing these lesions.

### MATERIALS AND METHODS

The present study was conducted on 33 patients with endobronchial lesions at GSL Medical College, Rajahmundry for the period of two years.

### METHODOLOGY:

A total of 33 patients with suspicion of clinical and radiological features of endobronchial lesions during the study period were considered as study participants. Patients satisfying the inclusion criteria were only subjected to the study.

The initial workup of the patients was done with detailed clinical history, thorough physical examination and recorded in the format prepared for the purpose. Informed written consent was taken from all the patients. All patients were subjected to fiberoptic bronchoscopy as

per the department protocol. The samples like bronchial aspirate and transbronchial biopsy specimens were collected and sent for pathological analysis following the proper transporting method. The reports given by the pathologist were recorded.

**Inclusion criteria:**

- All patients with suspicion of endobronchial lesions clinically and radiologically in whom bronchoscopy is an indication.

**Exclusion criteria:**

- Haemodynamically unstable patients
- Patients are not fit for fiberoptic bronchoscopy
- Patients who have denied consent

**STATISTICAL ANALYSIS**

All the collected data were recorded on a Microsoft excel sheet, and the master chart was prepared by the help of IBM-Statistical Package for Social Sciences (SPSS v20.0) statistical analysis was done. Descriptive data analysis was done by mean ±SD. Categorical data were analysed by Chi-square test. Correlation between the variables was made by using Pearson correlation coefficient. Linear regression analysis was done to establish the relationship between variables. A P-value less than 0.05 were considered as significant.

**RESULTS**

**Table 1: Patient details**

AGE (years)	N	PERCENTAGE (%)
0-20	2	6.0
21-40	5	15.1
41-60	18	54.5
>60	8	24.2
<b>Gender</b>		
MALE	18	54.5
FEMALE	15	45.4
<b>SYMPTOMS</b>		
DYSPNEA	20	60.6
COUGH	29	87.8
EXPECTORATION	16	48.4
FEVER	11	33.3
CHEST PAIN	11	33.3
HEMOPTYSIS	9	27.2
<b>PERSONAL HISTORY</b>		
SMOKING	15	45.4
ALCOHOL	9	27.2
NONE	15	45.4
<b>LUNG INVOLVED</b>		
RIGHT	20	60.6
LEFT	13	39.3

The age group most commonly involved in the study was 41-60 years (54.5%). The youngest was aged ten years, and the oldest was 85 year. Mean age was 52 years (S.D.±17.14). Out of the total of 33 patients involved in the study, 18 (54.5%) were males while 15 (45.4%) were females. From the analysis of the symptoms among the study population, the most common symptom was cough (87.8%), followed by dyspnea (60.6%), expectoration (48.4%), fever (33.3%) and chest pain (33.3%) and the least common was hemoptysis (27.2%). Analysis of the personal history showed that 24 patients had a significant personal history. In the 24 (72.7) patients, 15 (45.4%) had a history of smoking, and 9 (27.2) had a history of alcohol consumption. Analysis of the radiological findings in the study population showed that the majority of the cases (60.6%) had right lung involvement while 13 patients (39.3%) had left lung involvement.

**Table 2: Radiological findings of the study group**

RADIOLOGICAL FINDINGS	NO. OF PATIENTS	PERCENTAGE (%)
PNEUMONIA	9	27.7
MASS	14	42.4
COLLAPSE	10	30.3

Analysis of the radiological findings among the study participants showed that 14 (42.4%) patients had mass, 9 (27.7%) had pneumonia, and 10 (30.3%) had collapse.

**Table 3: Gross Fiberoptic Bronchoscopy findings**

FOB FINDINGS	NO. OF PATIENTS	PERCENTAGES (%)
ENDOBONCHIAL MASS	21	63.6
ENDOLUMINAL NARROWING	5	15.1
ABNORMAL MUCOSA (congestion, secretions, edema)	7	21.2

Fiberoptic bronchoscopy showed that 21 (63.6%) patients had endobronchial mass, 5 (15.1%) had endoluminal narrowing, 7 (21.2%) had abnormal mucosal changes like congestion/edema or secretions.

**Table 4: Etiological diagnosis of endobronchial lesions of the study group**

ETIOLOGICAL DIAGNOSIS	NO. OF PATIENTS	PERCENTAGE (%)
MALIGNANT	22	66.6
BENIGN (Tuberculosis, Pneumonia, Papilloma)	9	27.2
INCONCLUSIVE	2	6.0

Among the 33 patients studied, the etiological diagnosis was known in 31 (93.9%), malignancy was diagnosed in 22 (66.6%) patients, benign lesions like Endobronchial Tuberculosis in 6 (18.1%), Squamous cell Papilloma in 1 (3%), Pneumonia in 2 (6%) and inconclusive in 2 (6%) patients.

**Table 5: Correlation between radiological findings and final diagnosis**

RADIOLOGICAL FINDINGS	HISTOPATHOLOGICAL DIAGNOSIS	NO. OF PATIENTS
MASS	SQUAMOUS CELL CARCINOMA	9
	ADENOCARCINOMA	3
	CARCINOID	1
	INCONCLUSIVE	1
CONSOLIDATION	SQUAMOUS CELL CARCINOMA	1
	PNEUMONIA	2
	TUBERCULOSIS	6
COLLAPSE	SQUAMOUS CELL CARCINOMA	2
	ADENOCARCINOMA	4
	SMALL CELL CARCINOMA	2
	PAPILLOMA	1
	INCONCLUSIVE	1

Nine cases were diagnosed as consolidation on the radiological basis, and a bronchoscopy in those cases revealed – tuberculosis in 6, squamous cell carcinoma in 1, and pneumonia in 2 patients. Fourteen cases were diagnosed as mass lesions on the radiological basis, and a bronchoscopy in those cases revealed – adenocarcinoma in 3, carcinoid in 1, squamous in 9, inconclusive in 1 patient. Ten cases were diagnosed as lobar collapse on the radiological basis, and bronchoscopy revealed squamous cell papilloma in 1, squamous cell carcinoma in 2, adenocarcinoma in 4, small cell carcinoma in 2 and inconclusive in 1 case.

**Table 6: Type of malignancy diagnosed by FOB (N=22)**

TYPE OF MALIGNANCY	NO. OF PATIENTS	PERCENTAGE (%)
SQUAMOUS CELL CARCINOMA	12	54.5
ADENOCARCINOMA	7	31.8
CARCINOID	1	4.5
SMALL CELL CARCINOMA	2	9

Among the 22 cases diagnosed with malignancy, 12 (54.5%) were squamous cell carcinoma, 7 (31.8%) were adenocarcinoma, 1 (4.5%) was carcinoid, and 2 (9%) were small cell carcinoma.

**Table 7: Diagnostic yield of FOB Specimens(N=31)**

DIAGNOSIS	NO. OF PATIENTS	PERCENTAGE (%)
BIOPSY	23	74.19
BRONCHIAL WASHINGS	14	45.16

In all 33 cases, bronchial biopsy and bronchial washings were taken. Out of the 31 (93.9%) cases diagnosed, 23 (74.19%) patients had a positive report for biopsy, and 14 (45.16%) patients had a favourable report for bronchial washings.

## DISCUSSION

Endobronchial lesions are frequently encountered during bronchoscopy. The clinical profile of an individual, including smoking history, symptoms, radiological picture, and profile of endobronchial lesions, including type (nodular, exophytic, plaque, or ulcerative), location of the lesion, tells us about the likely possibility of diagnosis. But the diagnosis is generally confirmed by histopathological examination.

A total of 33 patients were included in our study. The most common age group involved in the study was the middle-aged group (41-60 years) (54.5%). The youngest patient was aged 10 years, and the oldest was 85 years. The mean age is 52 years ( $\pm$ SD 17.14). This observation is very much similar to Arun BJ et al.<sup>18</sup> in which the age group among the patients studied varied from 35 to 85 with a mean age of 60.91. After analysis of symptoms of the study participants, it was observed that cough was the most commonly found symptom. Out of 33 patients, 29 patients (87.8%) had a cough. Among them 13 patients complained of dry cough, and the remaining 16 (55.1%) had a productive cough. Most of the previous studies have a similar observation of cough as the commonest symptom. DevkotaKC et al.<sup>19</sup> found 89% of patients having cough in their series of 231 patients. Analysis of the history of smoking among patients included in the study showed that 15 (45.4%) patients had a significant smoking history. In 22 cases of lung cancer, 14 patients (66.67%) had a smoking history. In 6 cases of endobronchial tuberculosis, none had a history of smoking. Rana S and his colleagues<sup>20</sup> had similar observation as that of our study. In their series of 50 patients, 48% were smokers, and 46% of those detected to have lung cancer were smokers.

In the present study, among all cases of endobronchial lesions, more than 60% had lesions in the right lung. Remaining 40% had involvement of the left lung. A similar observation was seen in a retrospective study by Rana S et al.<sup>20</sup> who found lesions in the right lung in 52% of cases. As the present study has malignancy as the most common etiological cause, the right lung is most commonly involved. The right main bronchus is wider and shorter than the left main bronchus. The higher frequency of malignancies in the right lung may be because of more chances of the deposition of carcinogens in the right lung than in the left lung. In the randomised NELSON trial by Horeweg N et al.<sup>21</sup> it was evident that the majority of lung cancers (65.6%) were localised in the right lung. The authors explained the probable cause of right lung predominance might be due to better airflow towards the right bronchus at the beginning of the breath, leading to deposition of carcinogens towards that side.

After analysing the Computerised tomography reports of all patients, we correlated these reports with the pathological diagnosis of every individual. All radiological features were broadly divided under three categories- consolidation, atelectasis and mass lesion. Nine (27.2%) patients had consolidation, 10(30.3%) cases had a lobar or segmental collapse, and 14(42.4%) patients had evidence of mass lesion. In the study by Gupta S et al.<sup>22</sup> 50% showed features of consolidation and 28% were showing features of collapse. In the present study, the analysis of gross FOB findings among patients showed endobronchial mass as the most common gross FOB finding and observed in 21 patients (63.6%). It was followed by abnormal mucosa, which included oedema, congestion, secretions in 7 patients (21.2%) and endoluminal narrowing, which included stenosis or extrinsic compression in 5 patients (15.1%). This observation is in agreement with the observations of the following studies. In a study done by B. J. Arun et al.<sup>18</sup> endobronchial growth was the most common finding 44.44%, followed by external compression seen in 20.37%. Similarly, in a study by Sinha S et al.<sup>23</sup> the commonest finding in their series was necrotic/nodular growth occurring in 39.1%.

Specimens like bronchial aspirate, brush smear, and endobronchial biopsy/brushing material was sent to the lab in each case. Out of 33

patients, the diagnosis was confirmed in 31 patients. In the remaining two patients, the pathological reports were inconclusive. We treated them with antibiotics and other supportive treatment and subjected to other investigations like C.T. guided FNAB. The diagnostic yield of bronchoscopy was estimated to be 93.9%. In a study by B.J. Arun et al.<sup>18</sup> the definitive diagnosis with a positive yield was acquired by bronchoscopy in more than half of the patients analysed (59.26%). In a series of 120 patients by Bhadke B et al.<sup>24</sup> the diagnostic yield of FOB was found to be 75%. In this study, the authors recruited all clinically and radiologically suspected cases of lung malignancies.

In the present study among the 33 patients with endobronchial lesions, 10 presented with collapse of lung. The diagnostic yield of FOB is 80% in patients presenting with collapse radiographically. YAN Zhi-jun et al.<sup>25</sup> in a study to assess the value of bronchoscopy to identify the etiological causes of lung collapse, the diagnostic yield was 93.02% by examining 86 cases by bronchoscope. TANG Sang-zi et al.<sup>26</sup> analysed 112 cases of collapse of lung, The diagnostic yield was 91.96%. Among the 22 patients diagnosed by FOB as malignancy, 12 patients had squamous cell carcinoma of the lung (54.5%), 7 patients had adenocarcinoma (31.8%), 2 patients had small cell carcinoma (9%), 1 patient (4.5%) had carcinoid. In the present study, squamous cell carcinoma is the most common type of lung cancer. The findings are similar to the following studies. In a study of suspected lung cancer cases by B. J. Arun et al.<sup>18</sup> Squamous cell carcinoma (41.03%) was the most common. Adenocarcinoma was found in 17.95% of patients, and the exact cell type was unidentified in 30.77%.

Among the six patients diagnosed by FOB as endobronchial tuberculosis, all 6 patients (100%) had a positive result with bronchial washings for CBNAAT. In contrast, one patient had a biopsy showing chronic granulomatous inflammation. Both bronchial biopsy and bronchial washings are positive in 1 patient. This is on par with the study done by Ho Cheol Kim et al.<sup>27</sup>

## LIMITATIONS OF THE STUDY

The sample size in the present study was very small and inadequate to reach a fruitful conclusion. Due to the outbreak of COVID-19 pandemic the institution was converted into a COVID hospital. So, the flow of patients into the hospital was restricted. That is the reason why the sample size was inadequate. A good number of clinically and radiologically suspected patients to have endobronchial lesions either did not give consent or were unfit for fiberoptic bronchoscopy. So, we excluded them from the study. Because this was an unprecedented and unexpected event, it wasn't easy to overcome the investigator's situation, and the study had to be terminated before the due period. With the available collected data, the analysis was done, and the inference was made. A multicentric trial with a larger sample size will throw more light on patients' clinical profile and their correlation with the pathological diagnosis.

## CONCLUSION

Based on the symptoms of the patients, intrabronchial growth may be diagnosed if supported with investigations like a chest x-ray and C.T. thorax. Fob is an essential tool to get an adequate pathological and microbiological specimen. As from the symptoms the presence of intrabronchial lesions, particularly malignancies, can be suspected. Proper clinical analysis of cases may help in early diagnosis of malignancies, leading to a better prognosis. A larger multicentric trial with bigger sample size may provide more information about such patients' clinical and pathological profiles.

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