

## Original Research Article

# Study of the bronchoscopic evaluation of patients undergoing bronchoscopy in respiratory medicine department

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## ABSTRACT

**Background:** Bronchoalveolar lavage or BAL is a minimally invasive procedure that involves instillation of sterile normal saline into a subsegment of the lung, followed by suction and collection of the instillation for analysis. This procedure is typically facilitated by the introduction of a flexible bronchoscope into a sub-segment of the lung. The purpose of this study was to investigate the pathological variations in the tracheobronchial tree in various respiratory diseases.

**Methods:** The study evaluated the bronchoscopic profile of 150 patients who underwent flexible bronchoscopy in the respiratory medicine department of MGM Medical College in Aurangabad, India from October 2020 to September 2022.

**Results:** The majority of the patients were males (65%) and above the age of 50. The most common reason for bronchoscopy was radiological opacity (80% of cases), followed by diffuse pulmonary infiltration (10%). The study found that bronchoscopy was useful in obtaining samples for diagnosis of various respiratory diseases, including malignancies, tuberculosis, bacterial pneumonia, and hematological malignancies. The study also noted the therapeutic utility of bronchoscopy in managing inoperable stenosis of the central airways.

**Conclusions:** The authors concluded that bronchoscopy is an important diagnostic and therapeutic tool for the management of pulmonary diseases.

**Keywords:** Bronchoscopy, Respiratory diseases, Flexible bronchoscope, Bronchoalveolar lavage, Pathological variations

## INTRODUCTION

Bronchoscopy has become an increasingly important diagnostic and therapeutic tool for the management of pulmonary diseases. The flexible fiber-optic bronchoscope developed by Ikeda has progressively supplanted rigid bronchoscopy.<sup>1,2</sup>

Apart from the more orthodox indications for interventional bronchoscopies, such as foreign body removal, clearance and aspiration of secretions,

bronchoscopy nowadays is also used for inoperable stenosis of the central airways-benign or malignant.<sup>3</sup>

In some clinical scenarios, rigid bronchoscopy is said to have an upper hand over flexible bronchoscopy. Side port ventilation makes it very feasible to administer general anaesthesia in patients undergoing rigid bronchoscopy. In children, removal of foreign bodies and in adults, tracheal stricture dilatation and cryotherapy are indications for rigid bronchoscopy.<sup>4</sup>

Fibreoptics and flexibility have led to increasing use of flexible bronchoscopes in the diagnosis of pulmonary

diseases and more so ever in lung malignancy from their introduction in clinical practice since 1960s. Along with its diagnostic utility, it has been brought into therapeutic use very widely because of technology advancements leading to development of Nd:YAG laser, cryotherapy, tracheobronchial stenting to name a few. With wide and increased acceptance and use of flexible bronchoscopy along with somewhat decreased level of training in rigid bronchoscopy seen over the recent past time, it is more than likely that its use will continue to widespread.<sup>5</sup>

Fiber-optic bronchoscopy can be easily performed with the patient awake under topical anesthesia and it offers extensive visualization of the tracheo-bronchial tree. Samples can be collected by several methods like bronchial biopsy, bronchial brushing, aspiration, transbronchial lung biopsy, transbronchial needle aspiration and these combined advantages enhance the diagnostic value of bronchoscopy.

Another important reason for bronchoscopy could be to obtain bronchoalveolar lavage (BAL) specimen which can be useful in diagnosis of not only bronchial malignancies but also cases of sputum smear negative pulmonary tuberculosis, bacterial pneumonia and haematological malignancies.

BAL is a minimally invasive procedure that involves instillation of sterile normal saline into a subsegment of the lung, followed by suction and collection of the instillation for analysis. This procedure is typically facilitated by the introduction of a flexible bronchoscope into a sub-segment of the lung. The procedure was popularized in 1974 by the work of American physicians, Reynolds and Newball, in Maryland. Today, it serves predominantly as a diagnostic tool for the evaluation of lower respiratory tract pathology and in some uncommon conditions, it also has therapeutic utility.<sup>6,7</sup>

The purpose of this study was to investigate the pathological variations in the tracheobronchial tree in various respiratory diseases.

### **Aim**

The aim of the study was to evaluate the bronchoscopic profile of patients reporting to respiratory medicine OPD.

## **METHODS**

### **Study population**

Patients undergoing flexible bronchoscopy in the respiratory medicine department was the study population.

### **Study area**

The study was done in MGM Medical College, Aurangabad.

### **Study design**

This was a retrospective study of patients from October 2020 to September 2022 (2 years).

### **Sample size**

150 patients undergoing bronchoscopy in the last two years, in respiratory medicine OPD, MGM Medical College, Aurangabad were studied.

### **Inclusion criteria**

All patients undergoing flexible bronchoscopy were included.

In this retrospective study, records of 150 patients undergoing bronchoscopy in the last two years, in respiratory medicine OPD, MGM Medical College, Aurangabad were studied.

All bronchoscopic procedures were elective (except for foreign body bronchus, where respiratory distress was present). Routine workup, including detailed respiratory examination, sputum examination (for cytology and AFB), chest X-ray (posterior-anterior view) or high resolution CT scan was performed for all patients before the procedure to define the location of the lesion. The patients were kept fasting for at least four hours before the procedure. Fiberoptic bronchoscopy was carried out under topical-local anaesthesia with patient in supine position and neck extended. While doing fiberoptic bronchoscopy, the entire respiratory tract from nasal cavity to segmental individual bronchus level will be examined and findings noted. Wherever appropriate, samples were collected from the respiratory tract either for BAL or biopsies.

The patients of flexible bronchoscopy performed under local anaesthesia were then allowed to go, except those experiencing difficulty in breathing who were kept under observation in wards. The findings obtained on examination were recorded in predesigned proforma. The therapeutic measures that were taken and the complications that occurred were noted. Data was tabulated and analyzed in IBM SPSS version 26.

## **RESULTS**

Of the 150 patients evaluated 97 (65%) were males and 53 (35%) patients were females (Figure 1).

The majority of the patients were above the age of 50. (Figure 2). The bronchoscopy was performed on a 12-year-old kid.

This investigation was carried out on a total of 150 bronchoscopy patients. The most prevalent reason for the 150 instances was radiological opacity, which was detected in 120 individuals (80 percent). Diffuse

pulmonary infiltration was the diagnosis in 15 (10%) of the patients. With a normal chest X-ray, 12 (8%) patients underwent bronchoscopy for hemoptysis. Bronchoscopy was performed on the remaining 3 (2%) individuals to determine the reason of their unexplained, persistent cough (Table 1).

**Table 1: Indication of bronchoscopy.**

Indications	N	%
Radiological opacity	120	80
Diffuse pulmonary infiltrate	15	10
Hemoptysis with normal chest X-ray	12	8
Others	3	2

**Table 2: Clinical features.**

Clinical features	N	%
Cough	135	90
Hemoptysis	60	40
Breathlessness	104	69
Chest pain	86	57
Fever	50	33

**Table 3: Bronchoscopic finding.**

Bronchoscopic findings	N	%
Endobronchial growth	89	59.5
Non specific inflammation	30	20
Suspected growth	6	4
Inconclusive	16	10.5
Normal	9	6

**Table 4: Cytological diagnosis.**

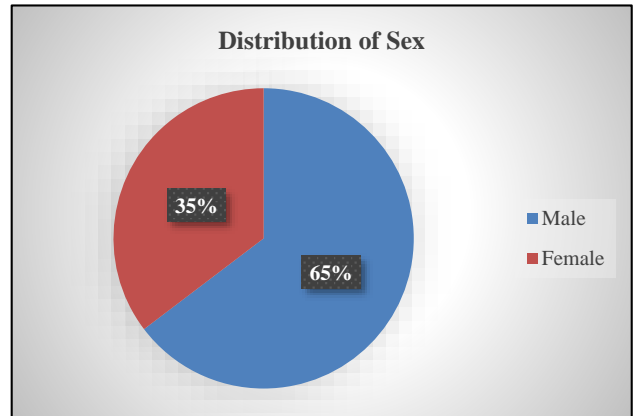
Cytological diagnosis	N	%
Confirmed malignancy	38	25.50
Suspected malignancy	22	14.50
Pulmonary tuberculosis	30	20
Inflammation	18	12
Normal	42	28

**Table 5: Histopathological finding.**

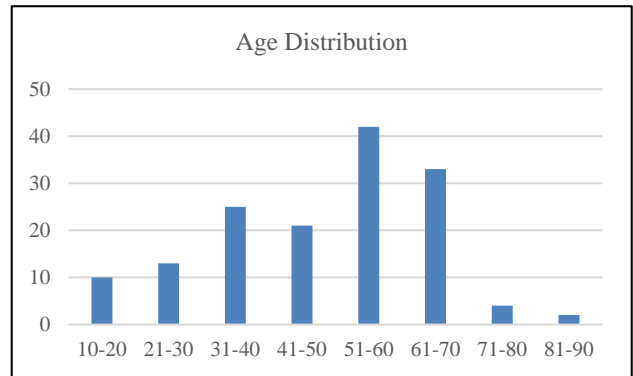
Histopathological findings	N	%
Malignancy	30	64.61
Pulmonary tuberculosis	7	15.38
Infective pathology	7	13.84
Inconclusive	3	6.15

The most prevalent presenting symptom in 135 (90 percent) of the patients was cough. Shortness of breath, chest discomfort, and hemoptysis were present in 104 (69%) of the patients, 86 (57%) of the patients, and 60 (40%) of the patients, respectively. Fever was detected in 50 (33%) of the patients (Table 2). 68 percent of patients

were current or former smokers, whereas 32 percent were nonsmokers.



**Figure 1: Distribution of sex.**



**Figure 2: Distribution of age.**

Endobronchial growth was the most prevalent finding on bronchoscopy, found in 89 (59.5 percent) of patients. Six individuals had endobronchial abnormalities without apparent growth (4.0 percent). Thirty (20%) of the patients demonstrated nonspecific inflammatory abnormalities. Bronchoscopy was inconclusive in 16 (10.5 percent) of the patients, whereas it was normal in 9 (6 percent) (Table 3).

A cytological study of the bronchoscopy material was done. On cytology, cancer was found in 38 (25.5%) of the patients, and suspected malignancy in 22 (14.5%) of the patients. Pulmonary tuberculosis was found in 30 (30%) of the individuals, while inflammation was seen in 18 (12%) of the patients. In 42 cases, the cytology was normal (28 percent). A cytological study of the bronchoscopy material was done. On cytology, cancer was found in 38 (25.5%) of the patients, and suspected malignancy in 22 (14.5%) of the patients. Pulmonary tuberculosis was found in 30 (30%) of the individuals, while inflammation was seen in 18 (12%) of the patients. In 42 cases, the cytology was normal (28 percent) (Table 4).

Histopathological examination was performed on 47 cases. Results revealed malignancy in 30 (64.61%), pulmonary tuberculosis in 7 (15.38%), infective pathology in 7 (13.84%) (Table 5).

## DISCUSSION

The majority of the bronchoscopy patients (64.5 percent) were men, and the bulk of the patients were between the ages of 60 and 70. The number of individuals requiring bronchoscopic evaluation gradually increased till the age group of 60 to 70. Bronchogenic cancer was found in 35 (50 percent) of individuals aged 60 to 70. This might be because the incidence of bronchogenic carcinoma increases with age.

Cough was the most prevalent reason for bronchoscopy (90 percent), which was consistent with a recent research.<sup>8</sup>

A change in the character of the regular cough of a smoker or a COPD patient, particularly if it was associated with other new respiratory symptoms, the possibility of bronchogenic carcinoma should be ruled out. COPD and bronchogenic carcinoma shared similar etiology like smoking, so COPD and bronchogenic carcinoma often coexisted. According to epidemiological research, the majority of individuals with bronchogenic cancer exhibited COPD signs and symptoms.<sup>4,5</sup> In this study, the most common reasons for bronchoscopy were opacity on chest X-ray, pulmonary infiltration, and hemoptysis. In our investigation, the most prevalent cause of hemoptysis was bronchogenic cancer. This was consistent with previous published investigations.<sup>9-11</sup>

Endobronchial growth was the most common finding at bronchoscopy, seen in 89 (59.5 percent) of cases and 16 patients with inconclusive bronchoscopy. Histopathological examination of attempted biopsy (47 cases) revealed malignancy in 30 (64.61 percent), pulmonary tuberculosis in 7 (15.38 percent), and infective pathology in 7 (15.38 percent) (13.84 percent) (Table 5).

Bronchogenic carcinoma was the most frequent illness identified by histological investigation in 30 (64.61 percent) of patients. Lung cancer was identified in a comparable percentage in another research conducted at a tertiary care hospital in Kathmandu.<sup>12</sup>

Of the 22 patients identified with bronchogenic carcinoma, 22 (73.80 percent) had non-small cell carcinoma, whereas the remaining 13 (26.19 percent) had small cell carcinoma. This discovery was consistent with previous reported series.<sup>14</sup>

It had been demonstrated that smoking was the leading risk factor for the development of lung cancer.<sup>15-18</sup> The cumulative risk of lung cancer in heavy smokers may be as high as 30%, compared to a lifetime risk of lung

cancer of 1% or less in nonsmokers. Smoking was linked to more than 90.0 percent of lung cancers.<sup>19</sup> Similarly, in our analysis, the vast majority (68%) of cancer patients were smokers. Bronchoscopy had been associated with a number of problems. 1.3 percent complication rate was found in a retrospective investigation of over 4,000 flexible bronchoscopies.<sup>20</sup> Premedications or anaesthetic medicines were responsible for around 25% of all problems.<sup>21</sup> In our investigation, no patients experienced serious problems. Mild to severe haemorrhages were observed in several cases during the surgery, which were self-limiting with the exception of one patient who experienced copious hemoptysis and was adequately handled.

Our research only looked at the diagnostic usage of bronchoscopy. In our setup, fiber-optic bronchoscopy had been confined to diagnostic objectives due to a lack of additional attachments and advanced devices for therapeutic procedures.

## CONCLUSION

Bronchoscopy is a diagnostic procedure that is both safe and effective, and it may be used to diagnose a wide range of pulmonary disorders, including bronchogenic carcinoma, pulmonary TB, and some interstitial lung diseases. According to the findings of our research, coughing and hemoptysis were the most often seen presenting symptoms among the patients. The majority of cases were diagnosed with radiological opacity. On bronchoscopy and histological investigation, respectively, the most prevalent results were endobronchial growth and malignancy. In addition, we would want to stress the need of attempting to get a biopsy from the aberrant portion of the lung even when bronchoscopy does not reveal any obvious signs of mucosal development.

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