

# Diagnostic Fiberoptic Bronchoscopy at Tribhuvan University Teaching Hospital

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## ABSTRACT

**Background:** Fiberoptic bronchoscopy is one of the most vital procedures performed in health care setting. Globally, several studies have reported findings of fiberoptic bronchoscopy while only few studies have been reported in Nepal. The aim of this study was to perform two year retrospective analysis of diagnostic fiberoptic bronchoscopy at tertiary referral centre.

**Methods:** A hospital based retrospective observational study was conducted at Tribhuvan University Teaching Hospital, Kathmandu, Nepal. Consecutive bronchoscopy reports from June 2017 to May 2019 were included. Data entry and analysis was done in Microsoft Office Excel 2010. Descriptive statistics was performed to obtain clinico-demographic profile of patients, indications and findings of bronchoscopy.

**Results:** A total of 238 bronchoscopy procedures were analyzed. Mean age of patients was 55.02 years with range from 15 to 84 years. Majority of bronchoscopy were performed in male patients (58%). One hundred and twelve patients (47.05%) had no endobronchial lesion. Endoscopically visible tumor was the most common abnormality seen in 57 (23.9%) patients with highest prevalence in 55-65 years followed by extrinsic compression of bronchial tree seen in 13 (5.5%) patients. Bronchioalveolar lavage for routine examination (n=207) was the most commonly performed procedure during bronchoscopy followed by bronchial biopsy (n=55).

**Conclusions:** Fiberoptic bronchoscopy is an extremely useful tool for evaluation of tracheobronchial pathology. Baseline bronchoscopic findings from tertiary referral centre in Nepal was obtained in this study.

**Keywords:** Bronchoscopy; fiberoptic.

## INTRODUCTION

Fiberoptic bronchoscopy is one of the most commonly performed procedures in health care setting. It is widely used to visualize tracheobronchial tree for diagnostic and therapeutic purposes in pulmonary conditions like suspected lung cancer, tuberculosis (TB), non resolving pneumonia, diffuse interstitial or alveolar infiltrates, suspected alveolar haemorrhage and recurrent haemoptysis.<sup>1-3</sup> Bronchoscopy helps in localization of lesion, collection of cytological specimen by bronchioalveolar lavage (BAL) and bronchial brushing and histopathological specimen by endobronchial and transbronchial biopsy and trans bronchial needle aspiration (TBNA). BAL is a minimally invasive procedure involving instillation of aliquots of normal saline into subsegment of lung followed by collection of return fluid for analysis. Biopsy of tumor by transbronchial or

endobronchial biopsy is useful in diagnosis of clinically and radiologically suspected malignancies.<sup>4,5</sup>

The aim of this study was to perform two year retrospective analysis on clinico-demographic profile of patients, common indications and findings of fiberoptic bronchoscopy performed at Tribhuvan University Teaching Hospital (TUTH), a tertiary referral centre.

## METHODS

A hospital based retrospective observational study was conducted at the department of Pulmonology and Critical Care at Tribhuvan University Teaching Hospital (TUTH). Ethical approval was taken from Institutional Review Board, TUTH. Consecutive bronchoscopy performed between June 2017 to May 2019 were included. Bronchoscopy was performed under 4%

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Lignocaine topical spray in upper respiratory tract with additional 2% Lignocaine gel topical application. Prior written informed consent was taken from each patient. Flexible bronchoscopy was performed either through nasal or oral route using Olympus® fiberoptic bronchoscope model EVIS EXERA III-CV-190. Respiratory rate, heart rate, oxygen saturation via pulse oximeter was monitored throughout the procedure. BAL for routine examination like gram stain, culture sensitivity, acid fast bacilli (AFB), Potassium hydroxide (KOH) preparation and Gene X-pert, BAL for cytology, bronchial biopsy, brush biopsy and TBNA were done according to indication in individual patient. TBNA sample was sent for histopathology in 100% alcohol and brush biopsy sample was sent for cytology in formalin.

Retrospective review of consecutive bronchoscopy reports and medical records of patients was done. Therapeutic bronchoscopy and incomplete records were excluded from the study. Data entry and analysis was done in Microsoft Office Excel 2010. Descriptive statistics was performed and results were interpreted in mean, frequency and percentage.

## RESULTS

A total of 238 bronchoscopy procedures were retrospectively analyzed. Mean age of patients was 55.02 years with range from 15 to 84 years. Majority of patients were in age group 55-65 years (Figure 1).

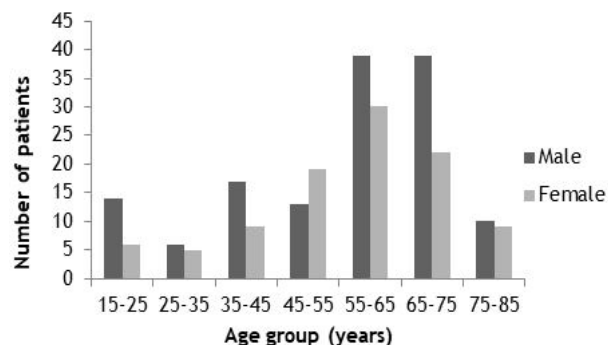


Figure 1. Age distribution of patients.

There were 138 (58%) males and 100 (42%) females undergoing bronchoscopy. The common clinical symptoms in patients were chronic cough (66.4%), haemoptysis (18.5%), shortness of breath (6.7%), weight loss (4.6%) and hoarseness of voice (3.8%). The most common indication for bronchoscopy was suspected malignancy seen in 102 (42.9%) patients followed by diffuse pulmonary infiltrates in 59 (24.8%), recurrent haemoptysis in 44 (18.5%), suspected tuberculosis with

negative sputum smear in 25 (10.5%) and non-resolving pneumonia in 8 (3.3%) patients. Bronchoscopy was performed through nasal route in 92.4% of patients while oral route in 7.6% of patients.

One hundred and twelve patients (47.05%) had no endobronchial lesion. Endoscopically visible tumor was the most common abnormality seen in 57 (23.9%) patients with highest prevalence in age group of 55-65 years followed by extrinsic compression of bronchial tree seen in 13 (5.4%) patients (Table 1). Other bronchoscopic findings comprised of malignant tracheo-oesophageal fistula (n=2), vocal cord polyp (n=2), tracheal polyp (n=1), foreign body (n=1) which were noted as incidental findings. Mucosal hyperemia and oedema, acanthosis, serosanguinous discharge, dilatation and distortion of bronchial tree were some other findings present concomitant with major bronchoscopic findings.

Table 1. Summary of bronchoscopic findings (n=238).

Findings	n (%)
No endobronchial lesion	112 (47.05)
Endoscopically visible tumor	57 (23.9)
Extrinsic compression	13 (5.5)
Bleeding (active and old blood clot)	12 (5.04)
Suspected growth	8 (3.4)
Stenosis	8 (3.4)
Non specific inflammation	6 (2.5)
Post TB sequelae	5 (2.1)
Inconclusive	7 (2.9)
Others	10 (4.2)

Upper lobe bronchus and main bronchus were the most common sites involved on right and left sides seen in 12 (38.7%) and 11 (42.3%) patients respectively (Table 2 and 3).

Table 2. Site of endoscopically visible tumor on right side (n=31).

Site of tumor	n (%)
Upper lobe bronchus	12 (38.7)
Main bronchus	7 (22.6)
Middle lobe bronchus	5 (16.1)
Lower lobe bronchus	3 (9.7)
Carina and main bronchus	1 (3.2)
Carina and lower lobe bronchus	1 (3.2)
Main bronchus, middle and lower lobe bronchus	1 (3.2)
Middle and lower lobe bronchus	1 (3.2)

Table 3. Site of endoscopically visible tumor on left side (n=26).

Site of tumor	n (%)
Main Bronchus	11 (42.3)
Upper lobe bronchus	7 (26.9)
Lower lobe bronchus	5 (19.2)
Lingular lobe bronchus	2 (7.7)
Middle and lower lobe bronchus	1 (3.8)

BAL for routine examination was the most commonly performed procedure followed by bronchial biopsy and BAL for cytology (Table 4).

Table 4. Summary of various procedures.

Procedure	n
BAL for routine examination	207
Bronchial biopsy	55
BAL for cytology	38
Bronchial brushing	30
TBNA	5

None of the patients had major complication during or after bronchoscopy. Post procedure throat discomfort was the most common complain reported by all patients (100%) while 5 patients had transient fever, 2 patients had shortness of breath and 1 had generalized clonic tonic seizure.

## DISCUSSION

This is a retrospective analysis of 238 bronchoscopy reports. The mean age of patients undergoing bronchoscopy in our study was 55.02 years with range from 15 to 84 years which was found to be consistent with findings of a cross sectional study involving 100 patients undergoing bronchoscopy done by Ghimire et al<sup>6</sup> in which mean age was found to be 54.71 years with range of 18 to 85 years. In the same study, majority of patients were male (76%) and higher proportion of patients undergoing bronchoscopy had abnormal chest X-ray (95%) with findings suggestive of lung mass, pulmonary TB, pneumonia and bronchiectasis. This finding is similar to our study with higher proportion of male patients (58%) undergoing bronchoscopy. The most common indication for bronchoscopy in our study was suspected malignancy seen in 102 (42.9 %) patients followed by diffuse pulmonary infiltrates in 59 (24.8 %), recurrent haemoptysis in 44 (18.5%), suspected tuberculosis with negative sputum smear in 25 (10.5%) and non-resolving pneumonia in 8 (3.3%) patients. In a retrospective analysis of 231 bronchoscopies done over a period of

seven years at a teaching hospital in Kathmandu, the commonest indication for bronchoscopy was radiological opacity (90.2%) followed by diffuse pulmonary infiltrates (4.3%) and haemoptysis with normal chest X-ray (1.7%).<sup>7</sup> These findings suggest that in patients with persistent pulmonary symptoms with clinical indication and suspicious imaging, bronchoscopy is valuable for better evaluation and diagnosis.

Endoscopically visible tumor was the most common abnormality seen in 57 (23.9%) patients with highest prevalence in age group of 55-65 years followed by extrinsic compression of bronchial tree seen in 13 (5.5%) patients. The higher prevalence of endoscopically visible tumor in age group of 55-65 years closely correlates with higher occurrence of lung cancer after sixth decade of life.<sup>8,9</sup> The role of fiberoptic bronchoscopy in detection and diagnosis of lung cancer is undisputed. A tumor is visible on bronchoscopy depending on the site of tumor and the stage at which it is performed. Visualization of tumor by bronchoscopy can vary from 37% to 71%.<sup>10-12</sup> In our study, bronchoscopy was indicated in 102 (42.9%) patients due to clinical and radiological suspicion of malignancy. The direct visualization of growth by bronchoscopy was seen in majority of these patients along with few incidental findings in non-suspicious cases resulting in total 57 (23.9%) patients with endoscopically visible tumor. In few cases, indirect evidences of tumor were also seen suggested by extrinsic compression of bronchial tree (5.5%), stenosis (3.4%), unilateral vocal cord palsy, bleeding, serosanguinous discharge, mucosal changes, acanthosis, dilatation and distortion of bronchial tree. All of these cases with clinical, radiological and bronchoscopic suspicion of malignancy were confirmed by BAL for cytology, bronchial brushing, TBNA and histopathological confirmation by bronchial biopsy.

Out of 57 endoscopically visible tumor, we found that upper lobe bronchus was the most common site affected on right side (38.7%) and the second most common site affected on left side (26.9%) after main bronchus (42.3%). Chauhan J et al<sup>13</sup> also found right upper lobe bronchus as the most common site of endoscopically visible tumor. However, the discrepancy in proportion of patients according to the site of tumor could have been due to the differences in sample size among these studies. In a retrospective analysis of 212 bronchoscopic findings in patients with confirmed diagnosis of lung cancer at a hospital in Brazil, tumor was localized with bronchoscopy in 169 patients and upper lobe bronchus was the most common site of involvement with occurrence of 28% and 20% on right and left sides respectively. In the

same study, 199 were evaluated for tumor histological type which showed squamous cell carcinoma in 39%, adenocarcinoma in 21%, small cell carcinoma in 12% and large cell carcinoma in 1% of patients.<sup>14</sup> However, we did not perform a separate analysis on correlation between bronchoscopic and histopathological findings in this study.

BAL for routine examination was the most commonly performed ancillary test done in 207 patients followed by bronchial biopsy, BAL for cytology, bronchial brushing and TBNA. The role of bronchial biopsy is vital in endoscopically visible tumor for diagnosis of primary lung cancer as seen in several studies<sup>4,5</sup> while BAL is useful in peripherally located endoscopically non-visible tumors.<sup>15</sup>

## CONCLUSIONS

Fiberoptic bronchoscopy is safe, inexpensive and valuable tool in pulmonary medicine. This study provides baseline bronchoscopic findings from tertiary referral centre in Nepal which can be used for future observational as well as interventional studies on fiberoptic bronchoscopy in health care setting. Larger studies involving correlation of clinical profile with radiological, bronchoscopic and histopathological findings is recommended.

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