Bronchoscopic Findings and Diagnostic Yield of Flexible Bronchoscopy: Experience from a Tertiary Care Hospital

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Abstract

Background: Bronchoscopy is the basic fundamental diagnostic tool for the evaluation of endobronchial disease. This study aimed to describe the bronchoscopic findings and diagnostic yield of flexible bronchoscopy at a tertiary care hospital.

Methods: A retrospective descriptive observational study of fiberoptic bronchoscopy (FOB) was performed in Respiratory Medicine Department of Mugda Medical College Hospital, Dhaka during the period of January 2022 to December 2023 Flexible bronchoscopy was performed, and bronchial washing, brushing, and biopsy specimens were collected when indicated.

Results: Here we observed 200 cases of bronchoscopy. Out of 200 cases, there were 146 males and 54 females.-Most patients (70%) were aged 50–60 years. Among males 100 (68%) and females 13 (24%) were smoker. Patients presented with COPD 24(12%), TB 36(18%), mass lesion 64(32%), pleural effusion 23 (11.5%), collapse 24(12%), consolidation 10(5%), hemoptysis7(3.5%), hoarseness of voice 4 (2%), DPLD 4(2%), Bronchiectasis 4(2%). Bronchial washings were done in 133 cases and brushing in 133 cases and common location for both was right upper lobe and left lower lobe, Bronchial biopsy was performed in 64 patients, most commonly from the right main bronchus and right upper lobe. Among patients bronchial tree was normal 94(47%), inflamed 44(22%), endobronchial growth 54(27%), suspected TB 4(2%), Vocal cord polyp 3(1.5%) and isolated vocal cord palsy1(0.5%). Histopathological diagnosis of bronchoscopic biopsy was Adenocarcinoma 48%, Squamous cell carcinoma 37%, Small cell carcinoma 8% and Tuberculosis 7%.

Conclusion: The accurate use of conventional bronchoscopy and its technique in the experienced respiratory interventionists will improve the diagnostic and therapeutic outcomes of those patients suffering from respiratory diseases.

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Introduction

Since the introduction of the first flexible fiberoptic bronchoscope by Dr. Shigeto Ikeda in 1966, fiberoptic bronchoscopy (FOB) has been a valuable tool in the diagnosis of pulmonary diseases.[1] Flexible bronchoscopy is very safe and has a high diagnostic yield. Rigid bronchoscope has been replaced by flexible bronchoscope in the diagnosis and management of inflammatory, infectious and malignant disease of the chest and also helps in the diagnosis and therapeutic approach of respiratory diseases.[2] For early diagnosis, different diagnostic modalities are available such as brushing, washing and biopsy.[3] The diagnostic sensitivity of bronchial brushing was 50% according to a study and the diagnostic sensitivity of bronchial biopsy in cases of visible cancer was 84.2% in the same study.[4] Another study has shown that at least five biopsies are needed to maximize the chance of obtaining a histological evidence of cancer.[5] FOB helps to visualize the whole tracheobronchial tree and also helps to obtain bronchial brushings, bronchial washings and bronchial biopsies. FOB will help the physician in arriving at a firm diagnosis and can influence the therapeutic decision making. In day-to-day practice, flexible bronchoscopy has become the most commonly employed invasive procedure in the practice of respiratory medicine.

Objective

The aim of this study is to describe the bronchoscopic findings of suspected patients and to establish the diagnostic yield of flexible bronchoscopy at Mugda medical college hospital, Dhaka. Here the permission of bronchoscopy was taken by director of Mugda medical college hospital, Dhaka and study design was approved by Institutional Review Board (IRB).

Methods

This is a retrospective study of fiberoptic bronchoscopy (FOB) performed at Mugda Medical College Hospital, Dhaka during the period from January 2022- December 2023. Bronchoscopy was performed in these patients and collection of bronchial washing, bronchial brushing and bronchial biopsy was done.

A total of 200 patients who underwent flexible bronchoscopy during the study period were included for suspicion of tuberculosis or malignancy. Clinically confirmed bronchial asthma and COPD without suspicion for tuberculosis or malignancy were excluded. Pre-bronchoscopy screening was done with history, physical examination, BT, CT, PT, Platelet count, fresh X-ray chest PA view, ECG, sputum smear for AFB. Topical anesthesia was achieved using 2% lignocaine spray in the oropharynx. Patients were instructed to be nil per oral for 3-4 hours prior to the procedure. Informed written consent was taken. All bronchoscopy examinations were done by using a 6 mm video assisted flexible bronchoscope (CV-170, Olympus, Tokyo, Japan) by experienced respiratory interventionists.

A flexible bronchoscope was introduced trans-nasally in majority of patients. All bronchoscopies were performed by a single operator and were done with the patient lying supine on the table and the operator standing at the head end. The nasopharynx, larynx, vocal cords, trachea and transbronchial tree were visualized under direct vision up to the fourth-generation bronchi. The brush and biopsy instrument were withdrawn through internal channel. The same fiberoptic bronchoscope was used throughout the study. Patients' medical records were reviewed. The following characteristics were analyzed in each patient: age, sex, bronchoscopy findings, localization of bronchial lesion and location

of washings, brushings, biopsy along with the presence of active bleeding.

During the bronchoscopy procedure, diagnostic materials were obtained by bronchial brushings, bronchial washing, endobronchial lung biopsy as decided by the bronchoscopist on a case by case basis.

Collection and handling of tissue sampling materials

The combination of washing, biopsy and brushing was carried out in these patients in most of the cases especially when tumor was visible. When no lesion was seen , endoscopically blind cytology was performed by brushing and washing the appropriate segment as determined by the chest radiographs/CT findings.

Brush cytology

Re-usable brush with nylon bristles was used for brushing which was cleaned between procedures. Once tumor was brushed , the brush was withdrawn and materials were transferred directly onto glass slides.

Bronchial washings

Bronchial washings were obtained with a lavage with 20 ml normal saline, subsequent aspiration into suction tubing. Specimen was sent in a sterile container for cytological examination.

Biopsy

For tumors which were visible through the bronchoscope and located , biopsy was not difficult. For tumors in difficult location , the tip of the bronchoscope was flexed as far as possible. Biopsy materials obtained was transferred to a container containing 10% formalin and sent for histopathological examination.

Results

A total of 200 patients underwent bronchoscopy procedures during the period of January 2022 to December 2023. Of these 200 patients ,146 patients were males and 54 patients were females. Most of the patients were of age group 50-60 years. 100 male and 13 female were smoker. Main indication of bronchoscopy was mass lesion in 64 cases and pulmonary tuberculosis in 36 cases. 7 patients presented with hemoptysis. Others included 93 cases (Table I).

The reasons why pulmonary tuberculosis patients were referred for FOB were negative sputum smear for AFB (n=20), negative induced sputum smear for AFB (n=9) and lack of sputum production even after hypertonic saline induction (n=7). Bronchial washings were done in 133 of the cases and the most common location was from the right upper lobe followed by the left lower lobe(Table II).

Bronchial brushings were done in 133 of the cases and the most common location was from the right lower lobe (Table III).

Bronchial biopsies were done in 64 of the cases and the most common location was from the right main bronchus followed by the right upper lobe (Table IV).

Active bleeding was seen in 20 of the cases, out of which 8 cases each were seen in the apical segment of right upper lobe and left lobe followed by 4 case each of posterior segment of right upper lobe and left lingula.

Bronchoscopy findings were reported in all the 200 patients with the majority of patients having a normal tracheobronchial tree (94 cases) next to be followed by endobronchial growth (54 cases) with and inflammatory lesion (44 cases) , suspected tuberculosis (4

cases), vocal cord polyp (3 cases) and vocal cord palsy (1 case).

Histopathological report of endobronchial growth (54 cases) reveals adenocarcinoma (26 cases), squamous cell carcinoma (20 cases) and small cell carcinoma (4 cases), TB (4 cases)
Gene Xpert for MTB/RIF of bronchoalveolar lavage (BAL) reveals pulmonary tuberculosis in 8 cases with Rifampicin sensitive.

Table I : Indications for bronchoscopy

Indication of Bronchoscopy	Number of patients
Mass lesion	64
TB	36
Collapse	24
Consolidation	10
Pleural effusion	23
Hemoptysis	7
Hoarseness of voice	4
COPD	24
DPLD	4
Bronchiectasis	4
Total	200

Table II: Table showing the site of bronchial washings

Site of bronchial washings	No. of cases	Site of bronchial washings	No. of cases
Right main bronchus	0	Right middle lower and left lower	3
Left main bronchus	0	Right upper lobe & bronchus intermedius	3
Both main bronchus	0	Left upper lobe	10
Right upper lobe	34	Left lower lobe	18
Right middle lobe	14	Left upper & lower lobe	3
Right lower lobe	14	Left lingula	8
Right upper & middle	3	Left lingula & lower lobe	3
Right middle & lower	3	Both upper lobes	3
Right upper & lower	3	Both lower lobes	0
Right upper middle & lower	3	Tracheal growth & left lower lobe	0
Right bronchus intermedius	8	Vocal cord	0
Total			51

Table III : Table showing the site of bronchial brushings

Site of bronchial brushings	No. of cases
Right main bronchus	4
Left main bronchus	4
Both main bronchus	4
Right upper lobe	18
Right middle lobe	24
Right lower lobe	30
Right upper & lower lobe	7
Right bronchus intermedius	12
Left upper lobe	18
Left lower lobe	12
Tracheal growth and right upper lobe	0
Carina	0
Total	133

Table IV : Table showing the site of bronchial biopsy

Site of bronchial biopsies	No. of cases
Right main bronchus	14
Left main bronchus	8
Both main bronchus	0
Right upper lobe	10
Right middle lobe	8
Right lower lobe	4
Right middle & lower lobe	4
Right bronchus intermedius	4
Left upper lobe	8
Left lower lobe	2
Left upper & lower lobe	0
Left lingula	2
Tracheal growth and right upper lobe	0
Vocal cord	0
Subglottic	0
Total	64

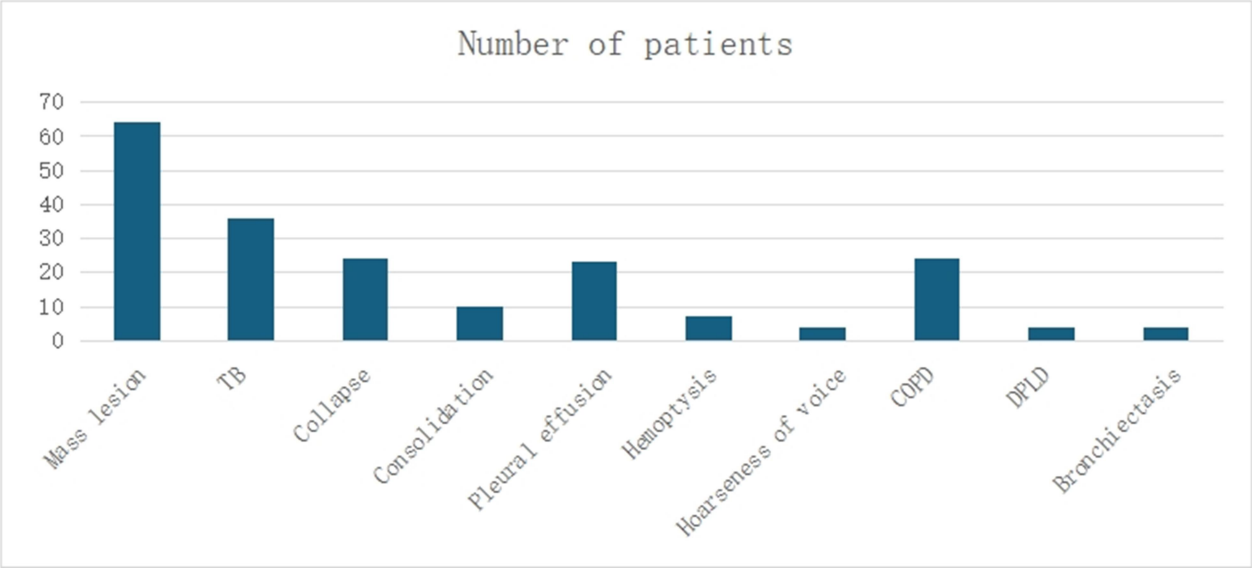


Figure1. Indication for Bronchoscopy

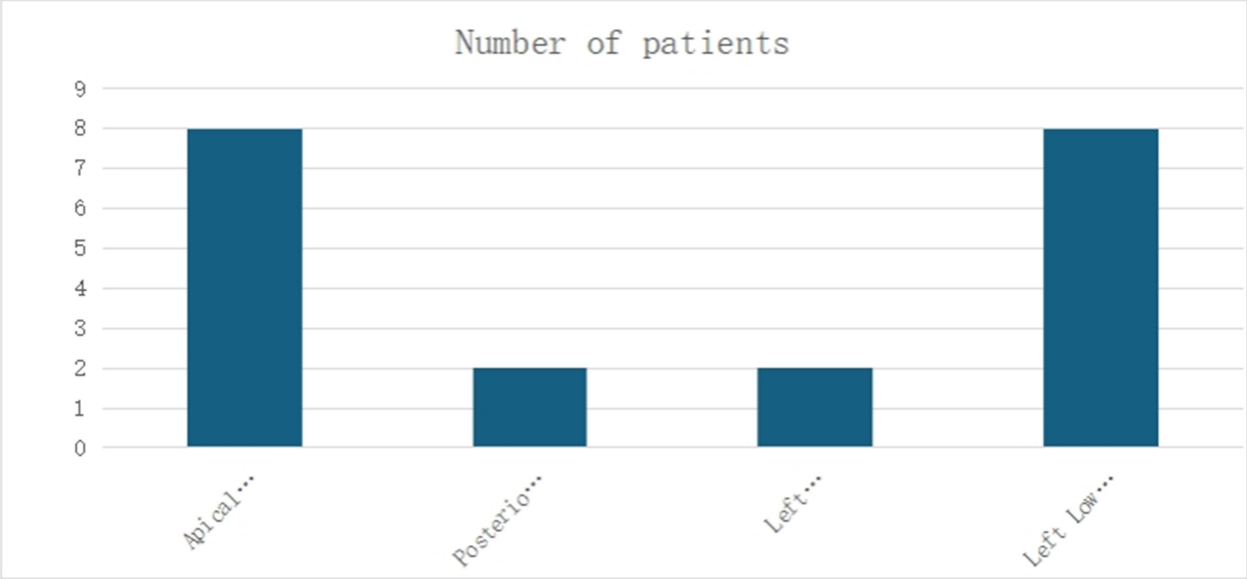


Figure 2. Bar diagram showing the site of active bleeding

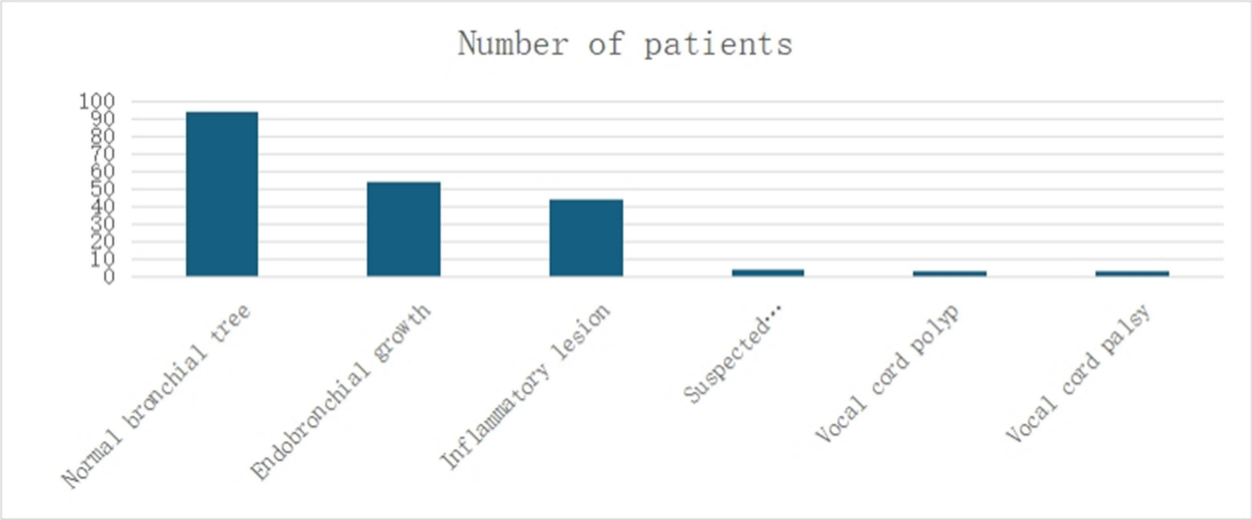


Figure 3. Bar diagram showing Bronchoscopic findings

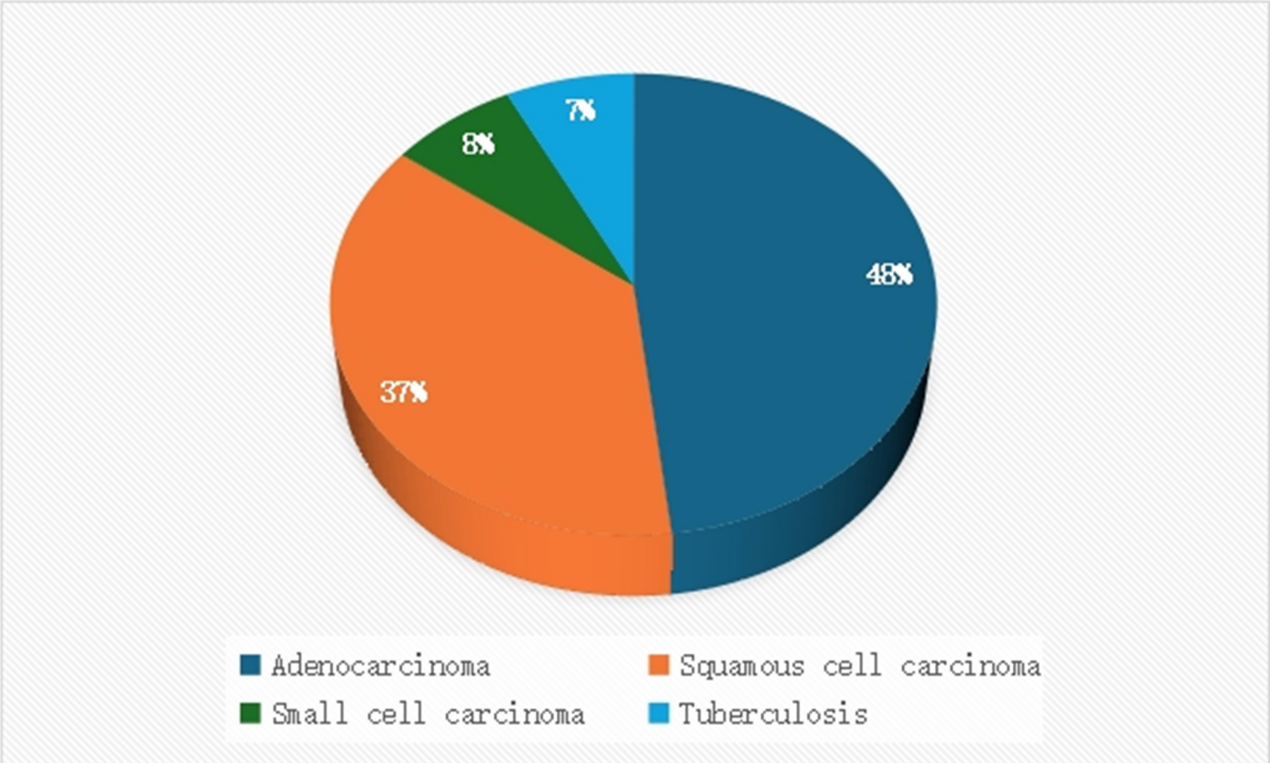


Figure 4. Pie chart showing histopathological findings of bronchoscopy

Discussion

In this study, a retrospective analysis of 200 cases of flexible fiberoptic bronchoscopies was performed over 2 year in Mugda Medical College Hospital, Dhaka. The commonest age group in our study for undergoing bronchoscopy was 50 – 59 years , though there was a wide age range. This was similar to a study done by Batau et al which had most of the cases done in the age group 51 – 60 years.[6]

Flexible bronchoscopy in our cases was performed more commonly in males which was consistent with the studies done by Batau et al, Fasihuddin et al and BJ Arun et al.[6-8] the predominance of males probably related to their smoking habits and greater exposure to environmental pollutants.

Lesions were more common in the right upper lobe in our study which was also seen in the study done by Fasihuddin S et al.[7] It is known that upper lobes are more susceptible to both lung cancer and pulmonary tuberculosis and this could be due to the fact that the upper lobes are less vascular and better aerated and is more affected by smoking.

Our study showed 20 cases of active bleeding as bronchoscopy finding. This finding was also seen in a study done by Ju-Hee Park et al.[9] According to the studies done by Nicotra MB et al bronchoscopy should be considered in the patients with significant haemoptysis.[10] Bronchoscopy can localize over 60% of the bleeding cases and can be helpful in cases which have alternative causes for bleeding. Though the optimal time to do the procedure remains controversial, this is the primary method for the diagnosis and localization of the site of hemoptysis. Analysis of bronchial washing in cases of bronchiectasis and bleeding may also provide important information regarding the cause of hemoptysis.

In the present study,suspected lung malignancy (64 cases) was the commonest suspected clinical diagnosis for which bronchoscopy was performed irrespective of age and gender. Pulmonary tuberculosis (36 cases) was the second suspected clinical diagnosis. This can be expected in a country like Bangladesh where tuberculosis is a commonly encountered clinical condition and is considered in the differential diagnosis of various clinical presentations. This study was in concordance with a study done by Jacomelli M et al in which out of 286 cases who underwent bronchoscopy, 127 cases were diagnosed on bronchoscopy findings as pulmonary tuberculosis.[11]

On comparing the top two suspected clinical diagnoses of lung malignancy (64 cases) and pulmonary tuberculosis (36 cases) with the findings during bronchoscopy, it was observed that the highest proportion (94 cases) of normal bronchoscopy findings were noted in subjects with “suspected pulmonary tuberculosis” category which was in concordance with the study done by Rahul Magazine et al who had 81% cases showing normal bronchoscopy findings in subjects with suspected pulmonary tuberculosis.[12]

Conclusion

Flexible bronchoscopy is increasingly being utilized in the diagnosis of a wide array of respiratory disorders day by day. It is fairly safe and can be performed as an outpatient procedure. Our study suggests that, in investigating suspected cases of lung malignancy, a bronchoscopist should adopt all diagnostic techniques of biopsy, brushing and washing to increase the yield of diagnosis. In short the optimal use of conventional bronchoscopy and its techniques in the hands of experienced respiratory interventionists

will improve the diagnostic outcomes of those patients suffering from respiratory diseases with the least morbidity and mortality, employing better therapeutic strategies and thus improving the overall management of those patients.

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