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A study of bronchoscopic profile of respiratory patients in tertiary care hospital

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Abstract

Introduction: Bronchoscopy is the diagnostic inspection of the tracheobronchial tree. It is an alternative method to aid in the diagnosis of infection where non-invasive methods fail to cite the underlying etiology; especially in cases of pulmonary tuberculosis.

Aim of the study: The aim of the current study is to assess bronchoscopic profile of respiratory patients in tertiary care hospital.

Methods: This cross-sectional, hospital-based observational study was done in the Department of Respiratory Medicine and Internal Medicine Rajshahi Medical College Hospital to find out the bronchoscopic profile of respiratory patients. A total of 120 respondents fulfilling inclusion and exclusion criteria participated in the study.

Result: Majority respondents belonged to age group 51–70 years (62.5%). Mean age was 52.49 ± 12.58 years. Majority of the respondents were Male (70.8%) and whereas were Female (29.2%). Majority of respondents were poor (50%). Majority of respondent's religion was Islam (75%). Majority of respondents were resided in rural area (62.5%). Among total respondents, 54.2% were smoker. Most common chest X-ray findings were consolidation (25%). Among respondents in 17.5%, no abnormality detected. Most common bronchoscopic findings were the right main bronchus mass (20%). Most common complications of bronchoscopy were fever (10.8%), followed by nausea/vomiting (10%) and infection, whereas 50.8% of patients had no complication due to bronchoscopy. Among the respondents, acid-fast bacilli were found in 0.8%, not found in 21.7%, and not done in 77.5%. Most common histological findings in respondents were normal (60%).

Conclusion: This study indicates that Bronchoscopy is a safe and useful tool for making the diagnosis of a variety of pulmonary diseases. Bronchial mass was the most common finding on bronchoscopy.

Keywords: Bronchoalveolar lavage, bronchoscopy, respiratory.

Introduction

When evaluating airway disease, bronchoscopy, an endoscopic examination of the airways, enables diagnostic and interventional techniques. In 1897, Gustav Killian carried out the first bronchoscopy.[1] The rigid Jackson bronchoscope (RB) and the flexible fiber-optic bronchoscope (FOB/FBS) are the two main varieties of bronchoscopes available today.[2] Shigeto Ikeda invented flexible bronchoscopy in 1968, and it is now a crucial respiratory medicine procedure. In the diagnosis and treatment of inflammatory, infectious, and malignant lung disorders, flexible FOB has

largely supplanted rigid, open-tube bronchoscopy as the most common invasive procedure in pulmonary medicine practice.[3] However, the standard for removing foreign objects from the airways is still rigid bronchoscopy. Airway foreign bodies hemorrhage or bleeding into the airway, examination of the airway for tracheal resection, airway stenosis, and better biopsy specimens when insufficient fiberoptic specimens are the primary diagnostic indications for RB.[4,5] For the pathological diagnosis of interstitial lung disease, especially sarcoidosis, and hypersensitivity pneumonitis, bronchoscopy is also a crucial tool. Another essential technique in the staging and diagnostic process for individuals with lung cancer is bronchoscopy. Lower airway visualization and sampling methods such as bronchoalveolar lavage (BAL), bronchial brushings, bronchial washings, endobronchial biopsies, transbronchial biopsies, and transbronchial needle aspiration are made possible by flexible bronchoscopy. In intensive care units, FOB is frequently utilized for tracheobronchial tree toileting and diagnostic examination. Although there are many different types of flexible bronchoscopes, they can be broadly divided into three size groups: pediatric, adult, and therapeutic. Flexible bronchoscopy is frequently used to diagnose possible airway injuries or obstructions, such as those caused by tumors or foreign bodies; to biopsy airway masses for diagnostic purposes; to perform particular guided endobronchial washings for the diagnosis and assessment of pulmonary infections; and to assess pulmonary lobar collapse. With flexible bronchoscopy, a visual examination of the airway is the most straightforward diagnostic tool. An intraluminal irregularity, obstruction, caustic ingestion, foreign material, inhalation injury, fluids and mucus, or trauma are all considered while evaluating the airway. In addition to potentially offering sensitive and precise methods for diagnosing pneumonia in ventilated patients, BAL fluid cultures may offer crucial details regarding the bacteria causing the illness. Most often done as an outpatient day procedure, the bronchoscopy operation is extremely well tolerated. Bronchoscopy-related complications are uncommon; their reported rates range from 0.08% to 1.08%. Although they are extremely rare, major problems do occur, including respiratory failure (0.2%), hemorrhage (0.12%), and pneumothorax (0.16%). In addition, procedure-related mortality is very uncommon (0.013%) and linked to severe airway blockage or organic cardiac disease.[6] However, it is a significant development in respiratory medicine, especially when it comes to the study of hemoptysis or radiological manifestations such as atelectasis or persistent opacities. It is a substitute technique to help diagnose infections when non-invasive approaches are unable to identify the underlying cause, particularly in pulmonary tuberculosis cases. In addition, FOB has emerged as a crucial tool for the pathological diagnosis of hypersensitivity pneumonitis and interstitial lung disease, specifically sarcoidosis. In the diagnosis process and staging of lung cancer patients, bronchoscopy is a crucial tool.[1] A safe and effective method for diagnosing a variety of respiratory conditions is bronchoscopy. It is a widely recognized method for diagnosing and treating various lung conditions. However, there is a dearth of research on the characteristics of bronchoscopic findings. The aim of the current study was to assess bronchoscopic profile of respiratory patients in tertiary care hospital.

Methods

This cross-sectional, hospital-based observational study was done in the Department of Respiratory Medicine and Internal Medicine Rajshahi Medical College Hospital to find out the bronchoscopic profile of respiratory patients. A total of 120 respondents of >18 years of age with respiratory distress having definite indication for bronchoscopy such as undiagnosed central pulmonary lesion, collapse of lung, unexplained hemoptysis, unresolved lung abscess, and who met the inclusion criteria with their consent. However, patients diagnosed with lung cancer, smear-positive pulmonary TB, recent myocardial infarction, blood dyscrasias, low level of consciousness, pregnant

women, and severely ill patients were excluded from the study.

Results

A total of 120 respondents with respiratory distress were included in this study. Majority of respondents belonged to age group 51–70 years (62.5%), followed by decreasing order 31–50 years (20.8%), 18–30 years (12.5%), and >70 years (4.2%). Mean age was 52.49 ± 12.58 years. Majority of the respondents were Male (70.8%) and whereas were Female (29.2%). Majority of respondents were poor (50%), followed by decreasing order middle class (33.3%) and rich (16.7%). Majority of respondent's religion was Islam (75%) and 25% was others. Majority of respondents were resided in rural area (62.5%) and 37.5% were resided in urban area. Among the total respondents, 54.2% were smoker and 45.8% were non-smoker [Table 1].

Table 2 shows chest X-ray findings of respiratory patients. Most common chest X-ray findings in respondents were consolidation (25%), followed by mass lesion (19.2%), cavitary lesion (16.7%), fibrotic lesion (10%), collapse of lung (8.3%), nodular lesion (2.5%), and reticular pattern (0.8%). Among respondents in 17.5%, no abnormality was detected.

Table 3 shows bronchoscopic findings of respiratory patients. Among the study population, Most common bronchoscopic findings in respondents were right main bronchus mass (20%) followed in decreasing order by carinal widening (18.3%) and left main bronchus mass (13.3%), right middle lobe bronchus mass (11.7%), right lower lobe bronchus mass (11.7%), left lower lobe bronchus mass (5.8%), left lingual mass (4.2%), vocal cord paralysis (2.5%), tracheal stenosis (1.7%), and tracheal mass (0.8%).

Table 4 shows types of complications due to bronchoscopy in respiratory patients. Among the study population, the most common complications of bronchoscopy in respondents were fever (10.8%), followed by nausea/vomiting (10%), infection, bleeding, and hypoxemia were 5.8% each, respectively, bronchospasm and breathing difficulties were 4.2% each respectively and myocardial dysfunction were 2.5%. Among the study population, 50.8% of patients had no complication due to bronchoscopy.

Table 5 shows BAL findings in respiratory patients. Among the respondents acid fast bacilli was found in 0.8%, not found in 21.7%, and not done in 77.5%. Gram stain/culture sensitivity was positive in 24.2%, negative in 25%, and not done in 50.8%. Fungal stain was positive in 4.2%, negative in 20%, and not done in 75.8%. Cytology was positive in 8.3%, negative in 5%, and not done in 86.7%.

Table 6 shows histological findings of respiratory patients. Most common histological findings in respondents were normal (60%), followed by squamous cell carcinoma (25%), adenocarcinoma (7.5%), small cell carcinoma (5%), inflammation (3.3%), other types (4.2%), and inadequate tissue (2.5%).

Discussion

This study was done in the Department of Respiratory Medicine and Internal Medicine in Rajshahi Medical College Hospital. This cross-sectional, hospital-based observational study was done to find out the bronchoscopic profile of respiratory patients. According to the current study, the mean age of respondents was 52.49 ± 12.58 years. Majority of respondents belonged to age group 51–70 years (62.5%), followed by decreasing order 31–50 years (20.8%), 18–30 years (12.5%), and >70 years (4.2%). In the study of Baumann *et al.* 2011 they also found most patient's age was within 51–70 years which corresponds with our result also.[4] In the current study, majority of respondents were Male (70.8%) and Female were (29.2%). According to Udwadia *et al.* 1990 study they also found that male respondents were more than female suffering from lung disease.[5] In Carey *et al.* 2007 study they found that, Sex hormones appear to exert regulatory effects on human lung development before and during

Table 1: Distribution of patients by sociodemographic characteristics (*n*=120)

Variables	Percentage
Distribution of patients by age (in years) (*n*=120)	
18−30	12.5
31−50	20.8
51−70	62.5
>70	4.2
Distribution of patients by gender (*n*=120)	
Male	70.8
Female	29.2
Distribution of patients by Socioeconomic condition (*n*=120)	
Rich	16.7
Middle class	33.3
Poor	50
Distribution of patients by religion (*n*=120)	
Islam	75
Others	25
Distribution of patients by residence (*n*=120)	
Urban	37.5
Rural	62.5
Distribution of patients by smoking history (*n*=120)	
Smoker	54.2
Non-smoker	45.8

Table 2: Chest X-ray findings among the patients with respiratory patients (*n*=120)

Chest X-ray findings	Frequency (n)	Percentages
Cavitary lesion	20	16.70
Consolidation	30	25
Collapse of lung	10	8.30
Fibrotic lesions	12	10
Mass lesions	23	19.20
Nodular lesion	3	2.50
Reticular pattern	1	0.80
No abnormality	21	17.50

*Multiple response considered

Table 3: Bronchoscopy findings among the respiratory patients (*n*=120)

Bronchoscopy findings	Frequency (n)	Percentages
Vocal cord paralysis	3	2.50
Tracheal stenosis	2	1.70
Tracheal mass	1	0.80
Carinal widening	22	18.30
Right main bronchus mass	24	20
Right upper lobe bronchus mass	12	10
Right middle lobe bronchus mass	14	11.70
Right lower lobe bronchus mass	14	11.70
Left main bronchus mass	16	13.30
Left lingual mass	5	4.20
Left lower lobe bronchus mass	7	5.80

*Multiple response considered

Table 4: Complication of bronchoscopy the respiratory patients (*n*=120)

Complication	Frequency (n)	Percentages
No complication	61	50.80
Complication present	59	49.20
Fever	13	10.80
Nausea/vomiting	12	10
Infection	7	5.80
Bleeding	7	5.80
Hypoxemia	7	5.80
Bronchospasm	5	4.20
Breathing difficulties	5	4.20
Myocardial dysfunction	3	2.50

the neonatal period. The androgen receptor is expressed in mesenchymal and epithelial cells of the lung throughout the human lifespan. The gender differences discussed in this review highlight the importance of considering sex hormones in the prevention, diagnosis, and treatment of pulmonary diseases.[6] According to the present study, the majority respondents were poor (50%), followed by decreasing order middle class (33.3%) and rich (16.7%). In Prescott and Vestbo, 1999 study they also found that lung disease was more common in poor socioeconomic status people. Poor housing

Table 5: BAL findings in respiratory patients (*n*=120)

BAL findings	Positive (%)	Negative (%)	Not done (%)
Acid fast bacilli	1 (0.8)	26 (21.7)	93 (77.5)
Gram stain/culture sensitivity	29 (24.2)	30 (25)	61 (50.8)
Fungal stain	5 (4.2)	24 (20)	91 (75.8)
Cytology	10 (8.3)	6 (5)	104 (86.7)

*Multiple response considered. BAL: Bronchoalveolar lavage

Table 6: Histopathological findings of respiratory patients (*n*=120)

Histopathological findings	Frequency (n)	Percentages
Squamous cell carcinoma	21	17.50
Adenocarcinoma	9	7.50
Small cell carcinoma	6	5
Inflammation	4	3.30
Inadequate tissue	3	2.50
Others	5	4.20
Normal findings	72	60

*Multiple response considered

conditions and home dampness with increased house dust mites and gas stove usage are all associated with respiratory symptoms, reduced lung function, and lower socioeconomic status. Household crowding has been hypothesized to cause increased instances of respiratory infections and thus increased rates of respiratory disorders.[7] In the current study, majority of respondents religion were Islam (75%) and 25% were others. As most of the population in Bangladesh are Muslims, most of the respondents were Muslims. Moreover, in the present study, majority of respondents were resided in rural area (62.5%) and 37.5% were resided in urban area. As our study was done in a government hospital most of the patients belonged from poor socioeconomic class and most of the patients came for treatment from rural area. Furthermore, 54.2% were smoker and 45.8% were non-smoker among the respondents in our study. According to Prescott and Vestbo, 1999 study they also found that smoking remains the most prominent cause of lung disease which was similar with current result. In a study Margaritopoulos *et al.,* 2016 they also found cigarette smoking is a very common and addictive habit and is well known for its harmful effects because of the high number of chemicals contained. The role of smoking in many human diseases, such as chronic obstructive pulmonary disease, lung cancer, and atherosclerosis, has already been defined.[8] In the present study, the most common chest X-ray findings in respondents were consolidation (25%) followed by in decreasing order mass lesions (19.2%), cavitary lesion (16.7%), fibrotic lesion (10%), collapse of lung (8.3%), nodular lesion (2.5), and reticular pattern (0.8%). Among respondents in 17.5%, no abnormality detected. In Khara *et al.* 2013 study, they also found that chest X-ray findings among the patients of bronchoscopy were consolidation and fibrotic lesion which corresponds with our result.[9] Current study showed that most common bronchoscopic findings in respondents were right main bronchus mass (20%) followed in decreasing order by carinal widening (18.3%) and left main bronchus mass (13.3%), right middle lobe bronchus mass (11.7%), right lower lobe bronchus mass (11.7%), left lower lobe bronchus mass (5.8%), left lingual mass (4.2%), vocal cord paralysis (2.5%), tracheal stenosis (1.7%), and tracheal mass (0.8%). According to Khara *et al*. 2013, they also found most common findings of bronchoscopy were right bronchial mass and carinal widening, which

is similar with recent study.[9] According to our study, common complications by bronchoscopy in respondents were fever (10.8%), followed by nausea/vomiting (10%), infection, bleeding, and hypoxemia 5.8% each, respectively, bronchoscopy and breathing difficulties 4.2% each, respectively, and myocardial dysfunction was 2.5%. However, 50.8% of patients had no complication due to bronchoscopy. In Asaad *et al.* 2017 study they found that mechanical complications of bronchoscopy are primarily related to airway manipulations.[10] Moreover, Stahl *et al*. 2015 study found that fever, infection, nausea, vomiting, and bronchospam were the common complication of bronchoscopy.[11] In the present study, BAL findings in respiratory patients acid-fast bacilli were found in 0.8%, not found in 21.7% and not done in 77.5%. Gram stain and culture/sensitivity were positive in 24.2%, negative in 25%, and not done in 50.8%. Fungal stain was positive in 4.2%, negative in 20%, and not done in 75.8%. Cytology was positive in 8.3%, negative in 5%, and not done in 86.7%. According to Khara *et al*. 2013 study, they found that acid-fast bacilli were most commonly negative but the gram stain was found positive in many cases. Moreover, fungal satin was not commonly done and cytology was positive among patients with lung carcinoma most which similar to the present study result. BAL fluid examination to be very useful in diagnosis and identification of the causative organism in patients having non-resolving, slowly resolving and hospital-acquired pneumonia patients.[9] The current study showed, histopathological findings in respondents were normal (60%) followed by squamous cell carcinoma (25%), adenocarcinoma (7.5%), small cell carcinoma (5%), inflammation (3.3%), other types (4.2%), and inadequate tissue (2.5%). Stevic and Milenkovic's, 2016 study reported that a wide spectrum of tumors can occur in the tracheobronchial tree, including primary malignant tumors, secondary malignant tumors, and benign tumors. Except SCC and small cell lung cancer, tumors and tumor-like conditions of the central large airways are uncommon. Careful clinical evaluation, imaging, and endoscopic examination are essential for the confirmation of endoluminal tracheobronchial lesions.[12]

Limitations of the study

The study was conducted in a single hospital with a small sample size. Long-term follow-up of the patients was beyond the scope of the study. Hence, the results may not represent the whole community.

Conclusion

This study indicates that bronchoscopy is a safe and useful tool for making the diagnosis of a variety of pulmonary diseases. Bronchial mass was the most common findings on bronchoscopy but there is no uniform pattern has been seen. However, further study is recommended to finalize the comment.

Funding

No funding sources.

Conflicts of Interest

None declared.

Ethical Approval

The study was approved by the Institutional Ethics Committee.

Recommendation

Any abnormal lesion of the bronchoscopy should be investigated appropriately. Further larger multicenter study is recommended with a larger sample.

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