Original Article

Usefulness of Fiber-optic Bronchoscopy in the Diagnosis of Pulmonary Diseases in Diabetic Patients: Experience in a Tertiary Care Hospital

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Abstract

Background: *Fiber-optic bronchoscopy (FOB) is an invasive procedure performed to identify possible endobronchial lesions. Diabetic patients often present with non-resolving pneumonia and collapse, many of whom are elderly and smoker; thus always giving rise to the suspicion of malignancy.*

Methods: *This observational study was performed from March 2009 to August 2013 in the Department of Internal Medicine and Pulmonology of BIRDEM General Hospital, Dhaka, Bangladesh; a 500 bedded tertiary care hospital dealing mostly with diabetic patients.*

Results: *Out of 160 diabetic patients 126 (78.7%) were male, 34 (21.3%) were female. Mean age of the patients was – 57.2 ±10.8 years. The indications of bronchoscopy were collapse (38, 23.8%), non-resolving consolidation (55, 34.4%), mass lesion (38, 23.8%), hemoptysis (10, 6.2%) and others (19, 11.8%). Findings in the bronchoscopy were mitotic lesion (56, 35.0%), inflammatory lesion (50, 31.3%) and normal finding (54, 33.8%). Among 56 cases of mitotic lesion, bronchial biopsy was taken in 48 (85.7%) cases. Histopathology reports of bronchial biopsy were squamous cell carcinoma (18, 37.5%), large cell carcinoma (11, 22.9%), adenocarcinoma (7, 14.6%), small cell carcinoma (5, 10.4%), inflammatory lesion (4, 8.3%) and normal finding (3, 6.3%). Among 38 cases of collapse, mitotic lesion was found in 24 (63.2%) cases. Among 55 (100%) cases of non-resolving consolidation, mitotic lesion was found in 18 (32.5%), inflammation in 23 (41.8%) and normal findings in 14 (25.5%) cases.*

Conclusion: *Bronchoscopy is an useful method to detect any endobronchial lesion in suspected cases of collapse or non-resolving pneumonia in diabetic patients and it can be the choice of investigation in non-resolving pneumonia.*

Keywords: *diabetes mellitus; fiber-optic bronchoscopy; non-resolving pneumonia.*

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Introduction

Fiber-optic bronchoscopy (FOB) is an invasive, yet very valuable and safe procedure for the diagnosis as well as therapy of pulmonary pathology.[1] It allows direct visual inspection of the bronchial tree for endobronchial lesion and also helps in recovery of deep respiratory secretions, brushing and biopsy, which is useful in diagnosis of infections, neoplasm and other non-infectious causes.[2] FOB not only helps in assessing the disease area but also provides better bacteriological and histological yield, thus helping to reach a definite diagnosis.[3]

Diabetes mellitus is a condition characterized by chronic hyperglycemia due to defect of insulin secretion or action or both.[4] Diabetes is an immunocompromizing condition that can lead to increased susceptibility to various infections including lung infection.[5] Moreover, a good number of elderly type 2 diabetic patients are smoker,

thus increasing the possibility of bronchial carcinoma. So FOB can be a useful tool in the evaluation of pulmonary diseases in diabetics. In this study, we intend to find out the usefulness of FOB in the diagnosis of various lung pathologies in the diabetic patients.

Methods

The present cross-sectional, observational study was carried out on 160 patients from March 2009 to August 2013 in the Department of Internal Medicine and Pulmonology of Bangladesh Institute for Research and Rehabilitation on Diabetes, Endocrine and Metabolic Disorders (BIRDEM) General Hospital, Dhaka, Bangladesh. All the patients were diabetic. Both hospitalized and outdoor patients who were referred for bronchoscopy were included in the study. Indications of bronchoscopy included collapse of lung, non-resolving pneumonia, hemoptysis, mass lesion in lung, unexplained chronic cough, recurrent unexplained pleural effusion and search for primary in case of metastatic carcinoma. Patients with smear positive pulmonary TB, diagnosed bronchial carcinoma, massive hemoptysis and unstable cardio-respiratory status were excluded from the study.

Detailed clinical history, physical examinations and investigations were carried out. Assessment of coagulation profile was done. ECG was done in patients above 40 years of age. Written informed consent of all study patients was taken. After premedication with intramuscular atropine 0.6 mg and under topical anesthesia (2% xylocaine), bronchoscopy was performed with flexible FOB (Olympus adult type) through trans-nasal route. Some patients required sedation with injection midazolam. Oxygenation was monitored during and immediately after procedure with pulse oxymetry and oxygen administered to maintain blood oxygen saturation >90%.

Necessary samples such as the bronchoalveolar lavage (BAL), bronchial brushing and bronchial biopsy were obtained depending on the type of lesion after thorough evaluation of endobronchial tree. Samples were tested for cytology, histopathology, Gram stain, acid fast bacilli (AFB) stain, culture and sensitivity and in some instances fungal staining and AFB culture.

Results

Out of 160 patients, 126 (78.7%) were male, 34 (21.3%) were female. Mean age of the patients was 57.2 ±10.8 years.

Among the different indications of bronchoscopy majority (55, 34.4%) had non-resolving pneumonia. Other indications are presented in table I. Bronchoscopy was diagnostic in 106 (66.2%) cases. Findings in the bronchoscopy are presented in table II.

Table I. Indications of Bronchoscopy (N = 160)

Indication	Frequency	Percentage
Non-resolving Pneumonia	55	34.4
Collapse	38	23.8
Mass lesion	38	23.8
Hemoptysis	10	6.2
Others	19	11.8

Table II. Findings of Bronchoscopy (N = 160) Findings

Findings	Frequency	Percentage
Mitotic lesion	56	35.0
Inflammatory lesion	50	31.2
Normal findings	54	33.8

Among 56 cases of mitotic lesion, bronchial biopsy was taken in 48 (85.7%) cases. In 8 (14.3%) cases biopsy was not taken as the nature of the lesion was very much suggestive of malignancy and the risk of bleeding was high. Histopathology reports of the bronchial biopsy showed majority (41, 85.4%) had bronchial carcinoma. Other findings are presented in table III. Among 41 cases of histologically proved bronchial carcinoma, majority (18, 43.9%) had squamous cell carcinoma. Other histological types are presented in table IV.

Table III. Histopathology Report of Bronchial Biopsy in Mitotic Lesions (N = 48)

Histopathology Report	Frequency	Percentage
Bronchial Carcinoma (All type)	41	85.4
Inflammation	4	8.3
Normal findings	3	6.3

Table IV. Histological types of Bronchial Carcinoma (N = 41)

Histological type of bronchial carcinoma	Frequency	Percentage
Squamous cell carcinoma	18	43.9
Large cell carcinoma	11	26.8
Adenocarcinoma	7	17.1
Small cell carcinoma	5	12.2

Among 38 cases of collapse of lung, majority (24, 63.2%) had mitotic lesion. Among the cases of mitotic lesion, majority had carina involvement (33/56, 58.9%). The findings of bronchoscopy in non-resolving pneumonia are presented in table V.

Table V. Findings of Bronchoscopy in Non-resolving Pneumonia (N = 55)

Findings	Frequency	Percentage
Mitotic lesion	18	32.7
Inflammatory lesion	23	41.8
Normal findings	14	25.5

In most of the cases, the procedure was free of any complication. Patients required approximately two hours recovering from the effect of topical anesthesia. In a few cases, patients experienced mild hemoptysis after taking bronchial biopsy. In each case where biopsy was performed, hemostasis was ensured by giving topical adrenaline through bronchoscope.

Discussion

Development of the flexible bronchoscope and various accessory instruments that can be inserted via the working channel has extended bronchoscopic exploration to the lung periphery. The instrument permits acquisition of tissue biopsy specimen, selective mucosal brushing, and broncheoalvoelar washings. Bronchoscopy is a safe procedure and currently the primary mean for diagnosis of pulmonary malignancies. [6,7]

There are various reasons for performing bronchoscopy. Our top four indications for FOB were non-resolving pneumonia, collapse of lung, mass lesion in lung, hemoptysis which constituted more than 80% of the total. Similarly Badhke et al in their study found the common indications for bronchoscopy were consolidation (41.7%), collapse (20.8%), parahilar mass (10.8%), consolidation with effusion (6.7%), cavity (6.7%) and collapse with effusion (4.2%).[8] In the American College of Chest Physicians (ACCP) survey on immunocompromized hosts (like diabetes mellitus), the most common indications for bronchoscopy were an abnormal chest radiograph (consolidation or mass lesion), haemoptysis and chronic cough.[9]

We found that FOB was diagnostic in 66.2% of patients. In the study by Silver et al FOB was diagnostic in 86% cases, but the study population was less compared to that of our study.[10] Foos et al analyzed the retrospective data of 616 bronchoscopy procedures and reported a diagnostic yield of 57%.[11] In that study the diagnostic yield of bronchoscopy for detection of malignancy was 66.6% which was similar to our study. In another study the diagnostic yield was 75%.[8]

Around one-third of the patients in our study had mitotic lesion in bronchoscopy. In another one-third cases, bronchoscopy showed inflammatory lesion and in rest one-third cases the findings were normal. Badhke et al found pneumonias in 26.6%, malignancy in 23.3%, pulmonary TB in 16.6% cases and in 25% patients no specific diagnosis was made.[8]

Among 41 cases of histologically proved bronchial carcinoma, squamous cell type was the predominant type (43.9%), followed by large cell carcinoma (26.8%). This is similar to previous pattern of histological type of bronchial carcinoma, but contrary to the present trend of rising proportion of adenocarcinoma.[12,13]

Non-resolving or slowly resolving pneumonia is a common but often difficult clinical entity to pulmonologists, as there is the concern for lung cancer or pulmonary tuberculosis.[14] It has been found that increasing age, systemic host defense impairments like diabetes and alcoholism, and specific reductions in pulmonary clearance as in chronic obstructive pulmonary diseases (COPD) are major association with delayed resolution of pneumonia.[15,16] Several studies in the past reported that failure to resolve a community-acquired pneumonia occurs in from 13 to 26 percent of patients.[17,18] In our study, among the cases of non-resolving pneumonia around one-third cases had mitotic lesion, which is almost similar to other studies.[14,18]

This study only included diabetic patients. So, no comparison with non-diabetic patients can be done through this study. Future multi-center study with both diabetic and non-diabetic patients is advisable.

The diagnostic yield of FOB with routine and basic procedures like endobronchial biopsy, BAL fluid analysis and brush cytology is satisfactory. Routine flexible bronchoscopy technique continues to have a high diagnostic yield in current clinical practice in pulmonary conditions like bronchial carcinoma and

pneumonia. The procedure will be more useful in diagnosis when combined with a sound clinical judgment and appropriate supportive investigations.

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