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ORIGINAL ARTICLE

Role of flexible Bronchoscopy in the Diagnosis of Intrabronchial Mass Lesions

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Abstract:

Background: *Variety of benign and malignant lesions of respiratory system presents as intrabronchial mass lesions. Present study was carried out to study the spectrum of intrabronchial lesions and role of flexible flexible bronchoscopy in their diagnosis.*

Methods: *Retrospective study of case-records of patients with intrabronchial mass lesions diagnosed by flexible bronchoscopy, bronchial washings and bronchial biopsy between January 2015 and July 2016.*

Results: *Out of the 696 flexible bronchoscopies done during the study- period, intrabronchial mass lesions were evident in 74 patients (10.6%) (age range 21-86 years; 60 males). Fifty (68%) lesions were malignant, eighteen (24%) lesions were benign while six (8%) lesions were inconclusive. Diagnostic yield was about 92%; repeat bronchoscopy for inconclusive results improved the diagnostic yield.*

Conclusions: *Though malignant lesions are common, benign lesions remain important causes of intrabronchial mass lesions. Bronchoscopy with adequate sampling is an essential diagnostic modality for confirming the diagnosis of such lesions.*

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Introduction:

A significant number of patients presenting with an abnormal chest radiograph and/or computed tomography (CT) requires further investigation in the form of bronchoscopy as a part of their diagnostic work-up. With the advance imaging techniques, intrabronchial mass lesions can be diagnosed with accuracy Pulnionologists come across significant number of intrabronchial mass lesions on bronchoscopy. Clinical and radiological features of these lesions may not discriminate between different aetiologies, and sampling is required to distinguish benign from malignant lesions. However, limited information is available from Bangladesh on the spectrum of diseases causing intrabronchial mass lesions and its epidemiology.

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The present study was undertaken to study the spectrum of the diseases presenting with intrabronchial mass lesions and epidemiology of such lesions and describe the utility of flexible bronchoscopy in diagnosing intrabroncha mass lesions.

Material and Methods:

This was a retrospective study conducted at a tertiary care hospital in North Bangladesh between January 2015 and July 2016. All patients who presented to the hospital for flexible bronchoscopy were included. Written consent was taken from all the patients who underwent bronchoscopy. Information of demographic details (age and gender), indication for bronchoscopy, findings of bronchoscopy, relevant investigations (radiology, reports of bronchoalveolar lavage and biopsy) of each patient with intrabronchial mass lesion was recorded. These lesions were further sub-grouped according to the diagnosis; patients with intrabronchial mass lesions were then grouped into those with benign and malignant lesions. Repeat bronchoscopy was done for inconclusive results. Percentage of all groups, subgroups and diagnostic yield of the bronchoscopy were calculated.

Results:

Six hundred and ninety-six patients underwent flexible bronchoscopy during the study period and 74 (10.63%) patients showed intrabronchial mass lesions. Of the 74 patients, 50 (68%) had malignant lesions and 18 (24%) had benign lesions while the results were inconclusive in six (8%). The main clinical indications of bronchoscopy in 74 patients with intrabronchial mass lesions in our study were: unexplained chronic cough with localised clinical finding; unexplained lung collapse; non-resolving pneumonia; diagnosis and staging of lung carcinoma; aspiration of foreign body; etc. Prominent clinical symptoms at presentation are shown in table I. Radiological findings in patients with malignant lesion were mass lesions, collapse or non-resolving pneumonias. Patients with benign lesions showed mainly non- resolving pneumonias, collapse or lymphadenopathy as shown in table II.

Table-I

Prominent clinical symptoms at presentation in 74 patients presenting with intrabronchial mass lesions

Symptom*	No. (%)
Dry cough	39 (53)
Haemoptysis	16 (21)
Dyspnoea	11 (15)
Hoarsness of voice	6 (8)
Chest pain	2 (3)

· Patients presented with combination of symptoms

Table-II

Radiological findings in patients with benign lesions

Radiological Finding	No. (%)
Consolidation	9 (50)
Collapse	5 (28)
Lymphadenopathy*	4 (22)

Their median age was 65 years (range 21-86 years); there were 60 males (male:female = 4.3:1). Patients with malignant lesions had median age of 62 years (range 45-84 years) while patients with benign lesions had median age of 69 years (range 21- 86 years). Among patients with malignant lesions (n=50), male:female ratio was 9:1. Among patients with benign lesions (n=18), male:female ratio was 2:1. Distribution of various malignant and benign lesions are shown in table 3. In one patient bronchoscopy detected carcinoma larynx extending to the trachea. One patient had adeno carcinoma on bronchial biopsy but bronchial washings were positive for acid- fast bacilli (AFB). Three foreign bodies included betel nut, ciprofloxacin tablet and a screw were found. Inconclusive results were due to inadequate sample size, necrotic material, non-specific finding or normal mucosa on histopathology with inconclusive bronchial washings.

Repeat flexible bronchoscopy was done in three patients with inconclusive results. In two patients malignancy was diagnosed while one remained undiagnosed. Three patients with inconclusive results were lost to follow-up.

Diagnosis was made on bronchoscopy in 68 cases of the 74 cases in the first attempt; the diagnostic yield.

Table-III

Distribution of various intrabronchial mass lesions

Type of Lesion	No. (%)
Malignant Lesions (n=50)	
Squamous cell carcinoma	22 (44)
Adenocarcinoma	9 (18)
Small cell carcinoma	12(24)
Large cell carcinoma	2 (4)
Non-small cell carcinoma	2 (4)
Others*	3 (6)
Benign Lesions (n=18)	
Tuberculosis	7 (39)
Foreign body	3 (17)
Nocardia	4 (22)
Bronchial adenoma	1 (5.5)
Arteriovenous malformation	1 (5.5)
Broncholith	2 (11)

* Others included infiltrating lesions from oesophagus and larynx

* Foreign bodies included betel nut, tablet and screw being 92 percent. Diagnostic yield improved further to 94.6% on repeat bronchoscopy.

Discussion:

Malignant lesions are common but benign lesions also contribute significantly to the intrabronchial mass lesions. Intrabronchial mass lesions were seen in all age groups. Benign lesions showed greater age range as compared to the malignant lesions. While malignant lesions are seen in middle-age to elderly- age group, benign lesions occurred in all age groups. Both benign and malignant intrabronchial mass lesions were predominantly seen in males as compared to females. The male preponderance was much more in malignant lesions as compared to benign lesions.

Though adenocarcinoma is the most common form of lung cancer, in our study squamous cell carcinoma and small cell carcinoma were common. This could probably be due to central location of these tumours which are better assessed with bronchoscopy; adenocarcinomas because of their predominantly peripheral location are not visualised on bronchoscopy. One patient who presented with fever and an opacity in the right middle zone on the chest radiograph was found to have anintrabronchial mass lesion that on biopsy was found to be an adenocarcinoma. Bronchial washings of this patient revealed AFB. This was attributed to coincidental finding in which patient had gradual clinical improvement after antituberculosis treatment though radiological opacity persisted. The number of case reports of benign lesions that mimic malignant lesions indicates the importance of the benign lesions. Infections that are reported to cause intrabronchial mass lesions include tuberculosis,1 nocardiasis2 and mucormycosis.3 Among benign lesions, tuberculosis was most common, possibly due to endemic nature of this disease in our country. Bronchial foreign bodies with granulomatous reactions leading to the complete obstruction of the airways may simulate endobronchial malignancy.4 Foreign bodies are mainly seen in children and elderly population, but, may be seen in young- to middle-age group adults also. Sometimes organised blood clots or mucus plugs may simulate intrabronchial mass lesions but these get cleared by aspiration or coughing. Rare entities, like mycotic pulmonary artery aneurysm5 or vascular lesions may also present as intrabronchial mass lesion.6 We also found an intrabronchial vascular lesion that simulated malignancy; diagnosis was confirmed on histological examination of the pneumonectomy specimen.

Computed tomography or virtual bronchoscopy can also diagnose intrabronchial mass lesions with good morphological correlation between CT and bronchoscopic findings (89% for discrete nodule, 80% overall).7 Virtual multi-slice CT bronchoscopy can add important information about intra-luminal tumour and its relation to surrounding structures.8 These modalities are non-invasive but do not permit obtaining samples for diagnostic testing and cannot distinguish benign lesions from malignant lesions. According to a study,9 CT failed to detect endobronchial tumours in 11 of 64 patients (17%). So, bronchoscopy can sometimes detect radiographicaily occult lesions. In an another study of 98 patients,'° bronchoscopy was diagnostic for cancer in 88 (89.8%) patients. Forceps biopsy gave results in 82.7% cases, transbronchial needle aspiration (TBNA) in 68.6%, brushing in 68.4% and washings in 31.6 percent. Cytological examination does not increase the diagnostic yield of biopsy spechnens" but increases the yield by 16.9%, when

intrabronchial lesions are not visible.1' Diagnostic yield of TBNA is high when endoscopically visible bronchial anomalies suggesting neoplasm are evident, particularly when the lesion is due to extrinsic compression, submucosal infiltration or exophytic growth with necrosis.'2 False-positive results of bronchoscopy are low. Sometimes results are inconclusive due to inadequate sample size or non- specific changes, so repeat bronchoscopy may be required in such cases for the diagnosis. According to the American Thoracic Society / European Respiratory Society (ATS/ERS)," diagnostic yield of bronchoscopy should be more than 90%, but in our study diagnostic yield was about 92 % on first attempt which improved to

94.6% on second attempt to diagnose inconclusive results. Recently, the role of endobronchial ultrasound (EBUS) during bronchoscopy as the diagnostic tool for lung cancer has emerged. According to a study,14 under EBUS guidance, the diagnostic yield of transbronchial lung biopsy in peripheral lung cancer by bronchoscopic examination was significantly improved without difference in the complication rate.

Bronchoscopy has the advantage of detecting lesions in the upper airways, as seen in one case in the present study, in which carcinoma larynx extending to the trachea could be identified. Disadvantages of bronchoscopy include its limited approach to distal airways and only proximal airways upto subsegmental level bronchi can be approached. It is invasive procedure and it has high cost apart from various other complications of bronchoscopy and biopsy. Moreover, it cannot be used for mass screening of malignancy but fluorescence endoscopy might be useful to detect early bronchial lesions, especially in smokers with heavy occupational exposure to asbestos.'5

In conclusion, malignant lesions are a common cause of intrabronchial mass lesions but benign lesions also contribute significantly to such lesions. Benign lesions can mimic malignant lesions on visual impression, and thus, adequate sampling is a must. However, good histopathology and microbiology laboratories should support bronchoscopy for obtaining high yield. In spite of advances in imaging techniques, bronchoscopy stillremains an essential tool for the diagnosis of centrally located mass lesions.

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