Fiberoptic Bronchoscopy Findings, Safety and Clinical Presentation of 101 Patients Referred for Lung Tumor Evaluation in Baghdad Teaching Hospital

Mustafa Nema

ABSTRACT:

BACKGROUND:

Bronchoscopy is widely used diagnostic and therapeutic tools in pulmonary medicine. Findings related to tumor effect, safety profile and patient presentation were explained for patients referred to bronchoscopy unit.

OBJECTIVE:

To evaluate the bronchoscopic findings combined with clinical presentation and radiological appearance as well as determining safety for patients referred to bronchoscopy unit.

METHOD:

Fiberoptic bronchoscopy arranged for 101 patients included, 69 males and 32 females. Age range 50.7-67.3 years at the bronchoscopy unit in Baghdad teaching hospital. Review of history and clinical examination performed. Inspection of tracheobronchial tree and appropriate sampling of visible lesions were performed.

RESULTS:

Cough was the major presenting symptoms (64.3%), followed by dyspnea (28.7%) and hemoptysis (17.8%). Involvement of vocal cord seen in 12.8%, tracheal lesions in 15.8% of patients. Carinal distortion observed in 2.9%. The right bronchial tree involved more than left one (39.6% and 29.7% respectively). Mass and/ or nodules are the main findings detected (82%), followed by bronchial narrowing due to tumor effect in 42.5%. In tumors located in the main bronchi 96% were more than 2cm from the carina. No mortality was recorded, while bleeding occur in 2.9%, hypoxemia in 4.9%, and fever in 0.9% of patients.

CONCLUSION:

With flexible bronchoscopy, endobronchial mass and associated neoplastic bronchial wall lesions were frequently found in patients referred for lung tumor evaluation. It is a very safe procedure. Cough, dyspnea and hemoptysis were the commonest presenting symptoms for patients referred for bronchoscopy.

KEYWORDS: bronchoscope, lung tumor.

INTRODUCTION:

Flexible bronchoscopy is the most common type of bronchoscopy used now a day. It is safe and can visualize the trachea, proximal airways, and segmental airways out to the third generation of branching, and can be used to sample and treat lesions in those airways [(1)]. Cough, dyspnea, hemoptysis and abnormal radiological findings forming the major indications [(2,3)]. Bronchial mass, infiltration and narrowing of the lumen due to tumor effect are the most common findings [(4)].

Dept. of Medicine/ College of Medicine/ Baghdad University.

PATIENTS AND METHODS:

Between April, 2010 and July, 2013, 101 patients (69 male and 32 female) with age range (50.7-67.3) underwent fiberoptic bronchoscopy performed by the author at the Baghdad Teaching hospital. The patients were referred because of possible lung tumor with one or more these symptoms (cough, hemoptysis, and dyspnea) and abnormal chest radiological finding. Written consent gained. Patients excluded include those with current or recent myocardial ischemia; poorly controlled heart failure; significant hypotension, hypertension,

bradycardia, or tachycardia; exacerbation of asthma or chronic obstructive pulmonary disease; severe hypoxemia; and life-threatening cardiac arrhythmias. Additional contraindications exist when brushing, biopsy, or needle aspiration is planned, which are related to bleeding risk.

Preparations:

Supplemental oxygen is administered to most patients (generally 2 to 6 L/min by nasal cannula), and intravenous access is established. The upper airway is anesthetized by 1 or 2 percent lidocaine into the posterior oropharynx to suppress the patient's gag reflex, lidocaine jelly (2%) to the patient nostril to the distal shaft of the instrument to reduced friction. Lidocaine also instilled to vocal cords, carina main stem and segmental bronchi for more comfortable procedure.

Equipment and supplies:

Olympus BF-260 fiberoptic bronchoscope was used with sampling sets (brushes, forceps and biopsy needles). In addition; ice cold saline and epinephrine in a concentration of 1:10,000 to control any endobronchial bleeding; resuscitation medications, and monitor for cardiac rhythm, rate, and pulse oximetry.

Conscious sedation:

midazolam given IV over one to two minutes in dose of 0.5 or 1 mg at a time and titrated to effect. Repeat doses given every two to five minutes as necessary.

Procedure:

airway inspection include visual examination of the trachea, main stem bronchi, and segmental bronchi performed. The inspection include examination of the mucosa and of the size, stability, and patency of the airway lumen. Any visible lesion was biopsied by forceps and/or brushed and then flushed with saline. The bronchial wash sent for cytology, bacteriology, mycobacteriology and mycology labs accordingly.

When BAL required a cumulative volume of 100 mL saline is instilled to the affected segment or lobe seen with CT and when the lesion is wide spread, multiple lobes will be sampled. In addition to lab test for BAL fluid Lymphocyte subpopulations (eg, CD4, CD8) also assessed using immunofluorescent labeled monoclonal antibodies when lymphoma or sarcoidosis suspected.

Post procedure care:

the patient maintained on cardiac and oximetry monitor and given oxygen until consciousness improve, then 1-2 hours observation before discharge.

RESULTS:

A total number of 101 patients were enrolled; 69 patients (68.3%) male and 32 (31.6%) female. The mean age 59 years with age range (50.7-67.3) years. There were 56 (55.4%) smokers (Table 1)

Table 1: Gender and smoking variables.

Variable	N	%
Gender		
Male	69	68.3
Female	32	31.6
Smoking habits		
Non-smokers	45	44.5
Smokers	56	55.4

Cough was the major presenting symptoms and recorded in 65 patients (64.3%) followed by dyspnea found in 29 (28.7%), hemoptysis in 18 (17.8%), chest pain in 17 (16.8%), weight loss in 7 (6.9%) and fever in 5 (4.9%) of patients (Table 2).

Table 2: Clinical presentations.

Symptom	N	%
Cough	65	64.3
Dyspnea	29	28.7
hemoptysis	18	17.8
Chest pain	17	16.8
Weight loss	7	6.9
Fever	5	4.9

All patients CXR and chest CT with or without contrast have been studied carefully before performing bronchoscopy. The right lung found to have involved by radiological abnormality in majority of patients 42.5%, then left lung 35.6%, bilateral involvement seen in 9.9% and mediastinum by 4.9% (Table 3).

Table 3: Radiological finding distribution.

Radiological findings	N	%
Right lung	43	42.5
Left lung	36	35.6
Bilateral	10	9.9
Mediastinal	5	4.9
other	7	6.9

When lesion classified according to the anatomical location (Figure 1), the majority of lesions were found in the right bronchial tree (right main bronchus and its subdivision) 39.6% while the left one involved in 29.7% of patients.

Vocal cord lesions (include paralysis, nodule, mass, ulceration edema, and features of acid reflux) detected in 12.8%. Tracheal lesions (includeing edema, nodule(s), mass, granulations and lumen narrowing) seen in 15.8% and lastly carinal distortion (including widening, distortion, deviation and tumor involvement) found in 2.9%.

The major morphology of the lesions in the bronchial tree seen with bronchoscope (Table 4) include: mass /nodules 82 (81.2%), associated bronchial lumen narrowing ٣
due to local lesion in 43 (42.5%), bronchial wall infiltration in 11 (10.9), extrinsic compression in 7 (6.9%), associated localized anthracosis in 4 (3.9%) and associated bronchomalacia in 2 (1.9%),

Figure 2 shows examples of bronchial lesions seen during bronchoscopy in patients included in this study.

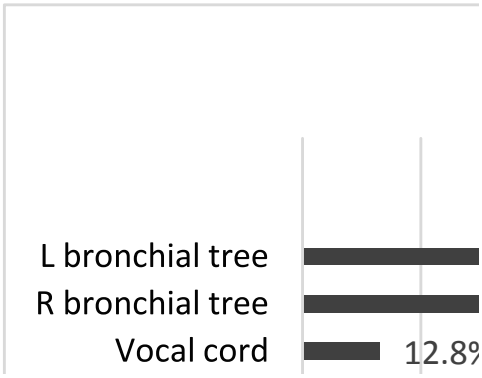

Figure 1: Location Bronchoscopic lesions.

Table 4: Morphology of bronchial lesions.

Bronchial lesion	N	%
Mass/nodule(s)	82	81.2
Narrowing	43	42.5
Infiltration	11	10.9
Anthracosis	4	3.9
Bronchomalacia	2	1.9

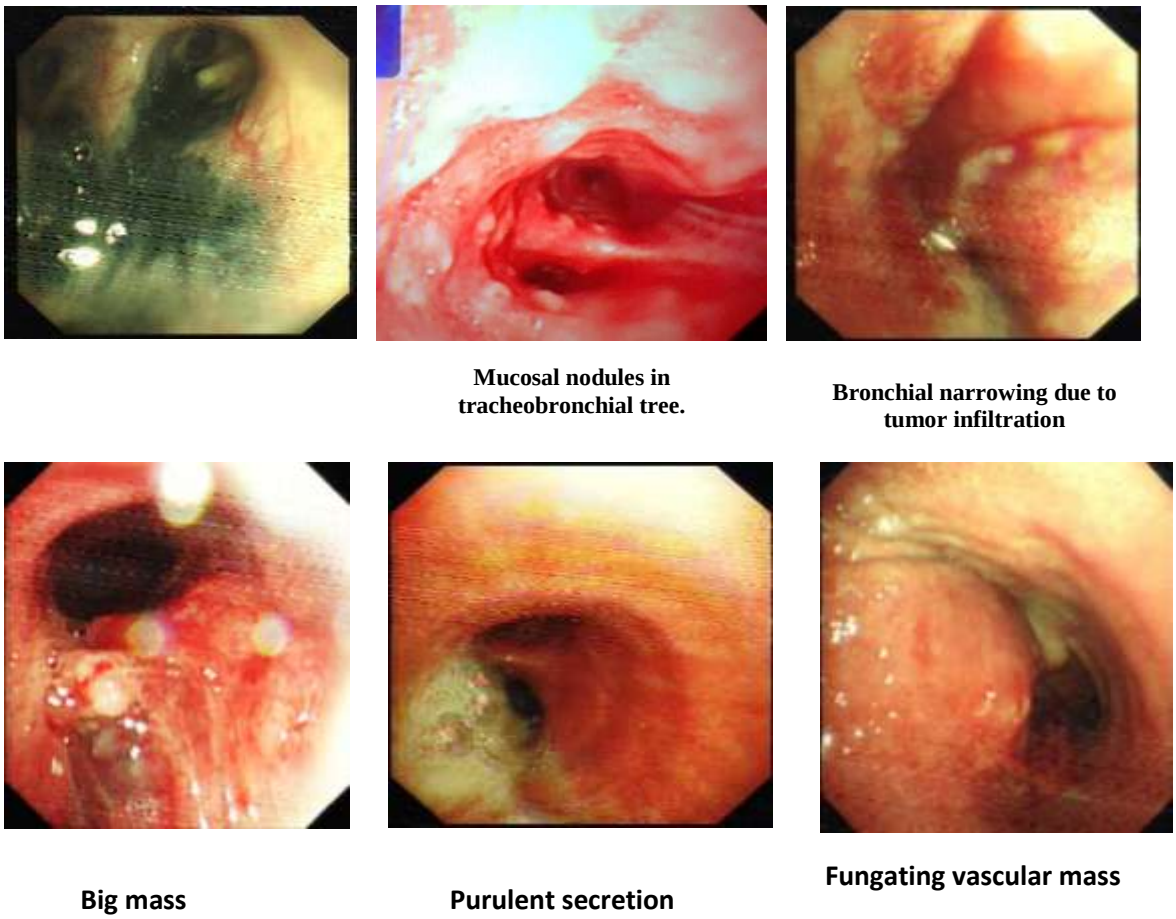

Figure 2: Examples of bronchoscopic lesions.

The vast majority of major bronchi lesion's distance from the carina found to be more than 2cm seen in 97 patients (96%). In three cases (2.9%) the lesion directly involving the carina and in only one (0.9%) it was less than 2cm from the carina.

It must be noted that most patient have more than one abnormal bronchoscopic findings at the same time.

Bronchial samples taken for lab test include wash, brush, biopsy, BAL and post procedure sputum collection.

The final diagnosis was not included in this study.

Complications that occur during or post-bronchoscopy were: moderate bleeding in 3 (2.9%), prolonged sedation in 3 (2.9%), hypoxemia in 5 (4.9%), sinus tachycardia in 4, fever in 1 (0.9%).

All of these were controlled without unfavorable consequences. No mortality recorded.

DISCUSSION:

Majority of patients enrolled with lung tumors in this study were middle age and older. The prevalence of lung cancer is increased with age. The fact that incidence of lung cancer is highest in 50-70 year age and much more lower in patients younger than 40 years of age, was explained in one of study example (4).

Cough was the commonest indication for bronchoscopy as it is recorded in 65 patients (64.3%). It is usually evoked by local tumor effect, and as bronchial mass and/or nodules detected in 81.2% of patients in this study, therefore cough as a major presenting symptom will be explained. Change in the character of cough in COPD patient should alarm for the possibility of lung cancer development. Both COPD and cancer share the similar etiology, namely smoking. Devkota et al study [(2)] found 89.8% of patient scheduled for

bronchoscopy have cough. Similar findings was also recorded by Parakash [3].

Chest pain and shoulder pain in the current study was found in 16.8% and it suggest chest wall or pleural involvement. It is an important presenting findings in patients with lung cancer [5].

Dyspnea forming 28.7% of presenting symptoms. Dyspnea developed when the tumor causing bronchial obstruction or narrowing. When dyspnea developed in elderly (especially when associated with smoking and/or COPD), bronchogenic carcinoma is one of the most important differential diagnosis. Hyde L and Chute CG, record shortness of breath in approximately 25 percent of cases [6,7].

Hemoptysis as a presenting findings to bronchoscopy in this study found in 17.8% of patients due to tumor vascular erosion. In Santiago etal study bronchogenic carcinoma said to be the commonest cause of hemoptysis [8].

Lung cancer is usually suspected in individuals who have abnormal chest radiograph findings or have symptoms caused by either local or systemic effects of the tumor [9].

Radiologicallly, in this study, the right lung found to be involved in majority of patients 42.5%, then left lung 35.6%, bilateral involvement seen in 9.9% and mediastinum by 4.9%. In Minami,et al study the right lung is involved in higher percentage (72%) [10].

While in Waheed study, the right lung involvement seen in 45.2%, Left lung in 31.7%, and bilateral involvement in 18.3% [19].

Vocal cord involvement with paralysis and other lesions seen in 12.8%. The finding of vocal cord paralysis was related to recurrent laryngeal nerve involved by the lung tumor. Carinal distortion found in 2.9% and this was due direct or indirect involvement by the tumor. Vocal cord and carina involvement was recorded to be 2% and 31% respectively in Rabahi MF,et al study [11]. Both malignant (primary or metastatic) can cause external compression or widening of the main carina [12,13].

Mass/nodule(s) in the bronchi found in 81.2%. With bronchoscopy assessment of the size of such lesions to separate mass from nodules and mass effect were evaluated and specimens collected for pathological analysis. Masses and nodules detected by bronchoscopy are most commonly malignant in elderly and smoker patients. Primary malignancy may be found in approximately 35% of solitary pulmonary nodules (14). Devkota et al found endobronchial growth being detected in 47.8% of patients (2), other study showed the sum of mass and nodules percent was 66% (11).

In Ugur Gonlugur et al and Martini and McCormick 1978 studies, direct tumor effect was seen in 19.1% and 38% respectively (including mass, nodules, infiltration and ulceration) [15,16].

Abnormal bronchial secretions (bloody, purulent or white-frothy) seen in 29 (28.7%) of patients. In Rabahi MF,et al 2012 it was seen in 39% [11].

Anthracosis seen in 3.9% of patients. In Mostafa Ghanei, et al study 71 from 919 patients (7.7%) were diagnosed with anthracosis [17] .Anthracosis is caused by the deposition of carbon, silica, and quartz particles in the macrophages, mucosa, and submucosa [18].

Bronchoscopy is safe procedure and complications recorded to be rare [19]. Moderate bleeding due of brushing and biopsy procedures occur in 3 (2.9%) of our study. Brisk hemorrhage in six out of 600 patients as a result of forceps biopsy documented in one study (20). Other complications detected in this study include: prolonged sedation in 3 (2.9%), hypoxemia in 5 (4.9%), brief sinus tachycardia in 4, fever in 1 (0.9%). All complications were controlled smoothly and no bad consequences developed. In Khalid et al study [19], no mortality happened, and mild haemoptysis was present in 4.3%, 8% had low grade fever and 2.4% developed bronchospasm.

Generally, the mortality reported from bronchoscopy is very low (0-0.5%) [20].

Bronchoscopist may describe the same lesion in different ways [21]. This may explain some of variations in the percentage of lesions in different studies accordingly.

CONCLUSION:

Fiberoptic bronchoscopy is a very safe procedure for the diagnosis of bronchogenic carcinoma and other forms of bronchial disorders endobronchial tumor, nodules and bronchial wall infiltration were the commonest findings.. In our study cough and hemoptysis were the commonest presenting symptoms and radiological opacity was the commonest indication.

REFERENCES:

1. Textbook of bronchoscopy, Feinsilver, SJ, Fein, AM (Eds), William & Wilkens, Baltimore 1995.
2. KC Devkota, R Pathak, A Khanal1 and R Chokhani Fiber-optic bronchoscopy: seven-year experience at Nepal MedicalCollege Teaching Hospital. Nepal Med Coll J 2010; 12: 260-63.

3. Prakash UBS, Offord KP, Stubbs SE. Bronchoscopy in North America: The ACCP survey. Chest 1991;100:1668-75.
4. Barros JA, Valladares G, Faria AR, Fugita EM, Ruiz AP, Vianna AG, et al. Early diagnosis of lung cancer: the great challenge. Epidemiological variables, clinical variables, staging and treatment. J Bras Pneumol. 2006;32:221-27. PMid:17273611. http://dx.doi.org/10.1590/S1806-37132006000300008.
5. Birring S S and Peake M D. Symptoms and the early diagnosis of lung cancer.: 10.1136/thx.2004.032698. Downloaded from http://thorax.bmj.com
6. Hyde L, Hyde CI. Clinical manifestations of lung cancer. Chest 1974; 65:299.
7. Chute CG, Greenberg ER, Baron J, et al. Presenting conditions of 1539 population-based lung cancer patients by cell type and stage in New Hampshire and Vermont. Cancer 1985; 56:2107.
8. Santiago S, Tobias J, Williams AJ. A reappraisal of the causes of hemoptysis. Arch Intern Med 1991; 151: 2449-51.
9. M. Patricia Rivera, Frank Detterbeck, and Atul C. Mehta, Diagnosis of Lung Cancer. The Guidelines. CHEST / 123 / 1 / January, 2003 supplement
10. Hironobu Minami, Yuichi Ando, Fumio Nomura, Shuzo Sakal, and Kaoru Shirnokata lnterbronchoscopist Variability in the Diagnosis of Lung Cancer by Flexible Bronchoscopy ,Chest 1994; 105:1658-62.
11. Rabahi MF, Ferreira AA, Reciputti BP J Bras Pneumol. 2012;38:445-451
12. Hosal SA, Fisher JA, Freeman JL Mediastinal obstruction of the trachea. J Otolaryngol 1995; 24:139–42.
13. Lee HS, Park YH, Cho BK Eur J Cardiothorac Surg 2001;19:221–22.
14. Swenson, SI, Silverstein, MD, Ilstrup, DM, et al The probability of malignancy in solitary pulmonary nodules: application to small radiologically indeterminate nodules.Arch Intern Med1997;57:849-55.
15. Ugur Gonlugur, Ibrahim Akkurt, Tanseli Efeoglu Classification of fibreoptic bronchoscopic findings: analysis of 2,698 cases. Comp Clin Path 2004;13: 1-3.
16. Martini N, McCormick PM Assessment of endoscopically visible bronchial carcinomas. 1978;Chest 73 (Suppl 5): 718–20.
17. Mostafa Ghanei, Jafar Aslani, Mohammadreza Peyman, Masoud Ahmadzad Asl, Omidreza Pirnazar Bronchial Anthracosis: A Potent Clue for Diagnosis of Pulmonary Tuberculosis Oman Medical Journal 2011; 26:19-22.
18. Naeye RL. The pneumoconiosis; coal worker's pneumoconiosis. In: Saldana MJ, ed. Pathology of pulmonary disease. Philadelphia: JB Lippincott, 1994:369-85.
19. Khalid Waheed, Seema Mazhar, Zafar Hussain Iqbal And Aamir Hassa. Role of fiberoptic bronechoscopy in the diagnosis of lung diseases: an experience with 164 cases of lung diseases: An experience with 164 cases Biomedica 2011;27:103 – 5.
20. Facciolongo N, Patelli M, Gasparini S, et al. Incidence of complications in bronchoscopy. Multicentre prospective study of 20,986 bronchoscopies. Monaldi Arch Chest Dis 2009;71:8.
21. Minami H, Ando Y, Nomura F, Sakai S, Shimokata K. Interbronchoscopist variability in the diagnosis of lung cancer by flexible bronchoscopy. Chest. 1994;105:1658-62.