Flexible fibreoptic bronchoscopy in Basra, Iraq: a 20-month experience

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تنظير القصبات بمنظار الألياف البصرية المرنة في البصرة بالعراق: خبرة عشرين شهراً

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خلاصة: تمثّل هذه الدراسة المستقبلية خبراتنا في تنظير القصبات باستعمال منظار الألياف البصرية المرنة من أجل تقييم مختلف الآفات الصدرية. ففي خلال عشرين شهراً أُجري التنظير القصبي لمئتين وثلاثة من المرضى (151 من الذكور و52 من الإناث، تتراوح أعمارهم بين 15 ومئة سنة). وكان لدى هؤلاء المرضى طيف واسع من الأعراض أو الصور الشعاعية غير الطبيعية، أو كلاهما معاً. وكانت الأغلبية تعاني من السعال وضيق النفس. كما كان نفث الدم من الأعراض الشائعة. وبصورة إجمالية، كان هناك 148 مريضاً مصاباً بأورام خبيثة بينما كان 55 مصاباً بآفات غير خبيثة. وكان أكثر الأورام شيوعاً السرطانات القصبية (91 حالة موكدة و33 حالة مشتبهة). وكان من الأورام الخبيثة الأخرى النقائل الرئوية وأورام المنصف. أما الآفات الصدرية غير الورمية فقد شملت السلّ الرئوي والكيس العداري الرئوي والخراج الرئوي والعدوى الصدرية المنصرفة والالتهاب القصبي المزمن. إن تنظير القصبات بمنظار الألياف البصرية المرنة أعظم ما يكون فائدة في تشخيص السرطانات القصبية (حيث تبلغ حصيلة التشخيصات الإيجابية 73%). ولكنه أقل ما يكون فائدة في تشخيص أورام المنصف.

ABSTRACT This prospective study represents our experiences in using fibreoptic bronchoscopy (FOB) in the evaluation of different thoracic lesions. Over a 20-month period, 203 patients (151 males and 52 females) (age range: 15–100 years) underwent bronchoscopies. The patients had a wide range of symptoms and/or radiographic abnormalities. The majority had cough and shortness of breath; haemoptysis was a common symptom. In all, 148 patients had neoplasms and 55 had non-neoplastic lesions. The most common malignancy was bronchogenic carcinoma (91 confirmed, 33 suspected). Other neoplasms included pulmonary metastases and mediastinal tumours. The non-neoplastic chest lesions included pulmonary tuberculosis, pulmonary hydatid cyst, lung abscess and resolving chest infection and chronic bronchitis. FOB was most useful in the diagnosis of bronchogenic carcinoma (positive diagnostic yield of 73%). It was least useful in diagnosing mediastinal tumours.

La fibroscopie bronchique à Bassora (Iraq): une expérience sur 20 mois
RESUME Cette étude prospective représente les expériences que nous avons réalisées en ce qui concerne l'utilisation de la fibroscopie bronchique pour l'évaluation de différentes lésions pulmonaires. Sur une période de 20 mois, 203 patients (151 hommes et 52 femmes - âges extrêmes: 15-100 ans) ont subi une bronchoscopie. Les patients présentaient divers symptômes et/ou anomalies radiographiques. Dans leur majorité, les patients toussaient et avaient des difficultés respiratoires; l'hémoptysie était un symptôme courant. En tout, 148 patients avaient des néoplasmes et 55 des lésions non néoplasiques. La tumeur maligne la plus courante était le carcinome bronchogénique (91 confirmés, 33 suspects). D'autres néoplasmes comprenaient les métastases pulmonaires et les tumeurs médiastinales. Les lésions pulmonaires non néoplasiques incluaient la tuberculose pulmonaire, le kyste hydatique pulmonaire, l'abcès pulmonaire et l'infection pulmonaire résolutive et la bronchite chronique. La fibroscopie bronchique était le plus utile dans le diagnostic du carcinome bronchogénique (rendement diagnostique positif de 73%). Elle était le moins utile pour diagnostiquer les tumeurs médiastinales.

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Introduction

Fibreoptic bronchoscopy (FOB) was devised in Japan in 1964. It has replaced the traditional rigid bronchoscope in many of its diagnostic and therapeutic applications. Its superiority is mainly due to its small size and flexibility, which permits visualization of segmental and subsegmental bronchi. It therefore allows the detection of more peripheral lesions.

FOB is the best means of evaluating the bronchial tree and its adjacent lung parenchyma [*1*]. It is extremely useful in the early detection of bronchogenic carcinoma. Moreover it can be used in the diagnosis of other pulmonary and mediastinal lesions [*2,3*].

The use of FOB in Basra is quite recent and our hospital is the only centre in southern Iraq with this facility; hence, it is the only referral centre for the procedure.

The purpose of this study was to present our experiences with FOB in the evaluation of different thoracic disorders, both neoplastic and non-neoplastic, with particular reference to specific chest lesions.

Patients and methods

Over a 20-month period (December 1995 to August 1997), 203 patients (151 males and 52 females) with different chest complaints and/or radiographic abnormalities underwent FOB in the Department of Thoracic and Cardiovascular Surgery of Basra University Teaching Hospital.

A total of 213 bronchoscopies were carried out (one patient underwent the procedure three times for recurrent idiopathic haemoptysis and eight patients had two bronchoscopies each because of a suspicion of malignancy which was not confirmed by the first examination)

The patients fasted for 4 hours. The procedure was then performed in a non-sterile room with the assistance of one nurse. The bronchoscope was inserted transnasally under local anaesthesia (lignocaine spray and solution) with the patient in a sitting position. In addition to the inspection of the respiratory tract from the nose to the 5th and 6th generation bronchi, biopsies were taken from visible endobronchial lesions. Bronchial brushings and secretions were collected for cytological and/or bacteriological studies.

Results

The age and sex distributions of the patients are shown in Table 1. The majority of male patients were between 40 years and 50 years, while most of the female patients were between 30 years and 40 years. The mean age for males was 58.3 years and for females 52.4 years. The youngest patient was a 15-year-old female with a mediastinal tumour (poorly differentiated lymphoma) and the oldest was a 100-year-old male with bronchogenic carcinoma.

Table 1 **Age and sex distribution of 203 patients undergoing fibreoptic bronchoscopy**

Age (years)	Males	Females	Total	%
< 20	0	1	1	0.5
21–30	8	4	12	5.9
31–40	8	3	11	5.4
41–50	22	14	36	17.7
51–60	55	20	75	36.9
61–70	46	9	55	27.1
71–80	10	1	11	5.4
> 80	2	0	2	1.0
Total	151	52	203	

Table 2 Main symptoms in patients undergoing fibreoptic bronchoscopy

Symptom	No.	%
Cough	180	88.7
Dyspnoea	170	83.7
Chest pain	70	34.5
Haemoptysis	65	32.0
Non-resolving pneumonia	40	19.7
Hoarseness of voice	15	7.4
Superior vena cava syndrome	6	3.0
Stridor	5	2.5

Table 2 shows the main presentations. Most of the patients had cough and shortness of breath. Haemoptysis was a common symptom.

Table 3 shows the final diagnoses of the patients. In all, 148 patients had neoplasms; the most common malignancy was bronchogenic carcinoma (91 confirmed and 33 suspected cases), 55 patients had non-neoplastic lesions, such as pulmonary tuberculosis (PTB) (19 cases) and pulmonary hydatid cyst (8 cases).

Table 4 shows the histological types of the 91 confirmed cases of bronchogenic carcinoma. The most common was squamous cell carcinoma (45.1%). The exact cell type could not be determined in 27 patients (29.7%).

There were 11 patients with pulmonary metastases. There were 3 patients with breast cancer and 1 each with laryngeal carcinoma, large-cell lymphoma, brain tumour, ovarian carcinoma, retroperitoneal

Table 3 Final diagnosis in 203 patients undergoing fibreoptic bronchoscopy

Diagnosis	Males	Females	Total	%
Neoplasms				
Confirmed bronchogenic carcinoma	74	17	91	44.8
Suspected bronchogenic carcinoma	27	6	33	16.2
Pulmonary metastases	5	6	11	5.4
Mediastinal tumours	3	2	5	2.5
Bronchial carcinoid	1	–	1	0.5
Lung sarcoma	–	1	1	0.5
Carcinoma of larynx	2	–	2	1.0
Carcinoma of bladder	1	–	1	0.5
Carcinoma of oesophagus	1	–	1	0.5
Chest wall tumour	1	–	1	0.5
Brain tumour	1	–	1	0.5
Non-neoplastic lesions				
Pulmonary tuberculosis	12	7	19	9.4
Lung abscess	3	1	4	2.0
Resolving chest infection	6	3	9	4.4
Chronic bronchitis	5	–	5	2.5
Pulmonary hydatid cyst	4	4	8	3.9
Idiopathic haemoptysis	3	3	6	3.0
Pleural effusion	1	–	1	0.5
Septicaemia	–	1	1	0.5
Interstitial lung disease	1	1	2	1.0

Table 4 **Histological diagnosis in confirmed bronchogenic carcinoma**

Type of carcinoma	No. of patients	%
Squamous cell carcinoma	41	45.1
Small cell carcinoma	8	8.8
Adenocarcinoma	7	7.7
Large cell carcinoma	7	7.7
Anaplastic carcinoma	1	1.1
Undetermined cell type	27	29.7
Total	91	100

tumour and adenocarcinoma. In 2 patients, the primary site was unknown. Bronchoscopy was normal in 3 of these 11 patients, while the remaining 8 had some abnormalities such as mucosal erythema (2 patients), bleeding (4), visible endobronchial growth (2), external bronchial compression (4) and bronchial stenosis (2).

There were 5 patients with mediastinal tumours (3 males and 2 females) who presented with shortness of breath (4 occasions), superior vena caval obstruction (2 occasions), anterior chest wall mass, stridor and severe pallor (1 occasion for each). The chest radiography revealed mediastinal widening (4 patients) and a huge right intrathoracic mass (1 patient). FOB was normal in all. A definite diagnosis of malignancy was established by open biopsy in 2 patients and by percutaneous transthoracic fine-needle aspiration biopsy in one. Malignancy could not be confirmed in the remaining 2 patients as one patient was unfit for diagnostic thoracotomy and the other refused it.

The youngest patient with primary malignant tumour of the lung (haemangiosarcoma) was a 27-year-old female who presented with shortness of breath, haemoptysis and left lung consolidation. FOB revealed a highly vascular tumour in the left main bronchus. The diagnosis was confirmed by open lung biopsy via left thoracotomy.

FOB was normal in 4 patients with carcinoma of the oesophagus, chest wall tumour and carcinoma of the bladder.

All but 2 of the patients with malignant lesions in the study were inoperable, on bronchoscopic basis or otherwise, the commonest cause of inoperability being poor pulmonary reserve. Of the 2, one refused the operation, while the second (a 51-year-old) had a left upper lobectomy for bronchial carcinoid (bronchoscopically visible); this patient is well after 10 months.

Two patients with laryngeal carcinoma were diagnosed bronchoscopically. Both presented with hoarseness of the voice and stridor. The left vocal cord was paralysed in one patient beside a subglottic mass. A fungating tumour attached to the soft tissue of the larynx was seen in the second patient.

A definite diagnosis of PTB was made in 19 patients by direct examination of Ziehl–Neelson-stained smears of bronchial wash obtained during FOB. Four patients with lung abscesses underwent FOB. All were located in the right upper lobe. Bronchoscopic drainage of pus produced significant clinical improvement in 2 of them. Eight patients with pulmonary hydatid cysts underwent bronchoscopy either for haemoptysis (6 occasions), atypical X-ray appearance (4) or suspicion of malignancy (1). The most impressive finding was the pathognomonic visualization of the laminated membrane of the cyst in a segmental bronchus in 3 patients.

Six patients with idiopathic haemoptysis (3 males and 3 females) underwent bronchoscopy. Visible bleeding was found and traced to its segmental origin in 2 patients. The different causes of haemoptysis in 65 patients are shown in Table 5. The

Table 5 **Causes of haemoptysis in 65 patients**

Cause	No. of patients
Bronchogenic carcinoma	31
Pulmonary metastases	4
Lung sarcoma	1
Pulmonary tuberculosis	10
Lung abscess	4
Pulmonary hydatid cyst	6
Chronic bronchitis	3
Idiopathic haemoptysis	6
Total	65

most common malignant cause was bronchogenic carcinoma, while the most common benign cause was PTB.

FOB was normal in patients with idiopathic pleural effusion, septicaemia and interstitial lung disease.

Discussion

The youngest patient to undergo FOB in the study was a 15-year-old. We do not have paediatric FOB to permit examination of younger patients. However, it is possible nowadays to examine even neonates using a miniature fibreoptic bronchoscope with an external diameter of 2.2 mm [*4*]. The oldest patient was a 100-year-old man with advanced bronchogenic carcinoma. This indicates the extreme range of FOB.

There were 151 males and 52 females (male:female ratio = 3:1). The male predominance was due to the high percentage of patients with bronchogenic carcinoma (61% of the total), 81% of whom were males. The majority of the patients were in their fifties; this is again attributed to the predominance of bronchogenic carcinoma.

FOB has been in clinical use for almost three decades and has now become one of the most important tools in the diagnosis of chest disease. It is a simple and useful tool to diagnose endobronchial lesions and also diffuse diseases of the lung [*5*]. Suspicion of bronchogenic carcinoma was the main indication for FOB in this study (124 patients). This diagnosis was confirmed in 91 patients; thus the positive diagnostic yield was 73%. It is comparable to other studies in which it ranges from 76% to 97% [*6*]. The most common histological type of bronchogenic carcinoma was squamous cell carcinoma (45.1%). The exact cell type could not be determined in 27 patients (29.7%). More experience in cytodiagnosis as well as the availability of new cytological techniques may permit more positive diagnoses [*6,7*].

FOB showed no visible tumour in 33 suspected cases, although it was repeated in 4 of these patients. These patients had either peripheral or extrabronchial lesions whose diagnosis with bronchoscopy necessitated the use of special techniques such as transbronchial lung biopsy under fluoroscopic guidance, transbronchial needle aspiration, detection of fluorescence after injection of haematoporphyrin derivative and the detection of tumour markers in bronchoalveolar lavage fluid [*8–11*]. Such techniques are not currently available in our centre.

The lung is often involved when extrapulmonary malignancies metastasize, and FOB is frequently performed as part of the patient's subsequent evaluation [*12*]. In our study, the number of patients with pulmonary metastases who underwent FOB was relatively small. However, bronchoscopic abnormalities were noted in 8 of them (72.7%). Argyros and Torrington reported bronchoscopic abnormalities in 39.6% of

their 111 patients [*12*]. Our higher rate of diagnosis of abnormalities may be related to the advanced disease found in our patients. The types of bronchoscopic abnormalities in both their study and ours were almost the same (visible tumour, extrinsic compression bleeding and submucosal infiltration).

As a result of the AIDS epidemic, Kaposi sarcoma has become a common cause of pulmonary metastases since the 1990s [*12*].

FOB was least useful in the diagnosis of mediastinal tumours, being normal in all cases. Mediastinoscopy and mediastinotomy are the diagnostic tools that should be used [*13*]. On the other hand, it was useful in the diagnosis of bronchial carcinoid, lung sarcoma and laryngeal carcinomas.

It was also useful in the diagnosis of PTB (19 cases). Many studies indicate that FOB can provide a rapid diagnosis of PTB by direct examination of Ziehl–Neelson-stained smears, bronchial biopsy and special cultures [*14–16*]. In addition, FOB can be useful in the diagnosis of concomitant PTB and carcinoma [*17*].

Pulmonary hydatid cyst is a very common chest disease in our area. Our study indicates that FOB can be very helpful when there is a suspicion of malignancy or when radiographic appearances are atypical. Three patients who had ruptured pulmonary hydatid cysts were diagnosed preoperatively by bronchoscopic visualization of the laminated membrane. The left upper lobe bronchus in a 50-year-old-patient was completely occluded by external compression by a huge intact hydatid cyst, which was thought to be a tumour. FOB was normal in 2 patients with small peripheral intact hydatid cysts. In one patient with bilateral pulmonary hydatid cysts and haemoptysis, preoperative bronchoscopy helped us to choose the side to operate on first. FOB was also helpful in the evaluation of late haemoptysis complicating hydatid cyst surgery. However, we agree with Saidi that bronchoscopy can induce rupture of intact pulmonary hydatid cysts, especially if large [*18*]. Therefore, whenever the diagnosis of pulmonary hydatid cyst is certain by the characteristic radiographic signs, bronchoscopy is better avoided.

Since the advent of FOB, most doctors would probably agree that all patients with haemoptysis should undergo bronchoscopy. The objective is to determine the cause, in particular malignancy, and to identify the site in case of future, unpredictable massive haemorrhage [*19*].

Six patients in our study had idiopathic haemoptysis (3.0%). FOB revealed the segmental origin of the bleeding in 2 (33%) of these patients. Weaver and colleagues studied the usefulness of FOB in haemoptysis and found it was diagnostic in 79% of cancer patients and in 62% of patients with a non-malignant cause of haemoptysis [*20*].

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