

FIBROPTIC BRONCHOSCOPY IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS - A MALAYSIAN EXPERIENCE

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ABSTRACT

We report our experience on the use of fiberoptic bronchoscopy in the diagnosis of pulmonary tuberculosis. The case records of 1,274 patients who underwent fiberoptic bronchoscopy at the National Tuberculosis Centre, Kuala Lumpur, Malaysia during a three-year period were reviewed. In 120 of them the final diagnosis was tuberculosis. Bronchoscopy confirmed the diagnosis in 37 patients (30.8%). This was achieved by bronchial aspiration for culture in 26 patients (70.3%) and bronchial biopsy for histopathology in 11 patients (29.7%). It was the exclusive method of confirmation in 16 patients (13.3%). Sputum culture was positive in 62 patients (51.7%) including 41 patients (34.2%) in whom bronchoscopy was unhelpful. Six patients had diagnosis confirmed by other means while in 36 others (30%) it was based on clinical features and supportive basic investigations. There were no complications noted. We conclude that while sputum examination remains the mainstay for diagnosing pulmonary tuberculosis, fiberoptic bronchoscopy serves as a safe and useful adjunct.

Keywords: Bronchoscopy, pulmonary tuberculosis, Malaysia.

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INTRODUCTION

Fiberoptic bronchoscopy which was introduced by Ikeda in the late 1960s⁽¹⁾ has become an essential procedure in the practice of respiratory medicine. It has superseded the use of the rigid instrument as the method of choice for routine bronchoscopy^(2,3). The larger area of the endobronchial tree available for examination offsets the smaller biopsy specimens obtained⁽⁴⁾. While it has a role in both the diagnosis and management of chest diseases^(5,6), the major indication for the procedure is in the diagnosis of bronchogenic carcinoma^(2,3) which accounted for 93.6% of cases in our study⁽⁷⁾.

The role of fiberoptic bronchoscopy in the diagnosis of pulmonary tuberculosis is more limited. In this paper we present a three-year experience of patients at the National Tuberculosis Centre, Kuala Lumpur, Malaysia who underwent bronchoscopy and in whom the final diagnosis was pulmonary tuberculosis.

PATIENTS AND METHOD

The case records of 1,274 patients who underwent fiberoptic bronchoscopy at our centre during the period May 1985 through May 1988 were reviewed.

Bronchoscopy was performed using an Olympus fiberoptic bronchoscope (Model BF3BR). Intramuscular atropine 0.6mg (in all cases) and oral diazepam 5-10mg (when required) were given half an hour before the procedure. After anaesthetizing

the pharynx, larynx and nasal cavity with 4% lignocaine spray, the bronchoscope which had been lubricated with lignocaine gel was introduced transnasally. With further instillation of 4% lignocaine solution via the bronchoscope, the tracheo-bronchial tree was systematically examined. Aspiration, biopsy and brushing were performed where indicated. The relevant specimens were sent for direct smear for acid-fast bacilli by Ziel-Neelsen method, culture for *M. tuberculosis* in Lowenstein Jensen medium and histopathological examination.

RESULTS

Pulmonary tuberculosis was the final diagnosis in 120 patients who underwent fiberoptic bronchoscopy during the study. There were 96 males (80%) and 24 females (20%). The mean age was 50.4 years. The patients' age ranged from 14 years to 87 years.

Chest radiographic findings are shown in Table I. Fifty-three patients (44.2%) had heterogenous shadows. The other common radiological features were pleural effusion and collapse-consolidation. Table II shows the gross features on bronchoscopy. In fifty-seven patients (47.5%) the endobronchial tree was inflamed. Of the six patients in whom a growth was seen, two had concomitant bronchogenic carcinoma.

Table I – Radiological Features of Patients

Type of Lesion	Number	%
Heterogenous (Infiltrative) shadows	53	44.2
Pleural effusion	19	15.8
Collapse – consolidation	18	15.0
Parahilar shadow	13	10.8
Cavitation	9	7.5
Solitary nodule/mass	5	4.2
Fibrosis	3	2.5
Total	120	100.0

The method by which the diagnosis of pulmonary tuberculosis was achieved is shown in Table III. Bronchoscopy confirmed or contributed to the diagnosis in 37 patients (30.8%). This was achieved by bronchial aspiration for culture in 26 patients (70.3%) and bronchial biopsy for histopathology in 11 patients (29.7%). Direct smear examination for acid-fast bacilli was positive from the bronchial aspirate of one patient.

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Table II – Gross Finding on Bronchoscopy

Finding	Number	%
Inflammation with or without narrowing	57	47.5
Normal	39	32.5
Narrowing alone	17	14.2
Scarring	1	0.8
Growth	6	5.0
Total	120	100.0

Table III – Method by which Diagnosis was achieved

Method	Number	%
Bronchoscopy alone	16	13.3
Bronchoscopy and sputum culture	21	17.5
Sputum culture alone	41	34.2
Other methods	6	5.0
Clinical and by basic investigations	36	30.0
Total	120	100.0

Table IV – Relationship between Gross Finding on Bronchoscopy and Diagnostic Yield

Finding	Number	Yield	%
Inflammation	57	24	42.1
Normal, narrowing or scarring	57	8	14.0
Growth	6	5	83.3

Bronchoscopy was the exclusive method of diagnosis in 16 patients (13.3%). Table IV correlates gross findings with diagnostic yield.

Sputum culture confirmed the diagnosis in 62 patients (51.7%) including 41 cases (34.2%) in whom bronchoscopy was unhelpful. Of the six patients in whom diagnosis was achieved by other means, this was attained by tru-cut biopsy (of the pulmonary lesion) in two, open lung biopsy in two, pleural biopsy in one and culture of pleural fluid in the other. In 36 patients (30%), diagnosis was based on clinical features and suggestive findings on basic investigations (Mantoux test, chest X-ray and erythrocyte sedimentation rate). These patients responded clinically and radiologically to a therapeutic trial of anti-tuberculous chemotherapy.

Six patients had concurrent coronary artery disease and two had bronchial asthma. None of the patients developed complications during or as a result of the procedure.

DISCUSSION

Pulmonary tuberculosis remains a significant cause of morbidity and mortality in this region. The most important method of diagnosis is direct smear examination of sputum for acid-fast bacilli. An adequate number of high-quality sputum specimens would be able to confirm the diagnosis in the majority of patients. Sputum examination serves as a simple, cheap and rapid means of diagnosis.

Fibreoptic bronchoscopy is indicated in patients who are unable to produce sputum or in whom sputum examination has been negative⁽⁸⁻¹⁰⁾. Another indication is in the diagnosis of concomitant bronchogenic carcinoma. All the patients in our study had at least three negative sputum smear examination results prior to the procedure. Up to six specimens were sent in those in whom the clinical features and basic investigations were highly suggestive of pulmonary tuberculosis. With proper

sputum examination, the need to proceed to bronchoscopy is reduced.

The diagnostic yield of bronchoscopy ranged from 4 to 96% in various studies⁽¹¹⁾. In our study it was 30.8%. This wide disparity in findings may be accounted for by a number of factors. Patient selection would to an extent determine the diagnostic yield. Where the prevalence of tuberculosis is higher and facilities more limited, a therapeutic trial would be an acceptable alternative to bronchoscopy in situations where clinical and investigative findings are suggestive. The amount and concentration of lignocaine used for local anaesthesia is also a factor as it inhibits the growth of *M. tuberculosis*^(8,11,12). In order to overcome this problem and improve the yield by culture we suggest that during the process of aspiration the first two aliquots (10 - 20ml each) of saline instilled into the respective segmental orifice be utilized for direct smear and cytological examination only. The subsequent two aliquots should then be collected separately and sent for culture. The use of concentration techniques for processing bronchial aspirate would increase positive results for both direct smear and culture⁽⁸⁾. This, however, was not performed in our study. Staining with the auramine-rhodamine method and examination under the fluorescent microscope was reported to give a higher diagnostic yield compared with the Ziehl Neelsen stain when the bronchial aspirate is examined⁽⁸⁾. The technique was not utilized in our study.

Danek and Bower reported that the appearance of the bronchial mucosa was not diagnostically helpful⁽⁹⁾. This finding was supported in our study. However, we found that when inflammation was noted on gross examination, the diagnostic yield of culture as well as on histology by bronchoscopy improved significantly. In our study six patients had a growth noted on bronchoscopy. In five of them (83.3%) the diagnosis of tuberculosis was confirmed on histology of the bronchial biopsy specimen. In the sixth patient sputum culture for *M. tuberculosis* was positive. Ip et al cautioned against the erroneous bronchoscopic diagnosis of bronchogenic carcinoma on the mere appearance of a mass visualized at bronchoscopy⁽¹³⁾. Hence it is important to differentiate between tuberculosis and carcinoma by histology as this has important therapeutic and prognostic implications.

A combination of the various procedures during bronchoscopy would improve the diagnostic yield⁽¹¹⁾. Aspiration and biopsy were found to be of greater value and brushing was of limited use^(8,10). This fact was also noted in our study as all our cases were confirmed by either bronchial aspiration for culture (70.3%) or bronchial biopsy (29.7%). For rapid diagnosis, direct smear examination of bronchial aspirate and bronchial biopsy are undertaken⁽¹⁰⁾. In our study only one patient had a positive smear. Factors which may have contributed to this finding have been discussed.

The question of whether to perform routine culture for *M. tuberculosis* in all patients undergoing bronchoscopy is controversial. In reaching a decision the cost-benefit has to be evaluated and the practice differs in various centres. Where there is a high prevalence of tuberculosis, the tendency is towards routine culture of bronchial aspirate^(11,12). In our centre, this is not done routinely but only when indicated. This practice had also been advocated by Kvale et al in his study⁽¹⁴⁾.

Fibreoptic bronchoscopy has been found to be a relatively safe technique with few complications^(2,3). In our study, none of the 120 patients developed complications during or as a result of the procedure. In conclusion, while sputum examination remains the most important method for confirming the diagnosis of pulmonary tuberculosis, fibreoptic bronchoscopy serves as a safe and useful adjunct.

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