RESEARCH ARTICLE

ROLE OF FLEXIBLE FIBEROPTIC BRONCHOSCOPY IN SUSPECTED SPUTUM SMEAR NEGATIVE PULMONARY TUBERCULOSIS CASES AT MICROSCOPY CENTRE UNDER RNTCP

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ABSTRACT

Background: Microbiological diagnosis is the main stay for the effective treatment of pulmonary tuberculosis. About 31%of the new cases may be smear-negative for AFB. Difficulties arise when a patient who is suspected of active tuberculosis, both clinically and radiologically, does not produce sputum or when it is available AFB may be negative. Fiberoptic bronchoscopy offers a mean of investigation whereby bronchial secretion and washing can be collected from the most likely abnormal site under direct vision.

Aims & Objective: To study the role of flexible fiberoptic bronchoscopy in suspected sputum smear negative pulmonary tuberculosis cases at microscopy centre under RNTCP.

Material and Methods: Thirty three patients aged Above 18 years old who were suspected of having pulmonary tuberculosis based on clinical and radiological appearances were prospectively studied. All subjects had at least 2 sputum smear examination which were negative for acid fast bacilli according to the revised national tuberculosis control program (RNTCP). The bronchoscopy was performed transnasally using fujinon bronchoscope by 2 bronchoscopists under local anaesthesia. A thorough examination of bronchial tree was carried out and bronchial aspirate (BA) bronchoalveolar lavage (BAL) bronchial brushing, transbronchial lung biopsy (TBLB) and post bronchoscopy sputum (PBS) were collected. The specimen obtained was placed on slides for Ziehl-Nielsen stain. Bronchial biopsy was performed on abnormal looking mucosa and stained with Eiosin-hematoxylin and Ziehl- Nielsen stains.

Results: In total 33 sputum smear negative suspected pulmonary tuberculosis cases, at microscopy centre under RNTCP, early diagnosis of pulmonary tuberculosis was established in 10 (30.30%) cases and in 3 (9.09%) cases diagnosis of malignancy was established.

Conclusion: Fiberoptic Bronchoscopy is a useful procedure to establish the diagnosis of pulmonary tuberculosis when sputum smear examination does not show acid fast bacilli. This allows appropriate treatment to be started with confidence.

Key-Words: Pulmonary Tuberculosis; Fiberoptic Bronchoscopy; Bronchoalveolar Lavage; Ziehl-Nielsen Stain; RNTCP

Introduction

Microbiological diagnosis is the main stay for the effective treatment of pulmonary tuberculosis for obtaining the correct sputum sample, patient education is imperative. However, even if the correct sample is expectorated, the bacillary population has to be at least 10000 per millilitre, to get the smear positive for acid fast bacilli (AFB).[1] Moreover, it depends on the previous treatment, default behaviour, and effective cough. Again 31%of the new cases may be smear-negative for AFB.[2] Difficulties arise when a patient who is suspected of active tuberculosis, both clinically and radiologically, does not produce sputum. Harris et al found that 40-60% of patient with active pulmonary tuberculosis suspected clinically or radiologically may fail to produce sputum, or when it is available AFB may be negative.[3] This poses problem to the clinicians who often have to embark on empirical anti-tuberculous treatment if clinical suspicion is high, at the same time subjecting patient to potentially toxic drugs and the inconveniences of prolonged therapy. A number of studies confirm the usefulness of fiberoptic bronchoscopy in diagnosis of pulmonary tuberculosis. Chan HS, et al analysed the ability to make a definitive diagnosis in sputum smear negative pulmonary tuberculosis by bronchoscopic aspiration; bronchoalveolar lavage (BAL) and examination of post-bronchoscopy sputum were compared. 34 patients with lesions on chest X-ray suspected of being pulmonary tuberculosis were entered into the study. A positive AFB smear result was obtained in 4/28 (14%) of cases by a combination of bronchoscopic techniques and post bronchoscopy sputum examination. Sputum examination, bronchoscopic aspiration and BAL are complementary techniques and together they give a high yield of definitive diagnosis of pulmonary tuberculosis.[4] Fiberoptic bronchoscopy offers a mean of investigation whereby bronchial secretion and washing can be collected from the most likely abnormal site under direct vision. This study was carried out to know the usefulness of bronchoscopy in sputum smear negative pulmonary tuberculosis patient diagnosed on clinically and radiologically grounds, by direct visualization of bronchial tree and collecting specimens such as bronchial aspirate, bronchoalveolar lavage and postbronchoscopy sputum and

to assess the positivity of these specimens through smear examination for AFB by Ziehl- Neelsen staining method.

Materials and Methods

This study has been conducted in the Department of Pulmonary Medicine UP Rural Institute of Medical Science & Reaseach Saifai Etawah (U.P.) India. Thirty three patients aged Above 18 years old who were suspected of having pulmonary tuberculosis based on clinical and radiological appearances were prospectively studied. All subjects had at least 2 sputum smear examination which were negative for acid fast bacilli according to the RNTCP. The bronchoscopy was performed transnasally using fujinon bronchoscope by 2 bronchoscopists under local anaesthesia. All patients received lignocaine 10% spray to the nose and throat and lignocaine 2% solution to the vocal cords, trachea and bronchi. Between 40 to 120mg lignocaine was used for the anaesthesia of bronchial trees. Premedication with pethidine 50 - 75mg and atropine 0.6mg intramascularly was given to all the in-patients half an hour before the procedure but not to the out-patients. A thorough examination of bronchial tree was carried out and bronchial aspirate (BA) bronchoalveolar lavage (BAL) bronchial brushing,transbronchial lung biopsy(TBLB) and post bronchoscopy sputum(PBS) were collected. The specimen obtained was placed on slides for Ziehl-Nielsen stain. Bronchial biopsy was performed on abnormal looking mucosa and stained with Eiosin-hematoxylin and Ziehl- Nielsen stains.

Results

Out of total 33 patients, 22 (66.66%) were male and 11 (33.33%) were female. The youngest patient was 18 years of age and the oldest was 73 years old. The maximum number 11 (33.33%) of patients belongs to 20-29 years age group followed by 40-49 years age group. Thorough examination of tracheobronchial tree showed no abnormalities in 9 (27.27%) patients and 24 (72.72%) patients had visible abnormalities. Maximum number 16 (48.48%) patients have abnormally hyperaemic and oedematous mucosa. Mucopurulent secretion was present in 13 (39.39%) patients. Definite bleeding site was present in 6 (18.18%) patients. They all were patients of haemoptysis. Mucosal atrophy and bronchial stenosis each was present in 4 (12.12%) patients. Intraluminal growth in 3 (9.09%) patients. Definite granular surface was present in 4 (12.12%) patients. Vocal cord abnormalities was present in 3 (9.09%) patients of which one patient had vocal cord erosion and two had paralysis of vocal cord (table-1).

Table-1: Bronchoscope Finding

	Findings	No.	%
	Normal Appearance	9	27.27
Abnormal Appearance (24)	Mucosal hyperemia and oedema	16	48.48
	Mucopurulent secretion	13	39.39
	Bleeding site	6	18.18
	Mucosal atrophy	4	12.12
	Bronchial stenosis	4	12.12
	Intraluminal growth	3	9.09
	Granular surface	4	12.12
	Vocal cord abnormalities : errosion/paralysis	3	9.09

Table-2: Result of Acid Fast Bacilli in Bronchoalveolar Lavage Fluid Smear

	No. of Patients	Percentage
AFB positive	5	18.50
AFB negative	22	81.5
Total	**27**	**100**

Table-3: Result of Acid Fast Bacilli in Bronchial Brushing Smear

	No. of Patients	Percentage
AFB positive	4	25
AFB negative	12	75
Total	**16**	**100**

Table-4: Result of Acid Fast Bacilli in Post Bronchoscopy Sputum Smear

	No. of Patients	Percentage
AFB positive	4	13.13
AFB negative	26	86.66
Total	**30**	**100**

Table-5: Cytopathological Results of Trans-Bronchial Lung Biopsy Samples

Cytopathology	No. of Patients	Percentage
Caseating Epithelioid granuloma	2	15.38
Malignancy	3	23.07
Non-specific inflammation	8	61.54
Total	**13**	**100**

Table-6: Role of Bronchoscopy in Diagnosis of Pulmonary Tuberculosis (n-33)

Diagnostic Techniques	Patients Diagnosed	%
BAL + Brushing	8	24.24
BAL + Brushing + Post-Bronchoscopy Sputum	9	27.27
BAL + Brushing + Post Bronchoscopy Sputum + TBLB	10	30.30

Table-7: Final Diagnosis by Bronchoscopic Procedures (n-33)

	No. of Patients	Percentage
Tuberculosis	10	30.30%
Malignancy	3	9.09%

Out of 33 patients, 3 patients had proximal intraluminal growth so distal sampling by BAL was not possible and 3 patients had active bleeding site so BAL was not done to avoid further bleeding. In remaining 27 patients BAL fluid smear showed AFB in 5 (18.5%) patients (Table 2). Bronchial brushing was done in patients with localized intraluminal abnormalities. Out of 33 patients, bronchial brushing was done in 16 patients. Bronchial brushing smear was positive for AFB in 4 (25%) patients (Table 3). The procedure of Post Bronchoscopy sputum smear examination was same as of Pre Bronchoscopy sputum. Post Bronchoscopy sputum smear examination for AFB was done in 30 patients because in three patients post

bronchoscopy sputum was mixed with blood. Out of 30 patients, 4 (13.13%) patients had positive smear for AFB (Table 4).

Trans Bronchial Lung Biopsy was one in patients with definite intraluminal abnormalities. Presence of caseating epitheloid granuloma was considered positive for Tuberculosis. Out of 13 patients, epithelioid granuloma was seen in 2 (15.38%) patients, malignancy in 3 (23.07%) patients and nonspecific inflammation in 8 (61.54%) patients (Table 5). Our study showed that maximum number, 8 (24.24%) patients were diagnosed with the help of BAL fluid smear and Bronchial brush smear, and Post Bronchoscopy sputum and TBLB helped further in diagnosis of pulmonary tuberculosis. So by using all the four techniques fiberoptic bronchoscopy helped in diagnosis of 10 (30.30%) patients (Table 6). Thus in total 33 sputum smear negative suspected pulmonary tuberculosis cases, at microscopy centre under RNTCP, early diagnosis of pulmonary tuberculosis was established in 10 (30.30%) cases and in 3 (9.09%) cases diagnosis of malignancy was established (Table7).

Discussion

After bronchoscopic examination of 33 patient, 6 (17%) patient had pathological features suggestive of tuberculosis, like inflammation with distortion, granuloma and ulceration in mucosal wall, which was comparable to the study by So et al 5 swollen mucosa, stenosis or plaques of caseous material in 12 (18%) of the 65 patient.[5]

Previous study shows that yield of AFB in BAL fluid smear from 7.5-26%.[6-8] Mohan et al obtained a positive yield of 26%, while Kartalglu et al obtained 15%. Panda BN et al reported the diagnostic yield of 12%. In our study BAL smear was positive in 5 (18%). Thus the data generated in our study is comparable to previous study. Positivity of AFB in bronchial brushing ranges from 12-71%.[9,11] Chawla et al[9] reported the diagnostic yield of 56%, while Pant K et al[10] obtained 27%.Swarnkar J Setal[11] obtained positive yield of 71% .In our study bronchial brush smear was positive in 25%. Post bronchoscopic sputum revealed AFB in 4 (12%). In various previous study yield of AFB in PBS ranges between 9-54%. So et al.[5] Obtained 25%, by Purohit et al[12] 26%, by Panda BN et al[8] 13% and 28% by Chawla R et al[9]. Cytopathological yield of Transbronchial lung biopsy ranges between 10-68%. Willicox PAet al[13] obtained result of 68%, while Panda BN et al[8] obtained 10%, Kulpatti DDS et al[14] reported 12%, and Charoenratanakaul et al[15] reported 17%. In our study cytopathological yield was 15%. One disadvantage of bronchoscopy for the diagnosis of pulmonary tuberculosis is that the transmission from one patient to another may occur if the bronchoscope is not disinfected adequately.[16] Further extension of the disease within the lung has also been reported after the procedure.[17]

Conclusion

We feel that fiberoptic bronchoscopy is a useful procedure to establish the diagnosis of pulmonary tuberculosis when sputum smear examination does not show acid fast bacilli. This allows appropriate treatment to be started with confidence in those patients whom the diagnosis have been confirmed by either smear or histological examination. For patients without proof of the disease, the decision depends on the clinical consideration. Unexpected disease may also be diagnosed and may require different treatment.

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