

Bronchoscopy in Sputum Smear Negative Patients: How Relevant is it?

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ABSTRACT

Introduction: Bronchoscopy, where available, can be a useful added tool to diagnose TB in sputum smear negative patients suspected to have pulmonary tuberculosis. This study was done to evaluate the role of fiberoptic bronchoscopy in the diagnosis of pulmonary TB in sputum smear negative patients.

Methods: 257 patients who were suspected to have pulmonary TB and had two sputum smear examinations negative for acid fast bacilli (AFB) even after sputum induction were subjected to bronchoscopy (FOB). Specimens from broncho-alveolar lavage (BAL) and post FOB sputum were collected and sent for microscopic examination for AFB.

Results: Out of these 257 patients, 61 (23.73%) were turned to be smear positive. Post FOB sputum (57, 22.18%) had a higher yield as compared to BAL (20, 7.7%) Bronchoscopy is a useful diagnostic technique and should be performed in all

smear negative patients for early diagnosis and treatment of TB, thus effectively reducing its transmission to the community.

Key words: Bronchoscopy, Smear Negative TB.

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INTRODUCTION

Tuberculosis (TB) is a public health problem worldwide especially in our part of the world and is known since time immemorial. At present the diagnosis is dependent on sputum smear examination and chest X-Ray. Sputum culture is considered to be the gold standard in the diagnosis of pulmonary tuberculosis.¹ As per the Revised National Tuberculosis control programme (RNTCP) sputum smear for acid-fast bacilli (AFB) is the most reliable tool for diagnosis of PTB. It has a very poor sensitivity (30–70%) despite high specificity (98–99%).

Bacteriologically positivity from sputum is around 16 to 50% and large portion remain negative in spite of clinical profile and radiological lesions being consistent with diagnosis of pulmonary tuberculosis.² Almost 30% of patients with clinical and radiological suspicion of tuberculosis are known to be sputum smear negative (SSN-PTB).³ It leads to an inadvertent delay in the initiation of treatment.⁴

Lack of sputum production, low bacterial load and improper technique can be the factors for SSN-TB. Mycobacterial cultures are more sensitive than AFB smears (80–85%), but culture results usually require 3–8 weeks.⁵ The delayed diagnosis results in spread of infection. Confirming tuberculosis by microbiological diagnosis is of utmost importance as it leads to the prevention of over treatment.

A number of studies confirm the usefulness of fiberoptic bronchoscopy (FOB) in the diagnosis of pulmonary tuberculosis.^{6,7} It is helpful in obtaining multiple specimens like broncho-alveolar lavage (BAL), post bronchoscopy sputum (PBS), trans-bronchial needle aspiration (TBNA) which can be used for microscopy by ZN staining or fluorescent stain, culture and cytology.⁸ This study was carried out to assess the role of FOB especially BAL and PBS smear negative pulmonary TB in a tertiary care hospital.

MATERIAL AND METHODS

257 patients who were clinically and radiologically suspected to have PTB but were sputum smear negative were included in this study. Patients with more than 16 years age, with two sputum smears negative for acid fast bacilli (AFB) as per the Revised National Tuberculosis Control Programme (RNTCP) were registered.

Patients with bleeding diathesis, severe dyspnea and who did not give written consent for FOB were excluded from the study. They underwent fiberoptic bronchoscopy (FOB) under local anaesthesia. A detailed examination of the bronchial tree was carried out. Specimens from BAL and post bronchoscopy sputum (PBS) were collected and were sent for smear examination for AFB by fluorescent microscopy as per RNTCP guidelines.

RESULTS

Out of 257 patients majority were males. The mean age of the patients was 43.5 years. Majority 231 (89.8%) patients did not give any history of previous treatment of TB. All patients had clinical signs of cough, low grade evening rise of temperature and weight loss for more than two to six weeks. The history of contact of TB was present in 57 (22.17%) patients.

69 (26.84%) specimens came out to be sputum smear positive on BAL or post FOB sputum samples. Eight specimens were positivity in both the samples. 12 patients were positive in BAL

fluid only and 49 were positive in post FOB sputum. Post FOB specimens had a much higher yield of smear positivity as compared to BAL (Table 1). The sensitivity of BAL was 28.98% compared to that of post FOB sputum which was 82.61%. Negative predictive value of BAL as compared to post FOB sputum was 79.32% and 94% respectively (Table 2). All the 61 patients were put on category one as per RNTCP and they improved, both clinically and radiologically.

No complications were reported in all these patients.

Table 1: Showing smear positivity of BAL and FOB

| Specimen | Smear Positive (%) |
|---------------------------------|--------------------|
| Post FOB sputum | 49 (21.05%) |
| BAL | 12 (19.30%) |
| Smear positive in one specimen | 61 |
| Smear positive in both specimen | 8 (24.56%) |

Table 2: Showing positivity in BAL and FOB specimens

| | TB positive in Smear Negative* | TB negative in smear negative** | Total |
|-------------------|--------------------------------|---------------------------------|-------|
| BAL Positive | 20 | 0 | 20 |
| BAL Negative | 49 | 188 | 237 |
| Post FOB positive | 57 | 0 | 57 |
| Post FOB negative | 12 | 188 | 200 |
| | 69 | 188 | 257 |

*Positive either by BAL or post-FOB sputum

DISCUSSION

Treating patients with clinical and radiological features suggestive of tuberculosis but sputum smear negative for AFB is a difficult task for any doctor. Waiting for culture results leads to a delay in treatment. Empirically treating these patients increases the number of over treatment[5]. Flexible FOB (FOB) has been reported to be a useful tool in the microbiological diagnosis of PTB, especially in patients with SSN-PTB.⁶

This study found that PBS and BAL specimens from FOB were helpful in diagnosing 61 patients with clinical suspicion of TB. When both specimens were used together, they could diagnose 69 out of the sample of 251 patients. Adding FOB, and subjecting the bronchoscopic secretions/ TBLB material to conventional diagnostic methods of AFB smear, mycobacterial culture and histopathology is helpful in the diagnosis of SSN-PTB[6]. The FOB also offer the additional advantage of the confirmation of diagnosis of several non-TB conditions that may mimic PTB as well and also it helps in viewing the endo-bronchial lesions which may be missed in Xray. Where available this procedure should be aggressively used to diagnose TB early.

Singhal et al showed that 15 out of 42 patients were diagnosed to have Pulmonary TB.⁹ Soto et al concluded that the analysis of BAL samples and post-bronchoscopic sputum samples provides a high diagnostic yield in smear-negative patients suspected of having pulmonary tuberculosis.¹⁰ In their study 23% were diagnosed with tuberculosis based on the analysis of BAL

samples. One study has suggested that sputum induction should be the initial method of choice before doing this procedure.¹¹

Study by Iyer et al have shown that patients with suspected pulmonary TB initially underwent multiple induced-sputum sampling for microscopy, culture and nucleic acid amplification (NAA). Those with negative induced-sputum results still suspected with TB are then referred for bronchoscopy.¹² We suggest that before the cultures the patients should undergo bronchoscopy and the specimens should be sent for smear examination.

It has also been suggested that there is need to formulate guidelines where the respiratory physician can make a definitive diagnosis without increasing the number of unnecessary treatment in new sputum negative tuberculosis patients and FOB can provide an excellent material to for diagnosis of suspected TB.⁵ FOB should be an essential requisite for respiratory work-up not only in confirming tuberculosis but also in establishing diagnosis of non-tuberculous pathology.¹³

In this study sputum samples were not sent for gene expert which could have increased the yield for diagnosis of tuberculosis.

CONCLUSION

Bronchoscopy has a very important role in the diagnosis of patients suspected to have tuberculosis especially whose sputum smears are negative or who cannot produce sputum. This study suggests that in tertiary care hospitals of areas with high TB

prevalence, bronchoscopic procedures should routinely be performed in such cases where the smear is negative for TB but the clinical suspicion is very high.

The carry home message from this study is that TB which is highly prevalent in India should be suspected and diagnosed as early as possible and where available FOB should be judiciously to diagnose TB at the earliest.

REFERENCES

1. Roberts GD. Bacteriology and bacteriological diagnosis of tuberculosis in David Schlosberg ed. Tuberculosis. 2nd ed. New York: Springer Verlag Publishing Company; 1988.
2. Kulpati DD HH. Diagnosis of smear negative pulmonary tuberculosis by flexible fiberoptic bronchoscopy. Indian J Tuberc 1986;33:179–82.
3. Harries A D, Maher D NP. An approach to the problems of diagnosing and treating adult smear-negative pulmonary tuberculosis in high HIV-prevalence settings in sub-Saharan Africa. Bull World Heal Organ 1998;76:651–662.
4. Kumar R, Singh M, Gupta N, Goel N. Bronchoscopy in immediate diagnosis of smear negative tuberculosis. Pneumonol Alergol Pol 2014;82:410–4. doi:10.5603/PiAP.2014.0053.
5. Choudhary S, Tayade BO, Kharbade S, Sontakke A, Khan S, Abraham R. Outcome of fiber optic bronchoscopy in sputum smear negative pulmonary tuberculosis. Panacea J Med Sci 2015;5:33–9.
6. Mohan A, Sharma SK. Fiberoptic bronchoscopy in the diagnosis of sputum smear-negative pulmonary tuberculosis: current status. Indian J Chest Dis Allied Sci 2008;50:67–78.
7. Shin JA, Chang YS, Kim TH, Kim HJ, Ahn CM, Byun MK. Fiberoptic bronchoscopy for the rapid diagnosis of smear-negative pulmonary tuberculosis. BMC Infect Dis 2012;12:1. doi:10.1186/1471-2334-12-141.
8. Quaiser S, Agarwal A, Khan R, Haque SF. Fiberoptic bronchoscopy, as a valuable diagnostic option in sputum negative pulmonary tuberculosis: A prospective study. Int J Appl Basic Med Res 2012;2:123–7. doi:10.4103/2229-516X.106355.
9. Singhal S, Gaidhane AM, Khatib N, Srivatsava T, Diwan S, Mahajan SN, et al. Use of flexible bronchoscopy for rapid diagnosis of suspected tubercular cases in rural India. J Infect Dev Ctries 2009;3:860–4.
10. Soto A, Salazar D, Acurio V, Segura P, Van der Stuyft P. Evaluation of the diagnostic utility of fiberoptic bronchoscopy for smear-negative pulmonary tuberculosis in routine clinical practice. J Bras Pneumol Publicação Of Da Soc Bras Pneumol E Tisiologia 2012;38:757–60.
11. Rao GN, Venu M, Rani NU, Sravani M. Induced sputum versus bronchial washings in the diagnosis of sputum negative pulmonary tuberculosis. J Fam Med Prim Care 2016;5:435–9. doi:10.4103/2249-4863.192336.
12. Iyer VN, Joshi AY, Boyce TG, Brutinel MW, Scalcini MC, Wilson JW, et al. Bronchoscopy in suspected pulmonary TB with negative induced-sputum smear and MTD?? Gen-probe testing. Respir Med 2011;105:1084–90. doi:10.1016/j.rmed.2011.03.003.
13. Panda BN, Rajan KE, Jena J, Nema SK, Murali M, Patil AP. Diagnostic yield from flexible fiberoptic bronchoscopy in sputum negative pulmonary tuberculosis cases. Indian J Tuberc 1995;42:207–9.

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