



## A Comparative Study of Bronchoscopic Aspirate And Percutaneous Fine Needle Aspiration Cytology in Sputum Negative, Clinicoradiologically Suspect Cases of Pulmonary Tuberculosis.

## KEYWORDS

FNAC, FOB, cytology, ZN stain

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**ABSTRACT**

*Introduction: Sputum negative, clinicoradiologically suspect TB presents a difficult diagnostic problem. The clinician has to either initiate empirical ATT or invasive techniques to seek evidence of TB / exclude other disease etiologies.*

*Methodology: Adult sputum smear negative patients clinicoradiologically suspected of pulmonary TB were subjected to FOB and transthoracic FNAC lung. Samples were subjected to cytology and ZN staining for AFB. Sputa of all patients were sent for culture.*

*Results & Conclusions: No clear superiority between the techniques emerged when considered in isolation. But when used together, the diagnostic confirmation was achieved in 51% more patients. Combination of the two is a good tool to confirm TB in sputum negative Pulmonary TB cases. Complication rates of the two techniques were comparable and self limiting.*

**Review of Literature and Importance of Study**

Sputum AFB is a reliable diagnostic method for pulmonary TB, but in some patients, in spite of a very suggestive clinical course and radiological findings, Acid Fast Bacilli cannot be demonstrated in the sputum (1). Radiography has its own limitations of costs and low specificity, though more sensitive than clinical examination and sputum examination.

Patients clinically suspected to have active TB, with no AFB seen on sputum microscopy present a difficult diagnostic problem. The clinician is faced with the decision of initiating empirical ATT or employing more invasive techniques to either seek evidence of TB or to exclude other disease etiologies (3, 4).

In 1981, Wallace et al reported that of 56 patients clinically suspected to have active TB, and with consistently negative sputum on direct smear examination, 68% cases were positively diagnosed from bronchoscopy specimens (4).

It was reported that bronchoscopy can improve the ability to document active TB, provide a sensitive means of making an immediate diagnosis, and uncover other disease processes presenting like TB(4). Similar observations were made by Wilcox et al(5) and so did Lam et al (6) the following year. Similar findings were reported by several authors subsequently (7, 8, 9, 10, 11, 12, 13, 14, 15).

Several studies found that Fine Needle Aspiration Cytology was cheap, quick and relatively less risky among the invasive methods to diagnose pulmonary TB (16, 17, 18, 19).

Similar findings were reported by several other authors (20, 21, 22, 23).

The FOB facilitates rapid diagnosis and offers the additional advantage of the diagnosis of several conditions that may mimic PTB. However, FOB is an invasive procedure associated with the risk of transmission of tuberculosis (TB) and other infections. It is costly, needs expertise and is not

widely available everywhere. (23).

Yuan, Yang, Chang et al evaluated the use of Ultrasound guided Percutaneous Fine Needle Aspiration Biopsy in Pulmonary TB with sputum and bronchial aspirate smears negative for Acid Fast Bacilli, and found the diagnostic yield and the procedural safety to be appreciably high (24).

**Methodology:** From among those attending the Pulmonary Medicine OPD at a tertiary care hospital in Pune, adult sputum smear negative patients, clinicoradiologically suspected of pulmonary TB were subjected to FOB and transthoracic FNAC lung. Patients with pleural /lymph node involvement, cavitary and/or bullous lesions or miliary shadows on CXR-PA, those with a h/o ATT in the past and those with contra-indications to any invasive procedure were excluded from the study. The samples were subjected to cytology & ZN staining for AFB. The criterion for diagnosis of tuberculosis on cytology was presence of epithelioid cell granuloma with or without necrosis. Sputa were sent for AFB culture on LJ medium.

**Results :**

**1. Of the total 185 (83 females and 102 males) subjects, most were middle aged; old patients were the least.**

Age group	Frequency	Percent
very young(18-25yrs)	41	22.16%
Young(26-40yrs)	48	25.94%
middle aged(41-55yrs)	81	43.78%
Old(>55yrs)	15	8.1%

	FNAC positive	FNAC negative	Total
FOB positive	25	22	47
FOB negative	48	90	138
Total	73	112	185

**2. Comparison of yield with FNAC and FOB taking ZN and Cytology together.**

The inter-rater agreement between FOB and FNAC is slight (Kappa k=0.157).

	Sp Culture positive	Sp Culture negative	Total
FOB /FNAC positive	81	14	95
FOB /FNAC negative	24	66	90
Total	105	80	185

**3. Comparison of results of FOB & FNAC together with sputum culture results.**

There is moderate agreement between FOB/FNAC and sputum culture results (kappa k = 0.59)

**5. Complications of the procedures : With FNAC, 4 patients (~2% of total) developed pneumothorax, 1 (~0.5% of total) had hemoptysis; with FOB, 2 (~1% of total) had hemoptysis .**

**6. Age grp with FOB Positivity. % are out of total positive (47) by FOB**

Age Group	Number	% out of 47 rounded off to closest integer
Very young ( 18 to 25)	27	57
Young (26 to 40 )	08	17
Middle aged (41 to 55 )	12	26
Old (> 55 )	00	00

**7. Age grp with FNAC +vity. % out of total (73) positive by FNAC**

Age Group	Number	% out of 73 rounded off to closest integer
Very young ( 18 to 25)	09	12
Young (26 to 40 )	35	48
Middle aged (41 to 55 )	21	29
Old (> 55 )	08	11

**8. CXR localization with FOB +vity % is out of total positive (47) by FOB:**

Localisation on CXR	Number	% out of 47 rounded off to closest integer
RUL	02	04
RUL+RML	08	17
RUL+RML+RLL	21	45
RUL+LLL	13	28
RUL+LUL	02	04
LUL+Lingula	01	02

**9. CXR localization with FNAC +vity . % is out of total positive by FNAC:**

Localisation on CXR	Number	% out of 73 rounded off to closest integer
RUL	05	07
RUL+RML	31	42
RUL+RML+RLL	17	23
RUL+LLL	04	06
RUL+LUL	12	16
LUL+Lingula	04	06

**10. Bronchoscopic findings in all study subjects**

Bronchoscopic finding	ZN +ve	Cyto +ve	Both -ve	Total
Mucosal inflammation	4	1	34	39
Mucosal ulceration	17	2	15	34
Pus/purulent secretions	22	0	27	49
Fibrosis/architectural distortion	0	0	15	15
No significant findings	1	0	47	48
Total	44	3	138	185

**Discussions**

1. No clear superiority in diagnostic confirmation between FOB and FNAC emerged when considered in isolation.
2. When used together, the diagnostic confirmation was achieved in 95(51%) more patients; hence the combination of the two is a good tool to confirm TB in sputum negative Pulmonary TB cases.
3. In fact, 14 (~8%) patients whose sputum cultures were negative were diagnosed with FOB and FNAC cytology results.
4. Comparing FOB and FNAC combination as a diagnostic tool versus sputum cultures, this could prove a very useful tool as sensitivity is 77%, specificity is 82.5%, PPV is 85.3% and NPV is 73.3%.
5. All complications were self limiting and comfortably managed without any additional intervention.
6. More patients (57%) from the very young age group were positive with the FOB samples and none were from the old age group.

More patients(48%) from the young age group and 21% from middle aged group were positive with FNAC samples.

7. Positive results with samples by FOB were significantly greater (45 %) with involvement of RUL+RML+RLL and the least (2%) were with LUL+Lingula .

Positive results with samples by FNAC were significantly greater (42%) with involvement of RUL+RML.

But for points 5 and 6 above, the small sample size makes it difficult to test the significance of these findings statistically

**Conclusions :** No clear superiority between the techniques emerged when considered in isolation. But when used together, the diagnostic confirmation was achieved in 51% more patients; hence the combination of the two is a good tool to confirm TB in sputum negative Pulmonary TB cases. Complication rates of the two techniques were low, comparable and self limiting.

A look at the data from this study also suggests that selection of FOB for very young patients and of FNAC for young patients will give better yield and also that selection of FOB in cases with involvement of RUL+RML+RLL and of FNAC for involvement of RUL+RML will give better yield. However, to confirm the validity of these suggestions, studies with larger samples are recommended.

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