ORIGINAL RESEARCH PAPER

Volume-7 | Issue-8 | August-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

TO STUDY THE DIAGNOSTIC ACCURACY OF ACID FAST BACILLI SMEAR FOR THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.

Microbiology

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ABSTRACT

To study the diagnostic accuracy of Acid fast bacilli smear with the gold standard TB culture by MGIT method.

Materials and Methods: 547 patients were screened for tuberculosis based on criteria for Tuberculosis like cough for more than 2 weeks, fever, loss of weight and loss of appetite, haemoptysis.

Observations & Results: Out 547 patients screened for tuberculosis, 237 patients were positive for tuberculosis by MGIT culture method and only 100 patients were positive by AFB smear method. The sensitivity was 42.19%, specificity was 99.03%, and the diagnostic accuracy was 74.41%.

Conclusion: The sensitivity of acid fast bacilli smear is low with high specificity. There is a need for a inexpensive and better tool for rapid diagnosis of tuberculosis.

KEYWORDS

Tuberculosis, Ziehl Neelson staining, AFB smear, TB MGIT culture

Introduction: The disease Tuberculosis is major public health problem. As per WHO about 1.3 million people died of the tuberculosis in 2014.[1] There is a requirement of rapid, accurate diagnosis for timely start of treatment.

Materials and Methods: Our study was observational prospective study. The study was cleared by Institutional ethics and research committee. About 547 patients were screened for tuberculosis based on clinical features suggestive of Pulmonary Tuberculosis. Patients' consent was taken and accordingly sputum samples were collected in Falcons tube as per RNTCP protocol.

From each patient's sputum sample, One part was processed for Bactec MGIT 960 system for mycobacterium tuberculosis culture whereas the other part of sputum was processed for acid fast bacilli smear (Ziehl Neelson staining method) as per standard guidelines mentioned in RNTCP (Revised national Tuberculosis Programme).

N o Of AFB seen	Report	Fields
1-2/300 fields	Doubtful	1-2/300 field
1-9 /100fields	1+	1-9/100 field
1-9/10 field	2+	1-9/10 field
1-9/field	3+	1-9/field
>9/field	4+	>9/field

Observations and Results:

Out of 547 eligible TB suspected patients, 230 positive by Gold standard Tb Culture were included as positive for active pulmonary TB and entered into the analysis of data.

TABLE 1: Gender wise distribution of TB Suspected Patients

Gender	TB Suspected Patients	(%)
Male	334	61.0
Female	213	39.0
Total	547	100

Out of 547 patients screened for Tb, 334 (61%) were males and 213(39%) were females.

Table2: Diagnostic accuracy of Smear AFB in comparison with TB Culture as Gold standard

	TB Culture Positive	TB Culture Negative	Total
Smear AFB Positive	100	3	103
Smear AFB Negative	137	307	444
Total	237	310	547

Statistic	Value (%)	95%CI
Sensitivity	42.19	35.83 to 48.76
Specificity	99.03	97.20 to 99.80
PPV	97.09	91.46 to 99.05
NPV	69.14	66.76 to
Diagnostic accuracy	74.41	70.53 to 78.01

Our results show that5 Smear AFB microscopy had a sensitivity of 42.19% and specificity of 99.03%. The diagnostic accuracy was 74.41%

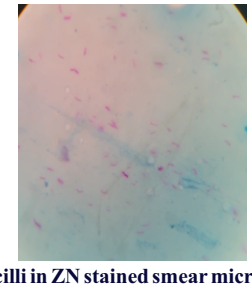

Fig 1. Acid fast bacilli in ZN stained smear microscopy

Fig 2: Biosafety cabinet for TB sample processing

Discussion:

Our study evaluates smear for AFB against Gold standard TB MGIT culture results by MGIT culture come earlier than conventional LJ culture methods.[2,3]

Comparative evaluation of Sensitivity, PPV & NPV of Smear AFB microscopy in following studies.[4,5,6]

Study	Sensitivity	Specificty	PPV	NPV
Pierrrae et al[4]	25	95.8	45.5	90.1
Dewald et al[5]	41	98.6	94.1	75.8
Kanwal et al[6]	39	100	100	11.86
Our study	42	99	97.03	69.14

After comparing with Gold standard MGIT TB culture, sensitivity, specificity, PPV & NPV of Smear AFB microscopy were 42%, 99%,

97.03%, 69.14% respectively, which is similar to other studies as shown in the table above.

Smear AFB microscopy is the most practical and fast method for screening & diagnosis of PTB. There has to be approx 10^4 tubercle bacilli per ml of sputum to be seen positive in AFB smear microscopy.[7] AFB Microscopy has good specificity at 99% & diagnostic accuracy of 74.41%. Still, a negative smear should be interpreted with caution and does not rule out the possibility of Pulmonary TB.

Conclusion: The smear AFB microscopy commonly used in most laboratories because of shorter time and low risk of infection to Lab personnel. Though it has lesser sensitivity, specificity is good. In order to accurately diagnose pulmonary tubetrculosis, a culture should be always requested concommitanlty with AFB smear as negative smear does not rule out active tuberculosis and not all positive AFB smears are M. tuberculosis, but could be atypical mycobacteria.

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