



TO STUDY FLUORESCENT AND ZIEHL-NEELEN STAINING TECHNIQUES IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS IN PEDIATRIC PATIENTS

Monica Kumbat*

Assistant professor, Department of Pathology, SRM medical college hospital and research centre, Kattankulathur, Tamilnadu.

ABSTRACT

Early analysis of tuberculosis could be very important for healing reasons and to govern the spread of contamination. The reason of this observes become to evaluate the efficacy of fluorescence (FL) microscopy in evaluation to Ziehl- Neelsen (ZN) staining. A general of 120 samples had been amassed from paediatric tuberculosis (TB) suspects and processed the usage of Petroff's method. The smears were stained by ZN and FL staining for the detection of acid-fast bacilli (AFB). Positive smears have been graded in line with scale of International Union against Tuberculosis and Lung Disease and World Health Organisation (IUATLD/WHO). The descriptive study conducted at SRM Medical College Hospital and Research centre. Out of 71 pulmonary and extra-pulmonary samples, forty nine have been high-quality for AFB on the ZN approach, whilst the positivity accelerated to 15 (12.5%) at the FL method. Two nice samples have been neglected on ZN staining which have been observed to be fantastic with FL microscopy; as a consequence typical positivity accelerated via 13/15 by FL microscopy over the conventional ZN approach. The difference in case detection was determined to be statistically vast ($p < \text{zero.00}$). FL method has a better diagnostic value and is less time-eating compared to ZN in diagnosing tuberculosis in paediatric patients.

Key words: MDR-TB, Fluorochrome, Ziehl-Neelsen (Z-N), Mycobacterium tuberculosis, Petroff's method.

INTRODUCTION

Tuberculosis due to Mycobacterium tuberculosis stays a principal public health hassle with approximately one-third of the sector's population affected. In 2017, 10 million humans had been infected with tuberculosis and 1.6 million died from the disorder. Over ninety five percentage of tuberculosis deaths occur in low- and middle-profits countries. [1]

Early diagnosis of tuberculosis is vital for therapeutic motives and to control the unfold of infection. [2] Culture of M. Tuberculosis is the gold standard technique for the analysis of TB. Though tradition is a slow method requiring specialized laboratories and tremendously skilled personnel. Nowadays with a

excessive tuberculosis burden and confined number of good enough resources and infrastructure, the diagnosis of Tuberculosis is predicated totally on smear microscopy for Acid Fast Bacilli (AFB), however its sensitivity is taken into consideration to be low in paucibacillary cases. [3]

Ziehl-Neelsen (ZN) stain is used international as a popular technique to hit upon AFB, however it has less sensitivity relative to fluorescent stain because it takes greater time to experiment as a minimum 300 fields and frequently misses the paucibacillary tuberculosis. Fluorescence (FL) microscopy technique has the benefit to examine at lower magnification, allowing the larger region consistent with unit of time. [4]

Corresponding Author: - **Dr Monica kumbat. Email: drpebyreddy@gmail.com**

There isn't always much data available for the use of ZN and FL microscopy to diagnose the instances of TB in paediatric patients. A proportional revise of Fluorescent and Ziehl-Neelsen Staining techniques in the Diagnosis of Pulmonary Tuberculosis in pediatric.

MATERIAL METHODS

The descriptive study conducted at SRM Medical College Hospital and Research centre and obtained ethical approval from the institutional committee. A total of 120 samples were out door from indoor and outside paediatric sufferers suspected of pulmonary tuberculosis (PTB) and extrapulmonary tuberculosis (EPTB).The sufferers up to the age of 15 years were covered no matter their gender and the sampling approach become time-structured. The samples had been processed by Petroff's method. The smears have been stained using ZN and LED FL staining. Before collecting specimens, each patient becomes interviewed and knowledgeable written consent was taken from sufferers or felony dad or mum of sufferers and applicable facts have been recorded systematically in a pre-designed records sheet.

RESULTS

Out of total, 71(59.1%) were PTB and 49(40.8%) were EPTB specimens. Among the EPTB The included pleural fluid which accounted for highest proportion 17(34.6%) followed by gastric aspirates 14(28.5%), pus 9(7.5%), pericardial fluids 4(3.3%), joint fluid 4(3.3%), ascitic fluid 3(2.5%), cerebrospinal fluid (CSF) 2(1.6%), tracheal aspiration and bone marrow 1() each.

Total of 71 PTB samples 10(14%) were positive by ZN stain and 9(12.6%) by FL staining. Amid 49 EPTB samples, 3(6.1%) was positive by ZN stain and 6(12.2%) by FL microscopy. There were 13(10.8%)AFB smear-positive samples on the ZN method while the positivity increased to 15(12.5%) on the FL method. Two positive samples were missed on ZN staining which were found to be positive with FL microscopy. Overall positivity thus increased by 13/15 using LEDFL microscopy over the conventional ZN method. The variation in case finding was found to be statistically significant (p<0.00) (Table-1).FL microscopy had more positive predictive value (PPV) than ZN microscopy. Comparison of 120 cases by both microscopic techniques was done separately (Table-2).

Table1: Comparative evaluation

Specimens	ZN stain positive	FL stain positive	ZN -ve FL +ve	ZN +ve FL -ve	Total number
PTB	10(14%)	9(12.6%)	1(10.8%)	00	71(59.1%)
EPTB	3(6.1%)	6(12.2%)	5(12.5%)	00	49(40.8%)
Total	13	15	6	00	120

Table-2: FL and ZN Staining (n=120).

Results	Fluorescence	Ziehl-Neelsen
No acid fast bacilli	105(87.5%)	107(89.1%)
scanty	2(1.6%)	5(4.1%)
1+	5(4.1%)	4(3.3%)
2+	5(4.1%)	2(1.6%)
3+	3(2.5%)	2(1.6%)

DISCUSSION

The recognition of AFB is often considered evidence of the infected state. In developing countries likes India, microscopy of the specimen is the fastest, cheapest and the most reliable method for the detection of AFB. Since early 1940s, the comparison of the FL method with the conventional ZN method on sputum smears was implemented to improve smear-positivity for the detection of AFB. In our study, 15(12.5%) samples were positive by FL stain and 13(10.8%) were positive by ZN stain. Out of 71 pulmonary samples 10(14%) were positive by ZN stain and 7(14.6%) were detected by FL staining. Out of extra pulmonary samples of 49 EPTB samples 3(6.1%) was positive by ZN stain and 6(12.2%) by FL microscopy. In present study showed FL staining technique is more sensitive in the detection of AFB in PTB as well as EPTB samples compared to ZN stain.

The result is in accordance with a study that found positivity for AFB by ZN method 37.5% (45/120) while the positivity increased to 69.1%(83/120) by FL method. This result correlated with Annam V, et al [5]

This have a look at showed that, in both FM and ZN staining techniques, early morning samples yielded greater AFB in comparison to spot samples. Interestingly, sputum samples nice for smear collected on the spot were also effective for samples collected early inside the morning. This has the same opinion with a have a look at achieved by Myneedu et al.[6] And which confirmed that the primary sputum pattern amassed without delay in the area of the laboratory showed discounted smear positivity compared to morning samples. Similarly, in addition they said that every one AFB high quality spot samples were also high quality for AFB inside the early morning smears. To reduce diagnostic defaulting, this end result calls for a 2nd study the usual 2-day protocol of collecting samples

on consecutive days for analysis of pulmonary tuberculosis. Early morning samples show to be ideal whilst onetime pattern series is to be adopted.

CONCLUSION

FL technique has a better diagnostic fee compared to ZN stain in paediatric patients where the case detection

fees of FL over ZN had been corresponding to those discovered by means of numerous studies. FL microscopy become much less time-consuming compared to ZN approach. FL technique stepped forward diagnostic value, mainly in patients with a low density of bacilli. LED FL microscopy decreased the price and there's no want for a separate dark room for microscopy.

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