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Letter to the editor

Light emitting diode fluorescence microscopy versus Ziehl–Neelsen smear microscopy for the diagnosis of pulmonary tuberculosis

Dear Editor,

Tuberculosis is a serious public health issue mainly in under developing countries like Nepal.[1] Early diagnosis of the disease is a very important step for the effective control of the tuberculosis but the lack of rapid diagnostic methods with high sensitivity in developing countries is a serious obstacle for the global control of the disease. Due to its low cost, Ziehl–Neelsen (ZN) smear microscopy is widely used for diagnosis of tuberculosis in the resource limited countries.[2] But in the poorer countries where the load of tuberculosis patients is very high, the laboratory with limited resources may not bear the workload created by the time required for examination of the ZN smears.[1] The recently developed light emitting diode fluorescence microscopy (LED-FM) has been reported to be a rapid and cheap method for the diagnosis of tuberculosis with high sensitivity.[2] However, in world literature there are only limited data regarding the use of the LED-FM for routine diagnostic purpose.[3] So we evaluated the performance of LED-FM for diagnosis of pulmonary tuberculosis in context of Nepal and compared it with that of ZN microscopy.

A cross sectional study was conducted among 325 suspected pulmonary tuberculosis patients attending German Nepal Tuberculosis Project laboratory, Kathmandu, Nepal; from June 2012 to December 2012. Three sputum samples "spot-morning-spot" were collected from each patient. The diagnosis of tuberculosis was performed by using ZN smear microscopy and LED-FM, and culture was used as reference method. The results of ZN microscopy, LED-FM and culture are presented in Table 1. The cultures of samples from 7 (2.15%) patients were contaminated.

In accordance to our study, Bhadade et al., reported the sensitivity, specificity and negative predictive value of LED-FM to be 67.53%, 88.71%, and 96.08% respectively but they reported the positive predictive value to be very low (40%) in comparison to our study.[4] The specificities of the LED-FM and ZN smear microscopy reported in our study were similar to those of LED-FM (98.9%) and ZN smear microscopy (98.9%) reported

Table 1 – Comparison of ZN smear microscopy results and LED fluorescence microscopy results with culture results.

Staining	ZN smear microscopy results versus gold standard culture results						
	Culture results			Sensitivity	Specificity	Predictive values	
ZN	+	–	Total			+	–
+	85	10	95	70.8%	94.9%	89.47%	84.3%
–	35	188	223				
Total	120	198	318				
Staining	LED-FM microscopy results versus gold standard culture results						
	Culture results			Sensitivity	Specificity	Predictive values	
LED	+	–	Total			+	–
+	87	15	102	72.5%	92.4%	85.29%	84.72%
–	33	183	216				
Total	120	198	318				

Note: +, positive; –, negative.

by Marais et al.[3] But in their study higher sensitivity of LED-FM (84.7%) in comparison to that of LED-FM in our study and lower sensitivity of ZN smear microscopy (61.1%) in comparison to that of ZN smear microscopy in our study, were reported.[3]

As in our study, no significant differences between the sensitivities and specificities of two methods were reported in the study by Marais et al.[3] and Albert et al.[5] However, the LED-FM microscopy is 2–4 times faster than ZN smear microscopy.[5] In a study by Cuevas et al., LED-FM was found to have higher sensitivity and lower specificity than ZN microscopy.[1] However, many other studies have reported the increased sensitivity with similar specificity of LED-FM in comparison to ZN microscopy.[1] The reasons for no significant difference reported in our study may be due to the small sample size taken and, good experience of the technicians in ZN method and less experience with LED-FM.[2] In conclusion, for the diagnosis of pulmonary tuberculosis LED-FM may be a better option than ZN microscopy.

Author's contributions

NDP, SKU conceived and designed the study, performed the laboratory work, analyzed the data and prepared the manuscript. RB performed the laboratory work and analyzed the data. AP and BS monitored the study. All the authors read and approved the final manuscript.

Conflicts of interest

The authors declare no conflicts of interest

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