

Loop-mediated isothermal amplification (TB-lamp): a step forward in the diagnosis of tuberculosis?

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Madam, Tuberculosis (TB), caused by Mycobacterium Tuberculosis, is still a social stigma yet a curable disease in most instances. It can affect multiple organs of the body other than lungs.¹ TB remains the leading cause of death, alongside HIV, among infectious diseases with the mortality rate reaching 1.5 million in 2014.¹ Therefore, it is important to have better and timely diagnostic and treatment options for the said disease including the rapidly spreading multidrug resistant-TB (MDR-TB). MDR-TB is caused mainly by low patient compliance to the first line anti-tuberculous drugs and is a growing threat for the community.

Sputum-smear microscopy is the initial diagnostic test¹ but its sensitivity is low.² Moreover, culture is the golden standard for the diagnosis of TB but it takes 3-5 weeks to give its results causing a delay in the commencement of treatment.³ The molecular assay, Xpert MTB/RIF, can diagnose MDR-TB, but requires continuous electricity supply and is expensive as well.⁴

According to WHO Policy Guidance of 2016,⁵ TB-LAMP is the potential diagnostic option for the rapid diagnosis of pulmonary TB. This test works by the amplification of bacterial DNA which is obtained from sputum sample at constant temperature. It takes less than an hour to be performed, and requires minimum laboratory equipment and biosafety regulations. It gives far less false-negative results as compared to sputum-smear microscopy. The implementation of this facility is also cost-effective and does not need continuous electricity supply in contrast to the currently used Xpert MTB/RIF. However, LAMP's effectiveness is lesser to that of Xpert MTB/RIF in aspects of drug-susceptibility testing of Rifampicin for MDR-TB.⁵ Concurrently, many studies have also reported the effectiveness of TB-LAMP for the confirmation of TB of

various other organs other than the pulmonary one.³

TB is a highly contagious disease with one active person infecting 10-15 others per year.⁶ Therefore, the initial diagnostic procedure with high sensitivity restrains the spread of the disease in community. Thus, TB-LAMP needs to be introduced and researched on an experimental basis across Pakistan to evaluate its effectiveness. With more extensive research, new and more efficient diagnostic measures could be developed and the worth of the newly emerged ones could be evaluated for their advantages over the previous ones.

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References

1. World Health Organization. Global tuberculosis report 2015 [Online] 2015 [Cited 2016 September 12]. Available from URL: http://www.who.int/tb/publications/global_report/en/
2. Noori MY, Ali Z, Wahidi SA, Mughal MN, Sharafat S, Masroor M, et al. False negativity in AFB Smear microscopy: An insight into the caveats of the most widely used screening tool for tuberculosis. *J Pak Med Assoc* 2016; 66: 1116-1119.
3. Nagdev KJ, Kashyap RS, Parida MM, Kapgate RC, Purohit HJ, Taori GM, et al. Loop-mediated isothermal amplification for rapid and reliable diagnosis of tuberculous meningitis. *J Clin Microbiol* 2011; 49: 1861-5.
4. Trebucq A, Enarson DA, Chiang CY, Van Deun A, Harries AD, Boillot F, et al. Xpert MTB/RIF for national tuberculosis programmes in low-income countries: when, where and how? *Int J Tuberc Lung Dis* 2011; 15: 1567-72.
5. World Health Organization. The use of loop-mediated isothermal amplification (TB-LAMP) for the diagnosis of pulmonary tuberculosis: policy guidance [Online] 2016 [Cited 2016 August 17]. Available from URL: <http://www.who.int/tb/publications/lamp-diagnosis-molecular/en/>.
6. Creecy A, Russ PK, Solinas F, Wright DW, Haselton FR. Tuberculosis biomarker extraction and isothermal amplification in an integrated diagnostic device. *PLoS One*. Published Online First: 1 July 2015 doi: 10.1371/journal.pone.0130260.

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