Clinical characteristics of patients with a positive molecular test for *Mycobacterium tuberculosis* in rural South Africa

Remco P.H. Peters, Luke T. Daum, Gerald W. Fischer & P. Bernard Fourie

Anova Health Institute, Johannesburg, South Africa
University of Pretoria, Department of Medical Microbiology, Pretoria, South Africa
Maastricht University Medical Centre, Department of Medical Microbiology, The Netherlands
Longhorn Vaccines and Diagnostics, LLC, San Antonio & Bethesda, USA

Introduction

- Diagnosis of tuberculosis (TB) in Africa has entered a new era with the introduction of molecular diagnostics.
- South Africa has implemented the Xpert MTB/RIF® assay (Xpert) as first-line test for *Mycobacterium tuberculosis* in sputum samples (**Fig 1**.)
- Sputum collected in PrimeStore® Molecular Transport Medium (PS-MTM) and transported to a central facility for molecular testing provides an alternative diagnostic approach.[1]
- The clinical value of a positive result of smear microscopy and liquid culture, based on detection of intact bacteria, is well-understood.
- However, there is limited understanding of the clinical value of a positive result of molecular test for *M. tuberculosis* (detecting DNA and intact bacteria) in sputum samples.

Figure 1. Molecular systems used in this study

Centralized Xpert® MTB/Rif assay

PrimeStore® transport system followed by centralized testing

Materials & Methods

- This evaluation was embedded in a prospective cohort study of adults with cough ≥2 weeks in rural South Africa.[2]
- Two sputum samples were obtained: one was tested by Xpert and the other by liquid culture.
- A swab was taken from the first sputum specimen, placed in PS-MTM, transported at ambient temperature and tested by real-time PCR in San Antonio, Texas, USA.
- Characteristics of 50 patients with a positive result for at least one molecular test were compared by culture result.

Results

- Of those 50 with a positive molecular test result, Xpert was positive in 39 (78%) and PS-MTM in 44 (88%); 33 patients were concordantly positive in both tests.
- The majority of patients (33/50; 66%) had a positive result for liquid culture; 22 of those were positive by smear microscopy as well.
- Compared to culture positive patients, the PCR positive, culture negative patients had a significantly shorter duration of cough, night sweats and loss of appetite and a lower sputum DNA load by PCR (**Tab. 1**).

Table 1. Clinical characteristics of patients with positive molecular test stratified by culture result

	Culture Positive (n=33)	Culture negative (n=17)	P-value
Gender (number male)	21/33	6/17	0.06
Age	37	43	0.5
Household contact with TB	9/33	4/17	1.0
History of TB treatment	4/33	4/17	0.4
Smoker	10/25	1/13	0.06
HIV status	16/29	7/13	0.9
Median CD4 cell count	176	99	0.44
Duration of cough (days)	30	21	0.002
Duration of night sweats	30	14	0.001
Duration of loss of appetite	30	14	0.033
Ct-value in PS-MTM PCR	31.2	35.3	0.025

Discussion & Conclusion

- In patients with *M. tuberculosis* DNA detected in sputum, there is a difference in clinical presentation between those with and without positive concordant liquid culture.
- This difference could be due to additional detection of DNA and/or non-viable bacteria and may possibly relate to earlier stage of disease.
- Further analysis of the clinical value of a positive molecular test result for *M. tuberculosis* in sputum samples in high-burden areas is warranted.

References

1. Daum LT, Peters RP, Fourie PB, et al. Molecular detection of Mycobacterium tuberculosis from sputum samples transported in PrimeStore® from rural settings. *Int J Tuberc Lung Dis* 2015; **19 (5):** 552-7.
2. Peters RP, Jonkman K, Brand J, et al. Cohort study of clinic- versus laboratory-based Xpert for diagnosis of tuberculosis in South Africa. *Submitted for publication.*

The Anova Health Institute NPC is supported by the US President's Emergency Plan for AIDS Relief (PEPFAR) program via the US Agency for International Development, (USAID) under Cooperative Agreement No. AID-674-A-12-00015.

The views expressed in this poster do not necessarily reflect those of PEPFAR or USAID.

Go to: www.anovahealth.co.za or follow us on twitter @AnovaHealthSA

Contact: peters@anovahealth.co.za