Evaluation of centrifuge-free stool processing methods combined with Xpert MTB/RIF ultra for diagnosis of intrathoracic paediatric TB

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Background

There is a growing interest for the use of stool samples as an alternative to respiratory samples for the diagnosis of intrathoracic TB in children unable to produce sputum. Unlike respiratory samples, stool samples require processing before molecular testing. Several groups have already evaluated different processing methods. However, it is difficult to know which method has the best diagnostic accuracy and potential for use at Primary Health Care level, due to the difference in study designs and populations.

Methods

In this study, we performed a head to head comparison of the diagnostic accuracy and feasibility of four stool processing methods in the same population using the same study methodology. We selected three centrifuge-free simplified methods (Optimized Sucrose flotation (OSF), Stool Processing Kit (SPK) and Simple One Step (SOS)) and one centrifuge-based method (sucrose flotation) with well documented performance used as comparator. Two stool samples and two respiratory samples were collected from children with presumptive TB the Mbarara Regional Referral Hospital (Mbarara, Uganda), Lusaka University Teaching Hospital (Lusaka, Zambia) and the Arthur Davidson Children Hospital (Ndola, Zambia). Stool samples were split in four identical aliquots and processed with the different processing methods. Reference standard was the bacteriological results from respiratory specimens. Laboratory technicians' perception of the methods was assessed using a self-administered questionnaire at different time points of the study.

Results

Thirty-six children with Ultra or culture positive results from respiratory samples were enrolled to evaluate sensitivity and 140 children with two negative culture results to evaluate specificity of Ultra from stool using the different processing methods. Sensitivity of the different methods ranged between 56% and 69% and specificity was above 95% for all methods. The three centrifuge-free methods were perceived as easy to perform by the laboratory technicians.

Conclusion

Simplifying stool processing, regardless of the method used, did not decrease its performance when compared with the centrifuge-based method. All centrifuge-free methods were feasible and well accepted by laboratory technicians.