

Impact of mouth rinsing before sputum collection on culture contamination

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Sputum culture is more sensitive than smear microscopy for the diagnosis of tuberculosis and facilitates the performance of drug susceptibility testing. Initiatives are underway in high burden countries to expand capacity for sputum culture to improve TB case detection and patient care.

Contamination by other bacteria and fungi is a limitation of sputum culture despite laboratory decontamination procedures. Potential sources of contamination include normal oral flora, poor dental hygiene and gingivitis or oral thrush, contamination of sputum containers by patients and staff due to poor collection technique or collecting saliva or pharyngeal specimens rather than deep respiratory secretions from the chest, and poor laboratory handling procedures. We studied whether mouth rinsing with clean boiled water before sputum collection would decrease culture contamination. Persons with suspected tuberculosis being evaluated at a TB clinic at Mulago Hospital, the largest public hospital in Uganda, underwent sputum collection for smear and culture during diagnostic evaluation.

Data were compared for 10 consecutive months before the mouth rinsing intervention was implemented and for 11 consecutive months thereafter. Specimens were collected at the clinic as spot specimens in wide mouthed, sterile, disposable containers. Before collection, patients were instructed by clinic workers to inhale deeply several times and cough deeply to collect a sample of deep respiratory secretions, not saliva.

The mouth rinsing intervention consisted of instructing the patient to rinse their mouth 3 times with clean, boiled water provided in containers at the clinic before collecting the sputum sample. Other patient instructions and laboratory processing (2% sodium hydroxide/1.45% sodium citrate with a

phosphate buffer, PH=6.8 decontamination before culture on solid 7H-10 and liquid MGIT media) were identical to those before the intervention. One thousand nine hundred and twenty-two sputum samples were cultured before the mouth rinsing intervention and 1860 samples after the intervention.

The contamination rates were calculated as follows: contaminated MGIT cultures + MGIT culture with a positive ZN but a contaminated blood agar plate divided by the total number of MGIT cultures. The median monthly culture contamination rate at our laboratory decreased from 22% (IQR=20.3) before the mouth rinsing intervention to 7% (IQR=8.9) after we instituted mouth rinsing before sputum collection ($p=0.05$, Mann-Whitney U test). One weakness in this study could have been differences in the techniques of handling the specimen both at the point of collection, transport and processing in the lab. However the method of collection, transport and processing in the lab was uniform for this study for the stated period.

Two recent studies in Indonesia and Pakistan have shown that practical measures, such as having a clinic health worker instruct patients how to collect a deep sputum specimen, improve detection rates based on smear microscopy^{1,2}.

Our data suggest that mouth rinsing with clean, boiled water before sputum collection may be a simple means to decrease culture contamination and improve the diagnostic yield of sputum culture in high burden settings.

References

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