Evaluation of a Modified Small Membrane Filtration Method

Kevin P. Fennelly
Department of Medicine and Emerging Pathogens Institute, University of Florida, Gainesville, Florida, USA

The recent paper titled “Prospective Cross-Sectional Evaluation of the Small Membrane Filter Method for Diagnosis of Pulmonary Tuberculosis” (1) should most appropriately be titled “...Evaluation of a Modified Small Membrane Filter Method,” as it did not replicate the methods of our original report on the small membrane filter method (SMF) in Journal of Clinical Microbiology (2). The title and abstract may suggest that there is only one SMF method, but that is not the case. The methods used in this paper build on the principle of concentrating bacilli in a smaller area to facilitate microscopic detection. The negative results from this paper were in stark contrast to prior positive reports (2–4), including the original report on the use of larger membrane filters as a tuberculosis (TB) diagnostic tool that inspired our development of the SMF method (4). Although I appreciate the acknowledgment for helping develop the laboratory protocol, I was not involved beyond that point, notably in troubleshooting problems.

I suggest that the most likely reason for the discordant results was the use of the “new, multitest manifold.” To my knowledge, this manifold system has never been validated. It seems to be quite different than the manifold described in the other study, from Brazil (3). As pictured in Fig. 1 in the paper, it appears that there must necessarily be some leak in the system to allow for flow during filtration, given the vacuum applied to the inverted sealed tubes. Perhaps there is a loss of some of the sputum digest through this system leak. The lack of any clogging of filters in this new system may reflect decreased flow through the filters. There was no mention of the vacuum pressure applied using the new manifold.

In our original study, the average volume of first sputum specimens was 6.8 ml (standard deviation, 3.0), i.e., over twice that of the recent report (unpublished data). We also divided the sputum specimens into two aliquots rather than three. Most of our samples (263 [78.5%]) appeared mucopurulent, while 41 (12%) appeared purulent and 29 (8.7%) appeared salivary. The original laboratory protocol also differed from the currently reported one in the concentrations of reagents. In our original study, the bleach solution was prepared frequently in the research laboratory; the commercial product used in this recent report may not have had as much active chlorine due to storage in hot conditions (5). Variability in these reagents might alter their chemical characteristics, which in turn might affect staining characteristics. No coverslips or antiquenching solution were used in the recent study, unlike the prior two (2, 3). Three prior studies have suggested that membrane filtration can substantially improve microscopy diagnosis of TB with simple, low-cost materials. A goal now should be to understand why the results from this modified method were so different from those of the prior studies so that errors can be avoided and so that the method can continue to be improved.

ACKNOWLEDGMENT

I have submitted a provisional patent application (U.S. patent application 61/952,230) for a device to facilitate the performance of the small membrane filtration method.

REFERENCES