The Usefulness of the MODS assay in a Level II Mycobacteriology Laboratory in the Philippine setting

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\textbf{Background and Objective}

- Multi-drug resistant M. tuberculosis is a growing concern in the Philippines, thus a reliable, low cost diagnostic tool, such as the microscopic observation drug susceptibility (MODS) assay for the detection of Mtb in clinical isolates is needed for early diagnosis.\textsuperscript{1,2} The assay utilizes liquid culture media in plastic micro wells where specimens are inoculated and microbial growth is observed through an inverted microscope.
- This study aims to compare the performance of the MODS assay in the detection of MT and MDR from sputum specimens from the standard egg-based solid culture medium and liquid M8 Bact culture system.

\textbf{Methodology}

- Patients suspected to have TB from the outpatient clinic of the hospital and patients referred by the programmatic management of drug resistant tuberculosis (PMOT) were asked to submit sputum specimens for processing.
- AFB smears were done to all specimens. After routine digestion, samples were inoculated onto LJ culture, MB Bact culture system and MODS assay and were monitored for growth. MODS assay were prepared in a 48-well tissue culture plastic plates and positive cultures were identified by their characteristic cord formation.\textsuperscript{1,2}
- The proportion method was used as the standard test for drug susceptibility, while direct drug susceptibility testing was performed with MODS assay.
- The culture plates were examined under an inverted microscope at 40x magnification daily for 15 days and twice weekly thereafter up to 40\textsuperscript{th} day of incubation.

\textbf{Results}

- 795 specimens were included from January 2012 to November 2013.
- 269 were smear negative and 526 were smear positive for AFB.
- Among the smear positive samples, computed sensitivity and specificity of MODS on the detection of MDR was compared to the disk proportion method by CDC is 96.1% and 99.5% respectively.
- Among smear negative samples, the sensitivity and specificity is both 100%.

\textbf{Discussion}

- All patients recruited were TB suspects based on signs and symptoms and chest x-ray. Majority of the patients were MDR\textsuperscript{T} suspects whose sputum specimens were submitted to the culture for Mtb drug susceptibility.
- MODS was able to detect Mtb isolates 1 week earlier than the MItaB test and three weeks than LJ.
- With regards to accuracy rates, our result showed higher sensitivity rates than cited in previous studies with sensitivity range of 77.8-92\%.\textsuperscript{1,2,4,5} We attribute this to the concentration of isoniazid used in the MODS assay which was similar to the critical concentration used for standard disk proportion method.
- Literature showed that patients on treatment for MDR\textsuperscript{T} showed sputum culture conversion within 12 weeks of starting therapy.\textsuperscript{5} Our study showed that sputum culture can still be positive even on 6\textsuperscript{th} month of treatment. For infection control purposes, isolation duration of patients can be determined earlier.

\textbf{Conclusion}

- In a resource limited country with a high burden of TB, MODS assay can lessen the waiting time for the results of MTB detection and susceptibility. This will give the physician the edge of knowing the culture and sensitivity results earlier, therefore will impact public health in terms of timely reduction of isolation and early contact investigation.
- In MDR\textsuperscript{T} suspects, ideally DST result should be known before drug regimen is reduced. MODS assay can provide timely result for the drug resistant program of the department of health.
- Our study is limited to clinical isolates. We did not take into account the clinical condition of the patients especially those on treatment.
- With adequate training, MODS assay can be adopted in the regional TB laboratory centers in our country.

\textbf{References}


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