

Session: OS202 MALDI-TOF - diagnostics for the micro lab in the 21st century

**Category: 4b. Diagnostic bacteriology – non-culture based, including molecular and MALDI-TOF**

25 April 2017, 14:30 - 14:40  
OS1031

**The use of matrix-assisted laser desorption ionization - time-of-flight mass spectrometry (MALDI-TOF MS) for rapid bacterial identification in patients with smear-positive bacterial meningitis - a study of diagnostic accuracy**

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**Background:** Bacterial meningitis is a rapidly occurring fatal disease, thus immediate diagnosis and adequate therapy are crucial. Diagnosis is obtained by cerebral spinal fluid (CSF); cultures results are the gold standard for diagnosis, but are available only within 24-72 hours. MALDI-TOF-MS identifies a wide range of bacteria by examining protein profiles. Little data exists regarding the use of MALDI-TOF-MS for examining CSF samples. We aimed at assessing the accuracy of MALDI-TOF-MS in rapid identification of CSF pathogens in patients with meningitis.

**Material/methods:** We conducted a prospective study examining samples with positive CSF Gram stains with MALDI-TOF-MS. The results were compared with the CSF culture; identification was considered accurate when identical to the CSF culture results (species and genus level). Lab workers performing the MALDI-TOF MS and ones interpreting its results were blinded to the result of the direct smear, besides the fact of it being positive.

Results: MALDI-TOF-MS was tested on 41 CSF samples with positive Gram stain; 17 cases of Gram-positive-cocci, and 24 cases of Gram-negative bacteria. Nine patients had community-acquired meningitis, and 32 patients had post-neurosurgical meningitis. The technique was found to have a sensitivity of 80% and PPV of 91% in examining Gram-negative CSF infections. Additionally, MALDI-TOF-MS correctly identified 2/5 samples with negative Gram stain. Only one Gram-positive cocci (Staph Aureus) was identified by MALDI-TOF-MS.

**Conclusions:** In CSF samples, MALDI-TOF-MS was relatively sensitive and specific in rapid identification of Gram-negative-rods, but not for Gram-positive-cocci. MALDI-TOF-MS may be used for a more rapid identification of Gram-negative bacteria in CSF samples, to aid in modifying the empiric treatment administered to these hospital-acquired pathogens, which are often multi-drug resistant.