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Poster presentation

Quantification of lactic acid in cerebrospinal fluid samples of infectious and noninfectious neurological diseases

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Background
The differential diagnosis between bacterial and viral meningitis is based on the cerebrospinal fluid (CSF) cellular and biochemistries characteristics, it is important for the adequate treatment and prognosis. CSF lactic acid determination is considered the best biomarker for this differential diagnosis. The objectives of this study were to quantify CSF lactic acid levels in bacterial and viral meningitis comparing with other infectious and noninfectious central nervous system diseases; and to calculate the CSF acid lactic operational characteristics as a biomarker for the differential diagnosis between bacterial and viral meningitis.

Materials and methods
It was studied prospectively 139 CSF samples, collected by lumbar puncture. The samples were distributed in the groups: Group 1 (n 33) CSF with viral meningitis characteristics; Group 2 (n 8) suspicion of viral meningitis although CSF had predominance of neutrofils; Group 3 (n 20) bacterial meningitis; Group 4 (n 17) neurological diseases; Group 5 (n 42) normal CSF; Group 6 (n 15) traumatic lumbar puncture; Group 7 (n 4) chronic meningitis (mycobacterium tuberculosis, cryptococos neoformans, candida sp). The levels of CSF lactic were determined by the AIR DIMENSION equipment (Dade Behring).

Results
CSF lactic acid concentration was more elevated in the group with bacterial meningitis (8.7 ± 5.4 mmol/L) than in the groups with viral meningitis, normal CSF, noninfectious CNS diseases and chronic meningitis (1.9 ± 0.6; 1.8 ± 0.6; 3.1 ± 3.7; 5.5 ± 2.8 mmol/L respectively) $P \leq 0.0001$. The CSF acid lactic concentration in the group with viral meningitis and CSF neutrofils predominance was 2.5 ± 0.4 mmol/L. The quantification of CSF lactic acid to discriminate bacterial from viral, meningitis with the cut-off of 3.5 mmol/L, had a sensibility of 80%, specificity of 97%, positive predictive value of 94% and negative predictive value of 89%.

Conclusion
CSF lactic acid levels were four times higher in the bacterial meningitis group than in the viral meningitis group. In the CSF samples with suspicion of viral meningitis with predominance of neutrofils and normal glucose the CSF lactic acid levels were similar to the levels in the CSF samples with viral meningitis but lower than in the samples with bacterial meningitis. The CSF lactic acid to discriminate bacterial meningitis from viral meningitis has high sensibility, specificity and predictive values.