Neonatal cerebrospinal fluid cytology: Preanalytical and analytical phase considerations

Dear Editor,

I read with interest the article entitled "Role of neonatal cerebrospinal fluid cytology in correlation to Creactive protein, blood culture, risk factors and clinical outcomes in neonatal intensive care" by Pradhan *et al*.[1] The authors have admirably addressed a continuing challenge in pediatric laboratory medicine, the cytologic analysis of cerebrospinal fluid (CSF) specimens.

CSF specimens from young children can be particularly challenging due to low specimen volume: the CSF volume often falls below the ~10.5 mL recommended by some authors.[2] In addition, because the tubes used for CSF collection generally do not contain preservative agents (to make cell counting feasible) the CSF is sensitive to a variety of preanalytical phase issues that may impact test results. Although these factors have been reported most frequently in patients with suspected hematologic malignancies involving the CSF, these preanalytical biases likely extend to the analysis of the CSF in any patient setting. Prolonged time from lumbar puncture to analysis is likely one of the leading issues resulting in a false negative CSF analysis, with significant cell loss occurring as soon as 30 min after the procedure.[3] Hemodilution of specimens, particularly in tubes collected after the first tube in multitube collections, may also impact results.[3]

There are also analytical phase challenges to CSF cell counting. Because cell chamber counts, the gold standard, are time-consuming and require specialized personnel, most laboratories use analyzers designed for use in fluids such as blood that have higher cell counts. Although commercially available analyzers can be used in a setting designed to optimize performance in low cell count environments, imprecision below ~20 cells per microliter is generally unfavorable.[4]

The combination of these preanalytical and analytical phase methodological issues may account in part for the high heterogeneity identified in a recent meta-analysis of 16 studies (31,695 patient specimens) that addressed CSF cell count in neonates with suspected meningitis.[5] Despite the obvious importance of preanalytical and analytical phase variables in studies that use clinical laboratory data, reporting systems such as the Standards for Reporting Diagnostic Accuracy Studies (STARD) unfortunately do not mandate their reporting.

I, therefore, would encourage a response from P Pradham *et al*. in which they report these preanalytical and analytical phase variables, in order to provide transparency to the readership of the *Journal of Family Medicine and Primary Care*. This information could help those readers interested in the potential application of the study findings to their practice environment and also further advance the science of this challenging field.

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Conflicts of interest

There are no conflicts of interest.

John L. Frater

Department of Pathology and Immunology, Washington University, St Louis, MO, USA

Address for correspondence: Dr. John L. Frater, Department of Pathology and Immunology, Washington University School of Medicine, 660 South Euclid Avenue, Box 8118, St. Louis, Missouri - 63110-1093, USA.
E-mail: jfrater@wustl.edu

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