



Comparison of Leucocyte Counting in Cerebrospinal Fluid by the XE-2100 and Fuchs-Rosenthal-Chamber

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All hospitals which treat patients with acute inflammatory neurological diseases measure the basic cerebrospinal fluid (CSF) parameters within two hours. The cell count is usually the key parameter for the correct diagnostic evaluation. False results within the normal range (< 5 white cells / μL) could significantly delay the correct management, whereas false elevated counts could lead to unnecessary, sometimes harmful procedures. CSF microscopy chamber cell counts are time consuming, labour intensive and frequently imprecise, but still remain the gold standard since more than one hundred years. We compared this gold standard with an automated count using the Sysmex XE-2100 multiparameter haematology analyser.

The number of WBC was determined in 226 fresh (maximum 2h from lumbar puncture) CSF samples by microscopy and by the XE-2100 WBC/BASO and DIFF channels.

Within-day imprecision of the XE-2100 DIFF channel and with the manual method showed nearly the same results; 46 % and 37% for extremely low WBC counts (2 cell/ μL). For higher WBC counts the DIFF channel is superior to the manual method. The within-day imprecision for the DIFF channel is superior to the WBC/BASO channel. The XE-2100 counts showed excellent correlation with the microscopy reference counts in the range 0-3000 WBC/ μL (DIFF channel: $R^2=0.985$; WBC/BASO channel: $R^2=0.883$). In the range lower than 50 WBC/ μL however, the DIFF channel ($R^2=0.870$ [n=201]) again showed a good correlation with the microscopy reference method, but, in contrast, the WBC/BASO channel showed no correlation (WBC/BASO channel: $R^2=0.06$ [n=201]).

Conclusions:

Determination of the WBC count in CSF using the DIFF channel of the XE-2100 is highly correlated to the microscopic reference method. Especially as no false normal (0-4) WBC counts were found, so it is unlikely that a pathologic pleocytosis has been missed. Some false positive results were obtained (3%). It is important for the supervising doctor to be aware of this for interpretation of the data.