

PKP-034: DETERMINATION OF METHOTREXATE IN CSF BY CHEMILUMINESCENCE USING THE ARCHITECT

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Background

Intrathecal administration of methotrexate (MTX) in the treatment of different neoplastic diseases to prevent relapses in the CNS and the need to keep MTX concentrations in CSF during infusion of MTX requires study of the pharmacokinetics of MTX at this level. It is therefore necessary to measure concentrations of MTX in CSF.

Purpose

To evaluate the validity (selectivity, accuracy and precision) of MTX measurements in CSF using a chemiluminescence assay for determination of MTX in plasma and to discard the matrix effect which might occur when measuring MTX in CSF.

Material and methods

Different concentrations of MTX were tested in different types of samples to evaluate the selectivity and discard the matrix effect. To the studied matrix (CSF) were added increasing and known amounts of plasma with MTX (addition standard) and the results were correlated with the regression equation of the data obtained in both matrices.

Accuracy was obtained by comparing the results of both matrices and obtaining the relative error. Due to the limitation of the small volume of CSF obtained in each extraction we were unable to perform different analyses on the same sample of CSF. 10 measurements on the same CSF sample containing a known quantity of MTX (obtained in our own test control) to evaluate precision were performed.

Results

	Theoretical value	Obtained value
CFS (matrix) + MTX 1 (plasma)	0	0,006
CFS (matrix) + MTX 2 (plasma)	0,19	0,187
CFS (matrix) + MTX 3(plasma)	0,38	0,39

Factor analysis of standard additions gave the regression line $X=0.00233+1.0105Y$. The correlation coefficient was $r = 0.99$ and the relative error was -2.3% .

456 432 440 424 456 440 456 448 440 464

Real Value = 436
Average Value = 445,44

The series of 10 repetitions of CSF with a known concentration (436 μM) gave an average value of 445.44 μM (424–464 μM), with SD of 12.5 and a variation coefficient of 2.8%.

Conclusion

The good selectivity, accuracy and precision of the CFS analysis by CMIA (Architect) gave reliable data on concentrations of MTX in CSF, highlighting the absence of the matrix effect.