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abstract

Flow cytometric detection of Acute Lymphoblastic Leukemia in CSF and its role in predicting survival and neurotoxicity in pediatrics at King Abdulaziz Medical City in Jeddah, Saudi Arabia – A retrospective study

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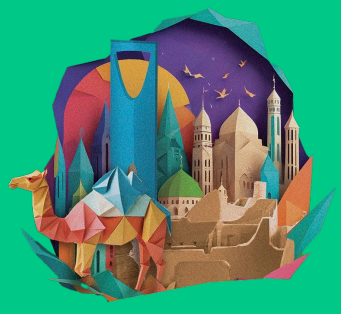

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abstract

Flow cytometric detection of Acute Lymphoblastic Leukemia in CSF and its role in predicting survival and neurotoxicity in pediatrics at King Abdulaziz Medical City in Jeddah, Saudi Arabia – A retrospective study

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Introduction: The gold standard for detecting central nervous system leukemia (CNSL) of acute lymphoblastic leukemia (ALL) cases at time of diagnosis is cytospin-based cytomorphology (CM). Nevertheless, the sensitivity of CM is considered low for detecting blasts in cerebrospinal fluid (CSF) samples. Flow cytometry (FCM) is currently proposed as a more sensitive tool to diagnose CNSL at time of diagnosis. This study aims to assess the outcomes of CNSL patients diagnosed with FCM, outline possible predictors for positive FCM results, and identify the concordance rate between the two diagnostic modalities.

Methodology: This is a retrospective and single-center study that included a total of 85 newly diagnosed pediatric (1 – 14 years) ALL patients that were collected in a non-randomized consecutive sampling technique. All CSF samples were examined by both CM and FCM at time of diagnosis. The diagnosis and management of all patients were according to the children's oncology group protocol "AALL0932". Statistical analyses for categorical and continuous data were carried out using the JMP statistical program version (17.2.0).

Results: Of the total 85 patients, 20 (23.5%) CSF samples were tested negative by CM and positive by FCM (CM- / FCM+) while no CSF samples had positive CM and negative FCM (CM+/ FCM-) results; in addition, 28 (32.9%) CSF samples were positive by both modalities (CM+/ FCM+) in comparison to 37 (43.5%) CSF samples being negative by both modalities (CM-/ FCM-). No statistically significant correlation was found between the accounted clinical characteristics and positive FCM results. CNS relapse was statistically significant ($P < 0.05$) in correlation with the number of extra IT chemotherapy given in the FCM+ group.

Conclusion: FCM analysis is more sensitive for detecting CNSL. CNS relapse is correlated with increased IT chemotherapy for FCM+ group. Studies of larger sample size are required to further validate the results.