

Development of a Telemedical Network Supporting an Automated Flow Cytometric Analysis for the Clinical Follow-up of Leukaemia

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Abstract : In patients with acute lymphoblastic leukaemia (ALL), treatment response is increasingly evaluated with minimal residual disease (MRD) analyses. Flow Cytometry (FCM) is a fast and sensitive method to detect MRD. However, the interpretation of these multi-parametric data requires intensive operator training and experience. This paper presents a pipeline-software, as a ready-to-use FCM-based MRD-assessment tool for the daily clinical practice for patients with ALL. The new tool increases accuracy in assessment of FCM-MRD in samples which are difficult to analyse by conventional operator-based gating since computer-aided analysis potentially has a superior resolution due to utilization of the whole multi-parametric FCM-data space at once instead of step-wise, two-dimensional plot-based visualization. The system developed as a telemedical network reduces the work-load and lab-costs, staff-time needed for training, continuous quality control, operator-based data interpretation. It allows dissemination of automated FCM-MRD analysis to medical centres which have no established expertise for the benefit of an even larger community of diseased children worldwide. We established a telemedical network system for analysis and clinical follow-up and treatment monitoring of Leukaemia. The system is scalable and adapted to link several centres and laboratories worldwide.

Keywords : data security, flow cytometry, leukaemia, telematics platform, telemedicine

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