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Algorithm for monitoring minimal residual disease on the basis of patient-associated immunophenotypes

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Abstract

Aims: Algorithm for monitoring MRD on the basis of patient-associated immunophenotypes.
MRD monitoring aims to identify cells with aberrant or rare phenotypes. It is appropriate to use patient-associated panels for MRD monitoring, which include: (i) phenotypic markers of transformed cells identified at the date of primary diagnostics, and (ii) markers often occurring in a particular variant of AL. Immunological MRD monitoring is an individualized laboratory diagnostic, since individual patients could have a complete preservation of aberrant phenotypes of transformed cells, as well as changes in the expression of some markers.
Methods: A multicolor flow cytometry was used.
Results: Seventy-five cases of primary pediatric AL were studied. Among them were 53 cases of B-ALL, 8 cases of T-ALL, and 13 cases of AML. Monitoring of MRD was performed in 23 B-ALL cases, 6 T-ALL cases, and 5 AML cases.
During MRD monitoring, we observed the complete preservation of phenotypes of transformed cells in 11 cases of B-ALL (48% of cases) and 4 cases of a change in expression (17%). In other cases, MRD of B-ALL was not detected (35%). Complete preservation of phenotypes of transformed cells was observed in 3 cases of T-ALL (50%) and in 3 cases MRD was not identified (50%). Complete preservation of cell phenotypes was observed in 3 cases of AML (60%), while in 2 cases (40%) a change in expression was revealed.
Summary: An algorithm for monitoring MRD on the basis of patient-associated immunophenotypes allows the verification of MRD through the presence of malignant cells with a sensitivity up to 10^{-5}. This algorithm provides full information to clinicians, and thus the possibility to plan transplantations.

Keywords: MRD, flow cytometry, ALL, patient-associated algorithm, monitoring