HEMATOLOGY

Early disease predictor for ALL relapse

While most childhood acute lymphoblastic leukemia is cured with modern treatments, relapse is the main cause of treatment failure. Therefore, determining early response to therapy is a primary prognostic goal. Assessment of blast counts in the bone marrow on day 15 is often used to guide therapy. Patients with insufficient response by day 15 have an unfavorable outcome due to leukemia relapse. As part of a clinical trial, investigators have now demonstrated that measurement of flow cytometry minimal residual disease at a single early time point in the bone marrow on day 15 following treatment represents a feasible and appropriate prognostic factor.

Bone marrow samples were assessed for 815 patients who were 18 years or younger with newly diagnosed ALL. The samples were collected on day 15 after 14 days of steroid treatment and single chemotherapy dose. Three groups were

identified by flow cytometry: standard (<0.1 blast cells); intermediate (0.1 to <10 blast cells) and high (≥ 10 blast cells). The 5-year cumulative incidence of relapse was 7.5%, 17.5% and 47.2% for the standard, intermediate and high-risk groups, respectively. Flow cytometry was the most important prognostic factor.

Flow cytometry was able to detect relapses in patients according to their bone marrow blast cell counts on day 15. In total, 5.5% of patients with blast counts lower than 0.1% had a relapse compared with 36.8% in patients with blast counts of ≥ 10 .

“Measurement of flow cytometry blast counts on day 15 bone marrow samples was the most powerful early predictor of relapse” conclude the researchers. Patients with a high flow cytometry minimal residual disease score at day 15 had a particularly poor prognosis, independent of all other clinical and biologic features.

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While this technology has yet to be standardized, it represents an important additional tool to assess ALL as it is rapid and relatively cheap. The authors plan to use this parameter in all patients in whom PCR may be informative, thus allowing to select patients for treatment tailoring.

Lisa Hutchinson

Original article Basso, G. *et al.* Risk of relapse of childhood acute lymphoblastic leukemia is predicted by flow cytometric measurement of residual disease on day 15 bone marrow. *J. Clin. Oncol.* **27**, 5168–5174 (2009)