CD26+ Leukemic Stem Cell Identification by Flow Cytometry: Role in Diagnosis and Follow-up of Chronic Myeloid Leukemia

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Introduction

Recent investigations have explored the potential of CD26+ leukemic stem cells (LSCs) as a diagnostic marker in chronic myeloid leukemia (CML). This study aimed to assess the diagnostic significance of CD26+ CML LSCs using flow cytometric immunophenotyping.

Methods

Patients over 12 years old with clinical suspicion and a morphological diagnosis of CML were included in the study. We used peripheral blood (PB) and bone marrow (BM) samples for the enumeration of CD26+ LSCs. A pre-titrated antibody cocktail containing CD45, CD34, CD38, and CD26 monoclonal antibodies was prepared. Control samples were obtained from patients with non-CML conditions, including non-CML myeloproliferative neoplasms (MPNs), acute leukemias, MDS/MPNs, and reactive bone marrows. Reverse Transcriptase (RT)-PCR was performed to identify the *BCR::ABL1* transcript type in all cases, and fluorescence in situ hybridization (FISH) was conducted on a subset of cases to analyze *BCR::ABL1* positivity in sorted CD26+ LSCs.

Results

A total of 218 samples were tested, including 177 PB and 41 BM samples. The cohort comprised 72 patients with chronic phase CML (CML-CP), 4 patients in the accelerated phase (CML-AP), 7 in blast crisis (CML-BC), 15 follow-up CML patients, and 79 non-CML cases. CD26+ LSCs were found in 100% of patients with a confirmed *BCR::ABL1* fusion. There was a strong correlation between CD26+ CML LSCs in the PB and BM ($r = .917$). Notably, follow-up CML patients with negative RT-PCR results did not show any CD26+ LSCs.

Conclusion

The consistent detection of CD26+ LSCs in all CML cases, combined with its cost-effectiveness and speed, suggests that PB flow cytometric estimation of CD26+ LSCs could serve as a promising surrogate for molecular genetic techniques at the time of diagnosis. Its role in assessing the ‘stem cell response’ during follow-up needs further exploration.