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Acute Leukemia of Mixed B/Myeloid Lineage with Dual *BCR::ABL1* and *CBFβ::MYH11* Fusion Genes

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A 14-year-old male presented with dizziness, nausea, and fever. Blood tests revealed: WBC 89.71×10^9/L, HB 98g/L, and PLT 392×10^9/L. Bone marrow aspirate and peripheral blood revealed 57% and 34% blasts separately (Figure1 A, B). Flow cytometry (FCM) revealed two abnormal cell populations: one expressed CD34, CD123, TDT, CD38, HLA-DR, CD33, CD13, CD117 (strong), CD7, CD36 (partial); the other expressed CD19, cCD79a, CD22, TDT, CD34, CD38, HLA-DR, CD13, CD33, CD123, and CD117 (partial) (Figure1 C). Cytogenetic analysis showed: 46,XY,t(9;22)(q34.1;q11.2),inv(16)(p13.1q22)[20] (Figure1 D). Fluorescence in situ hybridization (FISH) revealed positive of *BCR::ABL1* and *CBFB* rearrangement (Figure1 E, F). Whole-transcriptome RNA sequencing of fusion genes revealed exsistence of CBFβ::MYH11, BCR::ABL1 (p210), and ABL1::BCR. After one cycle of chemotherapy including vincristine (VCR), daunorubicin (DNR), PEG-asparaginase (PEG-asp), prednisone (Pred) concurrently with dasatinib, morphologic complete response was achieved and MRD negative by FCM, but both fusion signals remained positive by FISH.

Considering the splenomegaly and the BCR::ABL1 fusion signal detected in lobulated granulocytes, this case was deemed to have originated from the blast crisis phase of chronic myeloid leukemia (CML-BC)[1,2]. Cases of acute leukemia of mixed B/myeloid lineage, along with

BCR::ABL1 and *CBFβ::MYH11*, have rarely been reported previously. Early use of tyrosine kinase inhibitors (TKIs) in conjunction with hematopoietic stem cell transplantation may improve outcomes [3].

Ethics

Informed Consent: No personally identifiable patient information is included in this publication and informed consent was not required.

Footnotes

Authorship Contributions: Data Collection or Processing: X.L.; Writing: X.L., J.X.; Literature Search: X.C., C.L.; Analysis or Interpretation: Z.X.

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Running Head: Acute leukemia with BCR::ABL1 and CBFβ::MYH11

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