

LETTER TO EDITOR

Early T-cell precursor lymphoblastic leukaemia with monocytic morphology negative for CD3 by flow cytometry: A diagnostic challenge solved by immunohistochemistry

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Editor,

Early T-cell precursor acute lymphoblastic leukaemia (ETP-ALL) is defined as a subgroup of T-lymphoblastic leukaemia/lymphoma (T-ALL/LBL) comprising cells committed to the T-cell lineage, but with a unique immunophenotype indicating only limited early T-cell differentiation in the 2022 5th edition of WHO classification of hematolymphoid neoplasms.¹

We present a case of ETP-ALL with blasts exhibiting ample amount of cytoplasm suggestive of monocytic differentiation. A 51-year-old female was referred to our hospital with the impression of acute hepatitis because of fever and jaundice. Laboratory examination showed elevated GPT (ALT), GOT (AST), total bilirubin, γ -GT, and alkaline phosphatase. Complete blood count showed anaemia (haemoglobin of 103 g/L) and thrombocytopenia (platelet of $47 \times 10^9/L$) with a normal WBC count ($6.9 \times 10^9/L$), but with 11% blasts. Morphologically, the blasts in the peripheral blood and bone marrow (BM) were large with vesicular nuclei and irregular nuclear contours, a fine chromatin pattern, small nucleoli, and ample amount of cytoplasm, without cytoplasmic granules or blebs (Fig. 1). FCM immunophenotyping showed that the blasts expressed CD2, CD7, CD11c, CD56, and HLA-DR, and with a partial expression of CD11b, but not CD1a, cCD3 (clone UCHT1, FITC BD Pharmigen™), sCD3 (clone SK7, BD™ CD3 PE and FITC), CD4, CD5, CD8, CD10, CD13, CD19, CD33, CD34, CD117, TdT, or cMPO (Fig. 1). The marrow trephine was hypercellular with blasts accounting for around half of the marrow cells (Fig. 2A). Under high power, the blasts exhibited irregular nuclear contours (Fig. 2B). Immunohistochemistry (IHC) confirmed the expression of CD2, CD7, and CD56 by the blasts, but not CD1a, CD8, CD34, CD117, MPO or TdT. *In situ* hybridisation for EBV-encoded small RNA was negative. Initially we were hesitant to do immunohistochemistry for CD3 as it was negative by flow cytometry, either surface or cytoplasmic. But the blastic cells turned out to be diffusely positive for CD3 by IHC (Fig. 2C; clone LN10, Novocastra™), and this stain clearly highlighted the irregular nuclear contours of the blasts (Fig. 2D). In summary, our case fitted well with the diagnostic criteria of ETP-ALL [2], with the expression of CD3 (by IHC) and myeloid markers (HLA-DR and CD11b by FCM), but not MPO, CD1a, CD5, or CD8. Unfortunately, the patient died of septic shock and multiple organ failure in one month from initial presentation of fever and jaundice, without chemotherapy.

We presented this case to stress the importance of CD3 IHC in cases suspicious for T-ALL even if the blasts were negative for cCD3 and sCD3 by FCM. In summary, the morphology (large cells with abundant cytoplasm and markedly irregular nuclear contours) and immunophenotype (CD3 negative by FCM) of our case were atypical for T-ALL, yet CD3 IHC confirmed the cellular lineage and the typical phenotype indicated an ETP-ALL.

Keywords: CD3, early T-cell precursor acute lymphoblastic leukaemia, flow cytometry, immunohistochemistry, T-lymphoblastic leukaemia/lymphoma.

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Conflict of interest: The authors declare that they have no conflict of interest.

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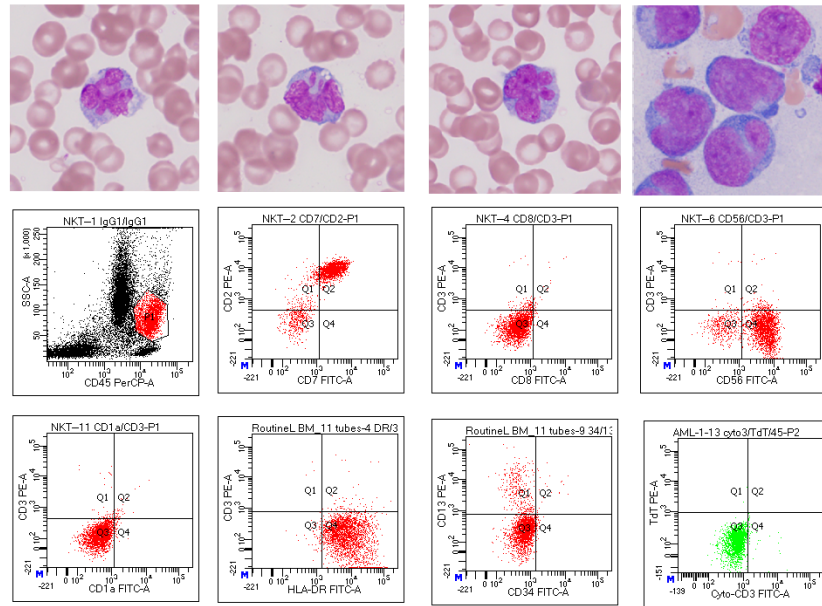


FIG. 1: The first-row shows blasts with ample amount of agranular cytoplasm, markedly irregular nuclear contours (the first three from PB and the fourth from BM). The 2nd and 3rd rows show flow cytometric histogram the blasts expressing CD2, CD7, CD56, and HLA-DR, but not CD1a, cCD3, sCD3, CD8, CD13, CD34, or TdT.

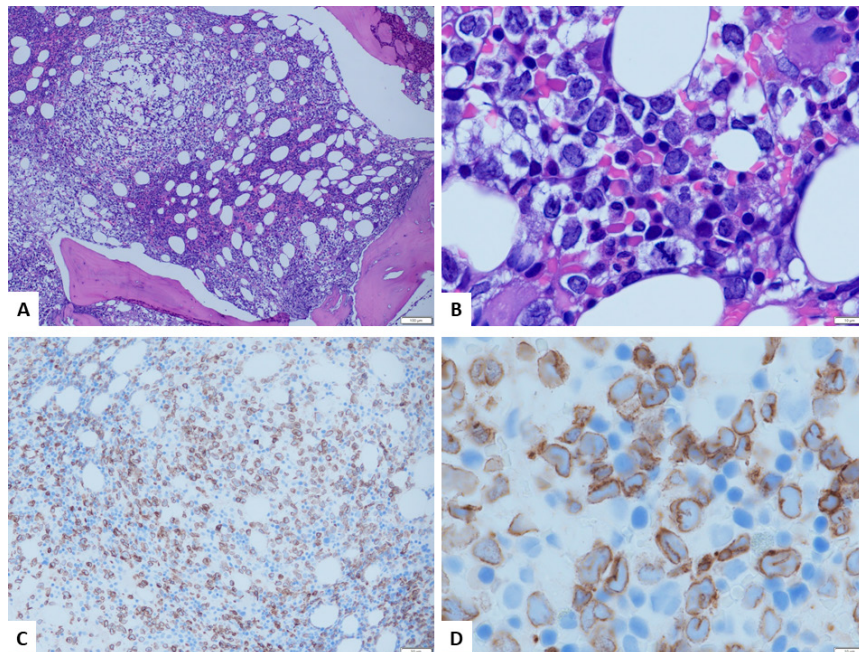


FIG. 2: BM trephine shows a hypercellular marrow (A, magnification x100) with blasts exhibiting irregular nuclear contours (B x1,000). IHC shows that the blasts are positive for CD3 (C, x200; D, x1000).

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