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TRBC1 enables identification of an otherwise immunophenotypically silent case of angioimmunoblastic T-cell lymphoma

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An 85-year-old woman presented with a month-long history of night sweats, chills, and appetite loss. Imaging showed diffuse lymphadenopathy above and below the diaphragm with splenomegaly. Histological and immunohistochemical evaluation revealed angioimmunoblastic T cell lymphoma (AITL; nodal T-follicular helper cell lymphoma, angioimmunoblastic-type per 5th edition WHO) with an associated EBV-positive B cell lymphoma (Fig. 1). Next-generation sequencing demonstrated positive rearrangements in TCR-γ, TCR-β, *IGH*, and *IGK* and pathogenic mutations in *RHOA G17V* and *TET2 Q1903*.

By flow cytometry, T cell findings were very subtle. A subset of CD3+CD4+ T cells showed slightly dim CD3 expression compared to CD8+ T cells and were 95% negative for TRBC1. The CD4:8 ratio was 0.9. There was no aberrant loss of CD2, CD5, or CD7. There was additionally a kappa-restricted B-cell population expressing CD5 and CD43 while negative for CD23 and CD200. By in-situ hybridization, EBER highlighted a small, monomorphic B cell population with plasmacytic differentiation. The plasmacytic portion was kappa restricted. Thus, a secondary small EBV+ B cell lymphoma with plasmacytic differentiation with an immunophenotype compatible with marginal zone lymphoma was also diagnosed.

This case provides an example of AITL in which the abnormal T cell population would have been essentially undetectable without the use of TRBC1 [1, 2]. The most frequent aberrancies, such as significant loss of CD3, loss of CD7, or expression of CD10, were not present in this case. There was no significant expansion of the CD4 population relative to CD8 T cells to suggest a CD4+ T cell proliferation. Prior studies have shown that flow cytometry, while sensitive in cases of AITL, can occasionally fail to detect an aberrant T cell population [3, 4]. Therefore, the use of anti-TRBC1 within a comprehensive flow cytometry panel can be a valuable addition in the detection of clonal T cell subsets in immunophenotypically subtle cases of AITL, particularly in small-volume biopsies, peripheral blood, or bone marrow assessment.

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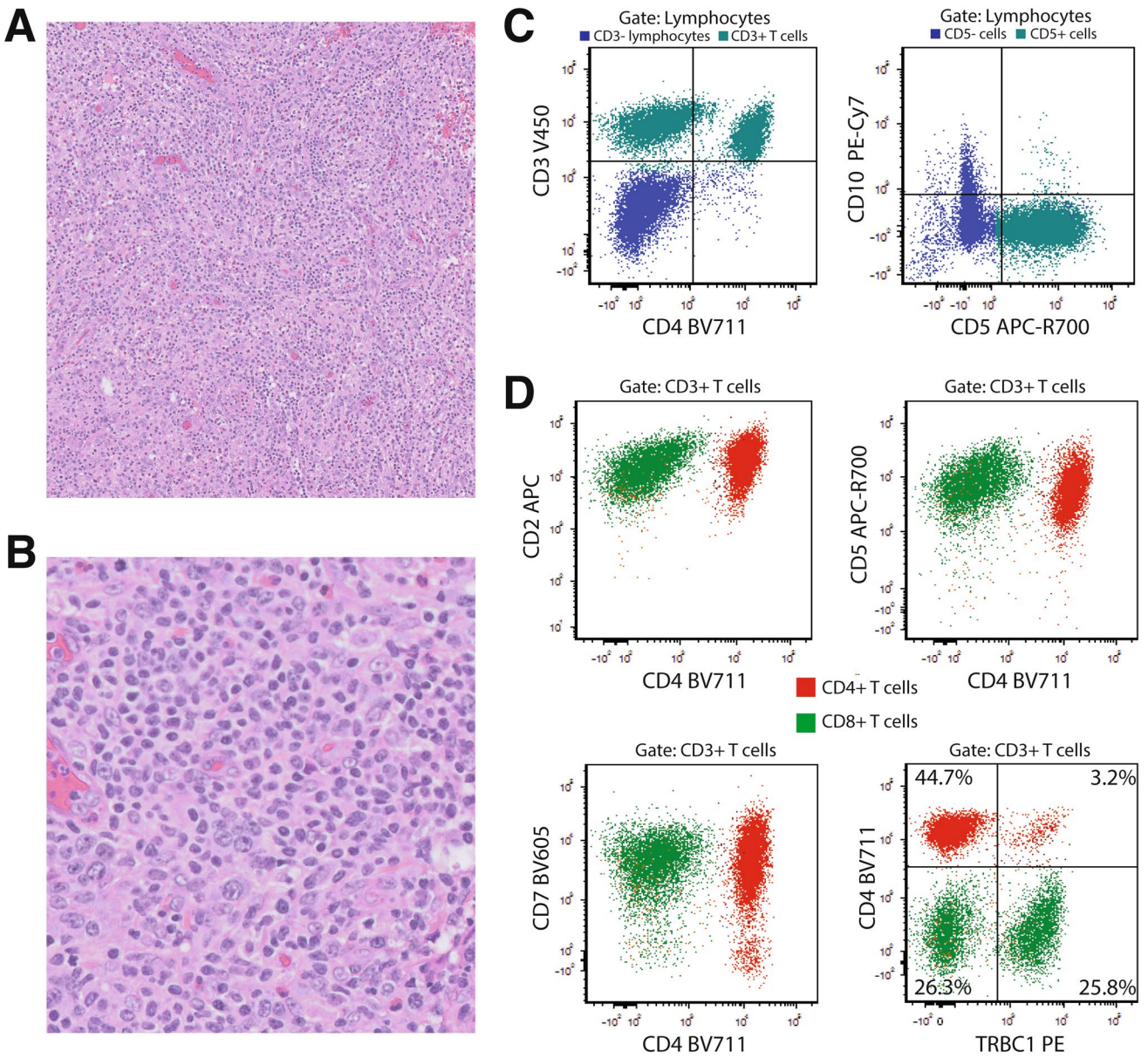

Fig. 1 **A**, **B** Histological sections show complete effacement of the lymph node architecture by a diffuse infiltrate of mostly small lymphocytes with admixed eosinophils and histiocytes. Paracortical areas show increased vascularity with an arborizing pattern. Hematoxylin and eosin; ×100 magnification; **B** hematoxylin and eosin; × 400 magnification. **C** Flow cytometry shows no loss of CD3 on the CD4+ T cell population and no expression of CD10 on the CD5+ T cell population. **D** Flow cytometry shows no loss of CD2, CD5, or CD7 on CD4+ T cells. TRBC1 expression on the CD4 T cell population is mostly negative (aberrant/clonal) while heterogeneous (normal) on the CD8 population

Data Availability The data that support the findings of this study are available from the corresponding author, JZ, upon reasonable request.

Declarations

Ethics approval This article does not contain any studies with human participants or animals performed by any of the authors.

Consent to participate For this type of study, informed consent is not required.

Consent for publication Consent for publication was obtained for every individual person's data included in the study.

Conflict of interest The authors declare no competing interests.

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