Terminal deoxynucleotidyl transferase (Tdt) and positive immunoblastic lymphoma

Terminal deoxynucleotidyl transferase (Tdt) is a specific marker for immature lymphoid cells; it is localised to the nucleus and catalyses the polymerisation of deoxynucleotide monophosphates without the use of a template. Immature lymphoid malignancies are usually Tdt positive, and mature lymphoid neoplasms such as multiple myeloma, chronic lymphatic leukaemia, Sézary’s syndrome, hairy cell leukaemia, Burkitt’s lymphoma and cell acute lymphoblastic leukaemia, are Tdt negative. A 62 year old caucasian women presented with a four month history of hip and abdominal pain and a 6 kg weight loss, which was followed by neck swelling, dysphagia, hoarseness, anorexia and itching. She had tonsillar enlargement, generalised lymphadenopathy, and a tender spleen palpable 5 cm from the costal margin. Her haemoglobin concentration was 9.6 g/dl, platelet count 246 x 10^9/L, and white cell count 5.2 x 10^9/L with a normal differential. Bone marrow aspirate was hypercellular containing 97% blasts, large cells of 20–25 μm in diameter with delicate chromatin and plentiful basophilic granular cytoplasm; most had a single large central nucleolus, some possessed two to four small nucleoli. A marrow trephine biopsy specimen showed almost complete replacement by blast cells, and a tonsil biopsy specimen showed a diffuse infiltrate of very similar cells. Serum immunoelectrophoresis indicated immunoparesis and her urine contained Ig light chain Bence Jones protein. A chest x ray picture showed there was an anterior mediastinal mass, and abdominal ultrasound scan showed severe enlargement of para-aortic lymph nodes. Intensive chemotherapy was started, but following a brief remission, the patient relapsed and died 13 months later.

The results of immunophenotyping of peripheral blood, marrow aspirate, and marrow trephine biopsy are shown in the table. Over 90% of marrow aspirate blasts were Tdt positive, and in a separate analysis of the frozen trephine biopsy specimen, over 80% of the blasts were Tdt positive. Ninety five per cent of marrow aspirate blasts stained for monoclonal surface immunoglobulin IgM κ, and 80% of blasts in a frozen trephine biopsy specimen also stained for monoclonal surface κ light chain. The trephine biopsy blast population was also positive for J5 (anti-CALLA) and over 25% of cells were positive for the proliferation marker Ki67. Both aspirate and trephine biopsy specimens were negative for T cell markers.

A recent review of published data showed that 24 cases of B cell lymphoma were all negative for Tdt, but two of 48 cases of B cell ALL described were Tdt positive. Two possible explanations were proposed.

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<th>Immunological phenotypes of blood and marrow cell populations expressed as percentage of positive cells</th>
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<td><strong>PAN T</strong></td>
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<td>Peripheral blood</td>
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<td>Marrow aspirate</td>
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<td>Marrow* trephine biopsy specimen</td>
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*The marrow aspirate contained 4% plasma cells, and the trephine biopsy specimen 5% plasma cells staining for cytoplasmic IgG λ.
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D M White, A G Smith and J L Smith

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