
CHAPTER ONE

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Pathology And Classification Of Lymphoma

Morphologic Examination And Immunophenotypic Analysis

1. Non-Hodgkin Lymphoma

1.1. B-Cell Lymphomas:-

1.1.1. Precursor B-Cell Lymphoblastic Lymphoma:-

Lymphoblastic lymphoma is a malignant lymphoma of precursor lymphocytes. Approximately 5 to 15% of Lymphoblastic lymphomas are of B-cell lineage. Although they may occur at any age, the majority of these rare lymphomas have been described in children and young adults. These neoplasms present frequently in cervical lymph nodes, bone, or the central nervous system or as skin tumors of the scalp and face [(1)].

Histologically, they exhibit a diffuse growth pattern with frequent mitoses (Fig. 1A,B) and a "starry sky" appearance. Capsular and interfollicular involvement of lymph nodes is characteristic. Cytologically, the tumor cells are small to intermediate in size with irregular nuclear borders, dispersed chromatin, and small nucleoli. [(2)].
Most B-cell lymphoblastic lymphomas are CD19, CD79a, CD10, and terminal deoxynucleotidyl transferase (TdT) positive with undetectable cytoplasmic Ig and variable expression of CD45 and CD20 [(3)].

1.1.2. Chronic Lymphocytic Leukemia and Small Lymphocytic Lymphoma:-

B-cell chronic Lymphocytic leukemia (CLL)/SLL is a neoplasm of small round B cells that usually have scant surface Ig and a $CD5^+$, $CD23^+$ phenotype. SLL is the term used to describe the disease when lymph node involvement is the dominant feature. Usually, these lymphomas present in elderly patients with a leukemic phase and generalized lymphadenopathy on routine examination. Bone marrow involvement is often extensive. Occasionally, patients present with bacterial infection related to hypogammaglobulinemia or with signs and symptoms secondary to anemia or thrombocytopenia that may have an autoimmune basis [4].

Lymph node architecture is totally effaced with loss of lymphoid follicles and obliteration of sinuses by an infiltrate of small round lymphocytes with clumped chromatin and scant cytoplasm (Fig. 2). Growth centers or proliferation centers (collections of intermediate-size round lymphocytes with open chromatin and small nucleoli called paraimmunoblasts) are dispersed throughout the lymph node and are thought to represent foci of cell proliferation [5].

On immunologic typing studies, neoplastic lymphocytes have weak or scant monotypic surface Ig, which usually is IgM associated with IgD. Neoplastic lymphocytes coexpress the nominal T-cell antigen CD5 with B-cell markers CD19, CD20 (weak); CD21, CD11c (weak); and CD23. [6]

1.1.3. Lymphoplasmacytic Lymphoma:-

Lymphoplasmacytic lymphomas are uncommon B-cell neoplasms composed of small lymphocytes, plasmacytoid lymphocytes, plasma cells, and variable numbers of large lymphocytes. These lymphomas often have marrow involvement and a leukemic phase. They are often

associated with high levels of an IgM paraprotein (Waldenstrom macroglobulinemia) or type II cryoglobulinemia [7]. Some patients have antecedent systemic or localized abnormal immune reactions, such as Sjogren syndrome [8].

Lymphoplasmacytic lymphomas are morphologically diverse and may cause diffuse or partial alteration of lymph node architecture. Many have an interfollicular distribution and abundant macrophages that may impart a mottled low-magnification appearance, resembling Hodgkin lymphoma. On high magnification, small lymphocytes are admixed with variable numbers of plasma cells, plasmacytoid lymphocytes, and admixed large lymphocytes. Other features indicating plasmacytic differentiation include Dutcher bodies (cytoplasmic Ig inclusions that appear to be intranuclear) and extracellular periodic acid-Schiff-positive material. Mast cells and hemosiderin-laden macrophages are often present. These lymphomas may transform to large cell lymphomas [9].

Tumor cells express pan-B-cell markers CD19 and CD20 and are usually $CD5^-$ [9].

1.1.4. Mantle Cell Lymphoma:-

Mantle cell lymphoma is B-cell lymphoma composed of small lymphocytes with irregular nuclear outlines that have a $CD5^+$ and $CD23^-$ phenotype and over express cyclin D1. These lymphomas are usually widespread at diagnosis with generalized adenopathy and extensive bone marrow involvement. They may involve extranodal sites, such as Waldeyer ring, or present as lymphomatous polyposis of the lower gastrointestinal tract [10]. Recognition of mantle cell lymphoma is clinically important, as these lymphomas pursue a more aggressive clinical course than other small B-cell lymphomas [11].