Chapter 10
Rare B-cell Lymphomas

Primary Mediastinal, Intravascular, and Primary Effusion Lymphoma

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10.1 Introduction

Diffuse large B-cell lymphoma (DLBCL) is the most common type of non-Hodgkin lymphoma. This group of diseases is defined pathologically by a diffuse infiltrate of large neoplastic B-cells and clinically by aggressive presentations. Variants and subtypes of DLBCL are recognized in the REAL (Real European-American Lymphoma Classification) and WHO (World Health Classifications) based on unique pathologic features and clinical presentations. Herein are described the three clinical subtypes of DLBCL.

10.2 Primary Mediastinal Large B-Cell Lymphoma

Primary mediastinal large B-cell lymphoma (PMBCL) is recognized as a unique clinical subtype of DLBCL based on distinct clinical and pathologic features and it is believed to arise from thymic medullary B-cells, suggesting a unique histogenesis (1). It accounts for approximately 2% of patients with non-Hodgkin’s lymphoma with a propensity to affect young adults. Although morphologically it resembles DLBCL, it has distinct morphologic, immunophenotypic, and genetic features. Further, it has long been appreciated that there is considerable clinical and pathologic overlap with nodular sclerosis Hodgkin’s lymphoma and recent microarray studies confirm that PMBCL nasa gene signature with striking similarities to that of classical Hodgkin’s lymphoma (CHL)(2).

10.2.1 Pathology

The tumor is composed of diffuse large cells with pale or ‘clear’ cytoplasm and variable degrees of sclerosis (Figure 10.1). PMBCL is derived from B-cells and the malignant cells express pan-B-cell antigens (CD19, CD20, CD22). However,
unlike other B-cell lymphomas, the malignant cells often lack surface immunoglobulin (sIg) (1), despite expression of the Ig coreceptor CD79a. CD30 expression is often weak and inhomogeneous in contrast to uniform and strong expression seen in classical Hodgkin’s lymphoma or anaplastic large-cell lymphoma.

The mediastinal location of PMBCL in addition to the finding of Hassall’s corpuscles and thymic lobules in some cases suggest a thymic origin. Although it is primarily a site of T-cell maturation, the thymus does contain a small number of B-cells that are positive for CD19, CD20, CD22, IgM, and lack CD21 (3). Hypermutated VH and BCL6 genes of a similar pattern have been observed in both PMBCL tumor cells and thymic B-cells, supporting derivation from the thymus and suggesting exposure to the germinal center at some point in histogenesis (4).

**10.2.2 Molecular Genetics**

Primary mediastinal large B-cell lymphoma is characterized by distinctive chromosomal aberrations, including consistent gains in chromosome 9p and 2p corresponding to JAK2 and c-REL, respectively (5, 6). Gains in chromosome 9 are highly specific for PMBCL and occur only sporadically in other B-cell lymphomas.