This special section of 10 articles focuses on the updates and diagnostic challenges in surgical pathology and cytopathology. It contains the proceedings of the sixth Chinese American Pathologists Association Diagnostic Pathology Course, which took place virtually October 10–11, 2020. We are very grateful to Alain Borczuk, MD, editor in chief; Donna Hansel, MD, PhD, former interim editor in chief; Fan Lin, MD, PhD, deputy editor in chief; and the editorial board of the Archives of Pathology & Laboratory Medicine for the great opportunity to publish this 2-part special section. We are also grateful to the course organizing committee, faculty, and contributors who made this special section possible.

The first part of the special section includes 4 articles, and concerns molecular, gynecologic, thoracic, and genitourinary pathology. Comprehensive genomic profiling by next-generation sequencing has revealed many new targetable genomic alterations and copy number variations and may help improve patient outcomes. However, these genomic changes are largely unknown to practicing pathologists. Thus, Zhang et al discuss the emerging cancer biomarkers and provide a molecular genetic update in tumors of bone, solid, soft, hematopoietic, and lymphoid tissues. Some of the markers have indeed been used by oncologists. The classification of endometrial carcinomas can be a diagnostic challenge. Immunohistochemistry (IHC) can be helpful. Moreover, 4 distinct molecular subtypes with different prognostic values have been proposed by the Cancer Genome Atlas program and are being adopted by an increased number of pathologists and oncologists. Therefore, the updates on the IHC and molecular classification of endometrial carcinoma by Wang et al are timely and clinically relevant.

Pulmonary salivary gland–type tumors (SGTs) are clinically and prognostically different from conventional lung carcinomas, but they often pose diagnostic challenges, especially in small biopsy and cytology samples, because of limited sample volume and overlapping morphology among pulmonary SGTs, metastatic SGTs of head and neck origin, and other lung tumors. In their review, Wang et al summarize the clinical characteristics, histomorphology, immunophenotypic features, and molecular alterations that are crucial for the diagnosis and differential diagnosis of various types of pulmonary SGTs. The diagnostic challenges and pitfalls that arise in the pathologic assessment of mass lesions in the adult genitourinary system, including bladder, kidney, prostate, testis, penis, and adrenal gland, are common. Jia et al provide diagnostic frameworks to evaluate these lesions in routine clinical practice, with emphasis on new pathologic variants of the tumors and IHC/molecular updates.

The second part of the special section includes 6 articles. Five articles focus on breast, liver, hematologic, bone, and pediatric pathology, and 1 concerns cytopathology. Lobular neoplasm, adenomyoepithelial lesions, papillary lesions, and fibroepithelial lesions are common diagnostic challenges in breast biopsies. Li et al summarize the late developments in and clinical management of these lesions. They also discuss important molecular and histologic characteristics for diagnostic uses. For example, MED12 mutations are seen more frequently in benign fibroepithelial lesions than in malignant phyllodes tumors. Lai et al provide an update on the histology of hepatic steatosis, steatohepatitis, and associated conditions, with a focus on differential diagnosis. They also elaborate on the fatty liver diseases due to metabolic dysfunction and other etiologies, including newly developed immune checkpoint inhibitors and viral infections such as coronavirus disease 2019 (COVID-19). Their concise yet updated review on fatty liver disease also emphasizes the importance of clinicopathologic correlation.

The 2017 World Health Organization classification of tumors of hematopoietic and lymphoid tissues reclassified some mature T-cell lymphomas and recognized a few new/provisional entities. It is thus necessary to understand these changes. Zhang et al review the useful diagnostic approaches for these reclassified and new entities, including T–follicular helper cell lymphoma, ALK-negative anaplastic large cell lymphoma, breast implant–associated anaplastic
large cell lymphoma, gastrointestinal T-cell lymphomas, and indolent T-cell lymphoproliferative disorder of the gastrointestinal tract (provisional entity).

Vascular tumor of the bone is composed of a heterogeneous group of lesions derived from neoplastic proliferation of endothelial cells. Most benign tumors involve the vertebral column, such as hemangioma, and are asymptomatic. Clinically significant neoplasms are infrequent. The benign tumors are indolent, whereas the locally aggressive and malignant tumors warrant special medical attention. Zhang et al review the current knowledge on the molecular genetic changes in vascular tumors of the bone and emphasize that ancillary tests, including IHC, fluorescence in situ hybridization, and next-generation DNA and RNA deep-sequencing assays, can now be used to improve the diagnostic accuracy of these rare tumors.

Rhabdomyosarcoma (RMS) is the most common soft tissue sarcoma of childhood and adolescence, comprising 50% of pediatric soft tissue sarcomas. Based on recent molecular genetic knowledge and morphologic features, RMSs are classified into 4 subtypes: embryonal RMS, alveolar RMS, spindle cell/sclerosing RMS, and pleomorphic RMS, with distinct clinical behavior. Fan et al point out in their review that genetic testing now plays an important role in diagnosis, management, and prognosis of RMS. The status of PAX-FOXO1 fusion genes, a predictor of poor outcome, has become widely used in the pathologic diagnosis of RMS and incorporated into standard risk stratification and therapy assignment. Surrogate IHC markers are a useful tool in determining fusion gene status when molecular testing is unavailable.

To better classify mediastinal tumors/lesions based on cytology, Xu et al share their experiences and useful IHC markers for thymic epithelial neoplasms, mediastinal lymphoproliferative disorders, germ cell tumors, neuroendocrine tumors, soft tissue tumors, and metastatic tumors. They also discuss differential diagnoses and diagnostic pitfalls. Two handy summary tables may help practicing pathologists when needed.

We hope readers will find this special section informative and relevant to their daily practice. Again, we sincerely appreciate this opportunity to share our experiences and the support of the editorial board of the Archives of Pathology & Laboratory Medicine.
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