Original Article

Pitfalls of FNA Diagnosis of Thymic Tumors

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BACKGROUND: Fine-needle aspiration (FNA), a minimally invasive and cost-effective procedure, often is used in the initial diagnosis of thymic lesions. However, the diagnosis can be challenging. Knowledge of the diagnostic pitfalls is important to improve diagnostic accuracy. **METHODS:** The authors retrospectively searched the pathology database of The University of Texas MD Anderson Cancer Center for FNA cases using the keywords "thymoma" or "thymic" in cytologic diagnoses or in corresponding final histologic diagnoses rendered from January 2002 to June 2018. The authors reviewed the FNA diagnostic accuracy and pitfalls in comparison with the final histologic diagnoses. **RESULTS:** A total of 118 FNA cases were identified from 115 patients. The FNA diagnoses were concordant with the final pathologic diagnoses in 110 cases (93.2%), including thymoma (97 cases), atypical thymoma (5 cases), and thymic carcinoma (8 cases). Discrepant FNA and final diagnoses were noted in 8 tumors (6.8%): thymoma versus atypical thymoma/thymic carcinoma (3 tumors), thymoma versus lymphoma (2 tumors), suspicious for lymphoma versus thymoma (1 tumor), and T-lymphoblastic lymphoma versus thymoma (2 tumors). Factors contributing to misinterpretation included intrinsic limitations of the FNA sample (sampling error and a lack of histologic architecture information) and similarities of the cytologic and immunophenotypic features of lymphocyte-rich thymoma and T-lymphoblastic lymphoma. **CONCLUSIONS:** An accurate FNA diagnosis of thymic tumors can be rendered in the majority of cases. Diagnostic pitfalls can be encountered in rare cases. It is important to handle each case carefully to avoid erroneous diagnoses that may lead to inappropriate treatment. ***Cancer Cytopathol* 2020;128:57-67**.

KEY WORDS: fine-needle aspiration (FNA); lymphoma; thymic carcinoma; thymoma.

INTRODUCTION

Fine-needle aspiration (FNA) is a minimally invasive and cost-effective procedure and thus often is used as an initial sampling method for lesions located virtually anywhere in the human body. Although uncommon, FNA of thymic tumors can be encountered in cytology practice, and the diagnosis can be challenging.[1]

The thymus is a lymphoepithelial organ located in the anterior mediastinum and is essential for the maturation of T lymphocytes. Among the primary neoplasms that develop in the thymus, thymic epithelial tumors (predominantly thymoma) are the most commonly encountered, followed by lymphomas, germ cell tumors, and neuroendocrine tumors.[2,3] Histologically, thymic epithelial tumors often demonstrate jigsaw puzzle–like lobules separated by acellular fibrous bands. The cellular components comprise neoplastic epithelial cells (either epithelioid or spindle) admixed with highly variable percentages of reactive polymorphous lymphoid cells (ie, thymocytes) with mature and immature T-cell phenotypes. Epithelial meshwork forms the scaffolding for lymphocytes. For the classification of thymic epithelial tumors in surgical pathology diagnoses, different classification systems (such as World Health Organization schema and the Suster-Moran classification) have been used

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