Sclerosing Mucoepidermoid Carcinoma with Eosinophilia: Characterization of a Rare Distinct Entity

Erik Ames, Ph.D.[1], Michael J. Campbell, M.D.[2], Alaa Afify, M.D.[1], Jeffrey F. Krane M.D., Ph.D.[3] and Eric C. Huang, M.D., Ph.D.[1]

[1]University of California, Davis Medical Center, Department of Pathology and Laboratory Medicine, Sacramento, CA 95817, USA; [2]University of California, Davis Medical Center, Department of Surgery, Sacramento, CA 95817, USA; [3]Brigham and Women's Hospital and Harvard Medical School, Department of Pathology, Boston, MA 02115, USA

ABSTRACT

Sclerosing mucoepidermoid carcinoma with eosinophilia (SMECE) is an extremely rare thyroid carcinoma with limited cytologic descriptions in the literature. Here we present a 52-year-old woman with a 3.9 cm thyroid nodule. Fine needle aspiration smears consisted of a highly cellular specimen with tumor cells in isolated patterns and solid squamoid nests. Tumor cells had round to oval nuclei, prominent nucleoli, smooth nuclear contours and moderate amounts of dense cytoplasm. In addition to the polymorphous population of lymphocytes, the background contained a striking abundance of eosinophils. The subsequent right thyroidectomy showed histologic features diagnostic for SMECE.

INTRODUCTION

Sclerosing mucoepidermoid carcinoma with eosinophilia (SMECE) of the thyroid was first described by Chan and colleagues in 1991 as a distinct entity which occurs in a background of chronic lymphocytic (Hashimoto's) thyroiditis[1]. It is an exceedingly uncommon entity with fewer than 20 articles available in the English literature to date. SMECE occurs predominantly in middle-aged women typically as a single nodule confined to a unilateral thyroid lobe. The defining histologic features of SMECE include squamoid and mucoid cells with eosinophilic infiltrate and fibrosis in a setting of chronic lymphocytic thyroiditis. A recent study demonstrated that these tumors are distinct from mucoepidermoid carcinoma of the salivary gland, based on both histologic appearance and genetic analysis: SMECE uniformly lacks the *MAML2* rearrangement which is seen in roughly two-thirds of mucoepidermoid carcinomas. While these tumors typically follow an indolent course, they can be locally aggressive[4]. In addition, extrathyroidal spread and metastasis have been reported.

Given the uncommon nature of SMECE, the majority of studies have described the histologic features of this unique tumor, though limited cytomorphologic descriptions exist in the literature[9-11]. Here we report the cytologic characteristics from fine-needle aspiration (FNA) smears and correlate with the histologic findings of this rare disease.

CASE AND RESULTS

A 52-year-old woman with no significant past medical history was incidentally noted to have an enlarged right thyroid on a routine physical exam. The patient was asymptomatic and euthyroid, with a TSH of 1.72 mIU/L. An initial FNA at an outside hospital was unsuccessful, and a repeat FNA was interpreted as chronic lymphocytic thyroiditis. The patient remained asymptomatic and euthyroid but her follow-up ultrasound revealed 30% growth of the nodule (Fig. 1). A repeat FNA was performed.

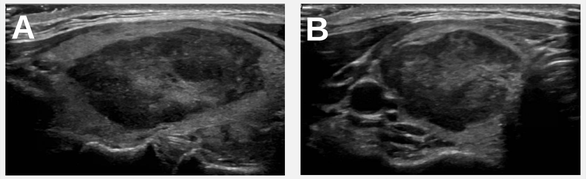


Figure 1. Long-axis (A) and short-axis (B) ultrasonographic appearance of right thyroid nodule measuring 3.9 x 2.0 x 3.1 cm and demonstrating irregular contours and heterogeneity of the nodule.

The FNA smears were highly cellular and consisted of tumor cells in clusters or singly in a background of a polymorphous population of lymphocytes. Cytologically, the tumor cells were round to polygonal with overlapping, enlarged round to oval nuclei, prominent nucleoli, fine chromatin, smooth nuclear contours, and rare nuclear grooves (Figs. 2A and 2B). Tumor cells had indistinct cytoplasmic borders and moderate amounts of dense cytoplasm (Fig. 2B). The cohesive clusters showed areas of squamous differentiation (Fig. 2C). Most strikingly, abundant eosinophils were noted in the background (Fig 2D). The FNA was interpreted as a follicular lesion of uncertain significance.

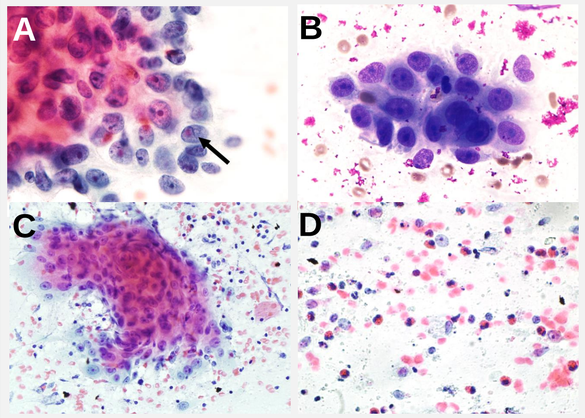


Figure 2. Fine-needle aspiration cytology shows (A) enlarged round to oval nuclei with prominent nucleoli, fine chromatin, smooth nuclear contours, occasional nuclear groove (arrow) [Papanicolaou stain, 1000x)] and (B) dense granular cytoplasm [Diff-Quik stain, 1000x]. (C) Frequent squamoid nests were present [Papanicolaou stain, 400x]. (D) The background displayed numerous eosinophilia and polymorphous lymphocytes [Papanicolaou stain, 400x].

CASE AND RESULTS (continued)

Gross and Histologic Findings

During the surgery, the thyroid was noted to be extremely inflamed with numerous heterogeneous nodules. The 21.1 gram right thyroid contained a 3.9 cm dominant nodule occupying the entire upper to mid pole. This nodule was firm, well-circumscribed, tan-white and homogeneous in appearance (Fig. 3A). The nodule abutted the surgical margins without gross involvement.

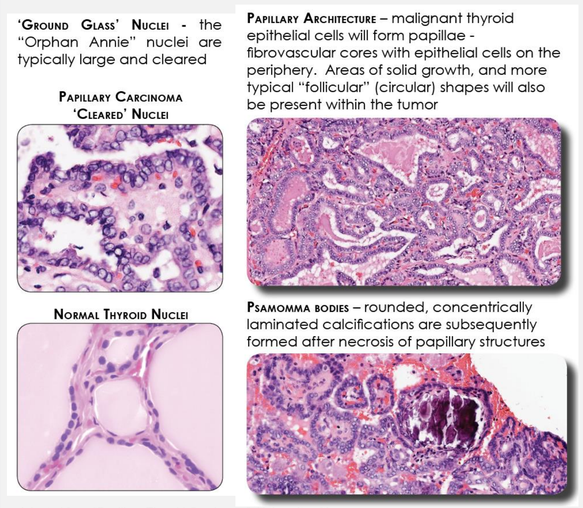
Histologically, the tumor consisted of variably-sized nests within a dense, fibrous stroma (Fig. 3B). Higher magnification revealed numerous eosinophils within the stroma surrounding well-circumscribed clusters of tumor cells (Fig. 3C). Squamous differentiation with keratin pearls was present (Fig. 3D) as well as goblet cells and mucous pools within the nests (Figs. 3E and 3F). The uninvolved thyroid demonstrated chronic lymphocytic thyroiditis. A definitive diagnosis of SMECE was established.

Figure 3. (A) Gross photograph showing a representative mid-pole section of right thyroid with a well-circumscribed, tan-white, firm nodule confined to the thyroid. The histology consists of (B) extensive fibrosis [H&E, 100x], (C) solid nests of squamoid tumors [H&E, 400x], (D) keratin pearls [H&E, 400x] and (E) mucin-secreting cells [H&E, 400x]. (F) Variably-sized mucin pools were found throughout the tumor [H&E, 200x]. Prominent eosinophils can be seen in the background.

CONCLUSIONS

Sclerosing mucoepidermoid carcinoma with eosinophilia is an exceedingly unusual malignancy of the thyroid. Histologically, the tumor is composed of squamoid and mucin-secreting cells in a fibrous stroma rich in eosinophils and in a background of chronic lymphocytic (Hashimoto's) thyroiditis. The cytological features of SMECE recapitulate its histologic features quite well, though cytology alone may be difficult to make a definitive diagnosis. The main cytologic characteristics of SMECE in our case included hypercellularity, oval to round nuclei, prominent nucleoli and rare nuclear grooves. Some clusters showed squamous differentiation with scattered keratin pearls. The background contained abundant eosinophils and lymphocytes.

It is important to cytologically differentiate SMECE from other thyroid neoplasms for prognostication and treatment purposes. While SMECE shows occasional grooves and has been reported to contain intranuclear inclusions, nuclear contours in SMECE are quite smooth and lack the pale chromatin typical of papillary carcinoma. Architecturally, SMECE consists of single isolated cells and nests of tumor cells, rather than microfollicles; thus, follicular neoplasm can be excluded. However, this architectural pattern may be suggestive of medullary carcinoma. Fortunately, calcitonin staining is absent in SMECE. Conventional mucoepidermoid carcinoma (MEC) of the thyroid should also be considered along with SMECE in the presence of squamoid and mucous cells. However, MEC lacks the dense eosinophilic infiltrate and typically displays more mucinous cells. Additionally, MEC is less likely to occur in a background of Hashimoto's thyroiditis. SCC may also be considered in cases where mucous cells are rare. Here, SCC can be identified by its more prominent atypia and mitotic activity. Again, eosinophils would not be as pronounced.



Adapted from "Papillary Thyroid Carcinoma". University of Iowa.
https://medicine.uiowa.edu/iowaprotocols/papillary-thyroid-carcinoma