Prognosis, Incidence, and Management of Tall Cell Variant Papillary Thyroid Carcinoma

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Abstract

Well-differentiated papillary thyroid carcinoma (PTC) is the most common subtype of thyroid cancer. Papillary microcarcinoma is defined as a PTC lesion that is less than 1 cm. In general, papillary thyroid carcinomas are non-aggressive. However, certain variants of PTC, particularly tall cell variant (TCV), microcarcinoma, and poorly differentiated thyroid carcinoma confer differing incidence and associated risk factors. Preliminary analysis of our local Roswell Park Cancer Institute population suggest that we have a higher incidence of tall cell variant papillary thyroid carcinoma compared to the national average. We also note intra-tumoral heterogeneity of thyroid tumor lesions. In this retrospective cohort study, we examine demographic, clinical, pathological, and radiological data to identify risk factors associated with the presumptive elevated incidence. We propose that core needle biopsy pathology is more effective than fine needle aspiration cytology in identifying and properly classifying thyroid tumors. We hypothesize that ultrasound contributes to tumor surveillance even in the presence of low thyroglobulin, and that PTC, which are 1 to 2 cm in size, should undergo active surveillance. In the case of poorly differentiated thyroid carcinomas, we suspect that management with iodine radiation will confer differing overall survival when compared to external beam radiation. Overall, the results of this study have the potential to have major implications in our practice and understanding of the incidence, prognosis, and management of TCV, microcarcinoma, PTC and poorly differentiated thyroid carcinoma.

Introduction

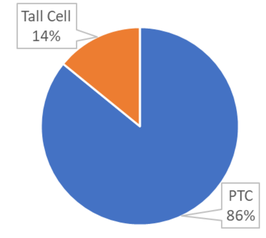
Well-differentiated papillary thyroid carcinoma (PTC), the most common endocrine malignancy, exists in multiple variants. Classical, conventional variant, follicular variant, and clear cell variant papillary thyroid tumors confer a low risk of metastasis or recurrence and have a good prognosis (1). PTC less than 1 cm in size are papillary thyroid microcarcinoma and confer a more benign phenotype. More aggressive and infrequent variants such as diffuse sclerosing variant (DSV), tall cell variant (TCV), columnar cell variant (CCV), solid variant (SV), or hobnail variant (HV), however, have a poor prognosis (2,3). Among these aggressive PTC variants, TCV is the most common. As its name suggests, tall cells distinctively have a height at least three times its width. TCV classification is ascribed to papillary thyroid tumors with 10-75% tall cells or tall cell features (2-4). The incidence for TCV is still under investigation and is cited to range from 1.3% to 13% of PTC (5). To diagnose papillary thyroid carcinoma, biopsy or cytology is typically done. Based on the findings, active tumor surveillance via ultrasound or thyroglobin levels, and or intervention is recommended (6-9). Historically, fine needle aspiration (FNA) was performed to assess the cellular features. Depending on the sampling, FNA accurately identifies thyroid malignancy; however, in many cases, FNA findings are inconclusive (10-12). Several institutions, including Roswell Park Comprehensive Cancer Center, presently evaluate the tissue architecture and cellular component of thyroid nodules by performing core needle biopsy and smears. Core needle biopsy has been shown to have a lower non-diagnosis result rate, when compared to FNA (11,12). Preliminary analysis of our local Roswell Park Cancer Institute population suggest that we have a higher incidence of tall cell variant papillary thyroid carcinoma compared to the national average. Accurate assessment of these variant pathologies is critical to treatment planning since the variants differ in their aggressiveness and prognosis.

Methods

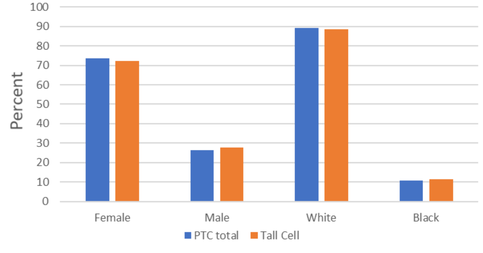
- ❑ We designed a database to capture many variables (110) for our patients diagnosed with PTC between 2014-2016 (n=95). This retrospective database will allow us to address the multiple related questions described above.
- ❑ Data were extracted from the Roswell electronic health record via SQL query and manual extraction.
- ❑ The data were assembled into an SPSS database for demographic, frequency and survival analyses

Results

A



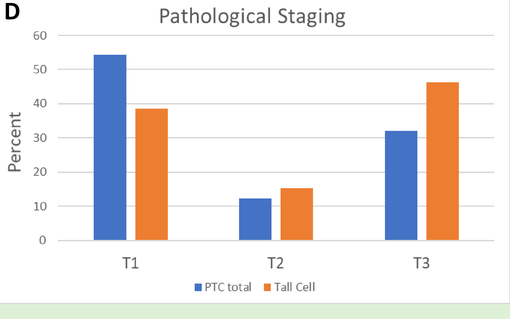
B



C

	PTC Total [mean (SD)]	Tall Cell [mean (SD)]
Age at Surgery	52 (14.3)	56.2 (14.8)
BMI	31.4 (7.3)	32.3 (7.1)

D



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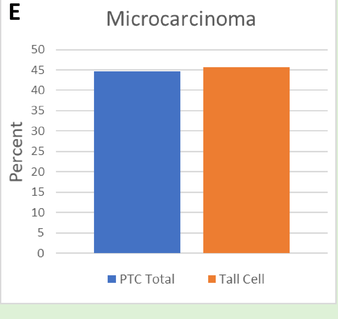

Conclusions

- ❑ We found that 14% of the PTC patients treated by Head and Neck Surgery department between 2014 to 2016 had tall cell variant pathology. This is consistent with the upper limit of TCV reported in the literature.
- ❑ Demographic distributions were very similar between these two populations.
- ❑ Tall cell variant patients had a higher incidence of advanced staging at diagnosis
- ❑ Microcarcinoma incidence was similar between PTC and TCV in this cohort.

Future Directions

- ❑ Further analyses of PTC variants in our population, including assessment of the incidence of partial vs total thyroidectomy, multifocal tumors, use of adjuvant therapy and recurrence.

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