Is True Follicular Thyroid Cancer Much Rarer Than Previously Reported?

Kristen J. Otto, MD,1 Jacqueline S.C. Lam, MBBS,1 Christina MacMillan, MD,2 Jeremy L. Freeman, MD, FRCSC, FACS1

1. Department of Otolaryngology - Head and Neck Surgery, University of Toronto, Mount Sinai Hospital, Toronto, Ontario
2. Department of Laboratory Medicine and Pathobiology, University of Toronto, Mount Sinai Hospital, Toronto, Ontario

Objective: Follicular thyroid carcinomas have been traditionally reported to represent 10-15% of all thyroid malignancies, while papillary cancers have been reported as approximately 80%. The problem with these figures is that they fail to account for changing diagnostic criteria and incidence patterns among papillary cancers. A review of multiple large, long-term, cross-sectional cancer registries (NCD, SEER) demonstrates that the incidence of papillary thyroid cancer has risen 2.4-fold over the last 30 years. Also, the histologic criteria required for making the diagnosis of papillary cancer, and differentiating the follicular variant of papillary from true follicular carcinoma have undergone a tremendous evolution. We aim to document the true proportion of follicular thyroid cancers in a cohort from a high-volume academic head and neck endocrine surgery practice.

Patients and Methods:

Record Review - A review of all patients undergoing thyroidectomy between January 2006, and December 2007, was performed retrospectively. Patients included were those whose final pathology revealed a primary thyroid malignancy. Charts were analyzed for demographic information, surgical details, and final diagnosis. Thyroid cancers were classified into major subtypes: papillary, follicular, Hurthle cell, medullary, and undifferentiated/anaplastic. Papillary carcinomas were further subclassified into seven variants: classic, follicular, tall cell, insular, oncocytic, cystic, and microcarcinoma. Totals and proportions were calculated and compared to previously reported historical controls (SEER, NCD).

Histopathologic Diagnostic Criteria – All specimens were reviewed by one of eight pathologists with experience in FNA thyroid cytology and thyroid pathology. Standard criteria for follicular carcinoma diagnosis (capsular or vascular invasion) were applied. For encapsulated follicular neoplasms without capsular invasion, nuclei were examined for nuclear features of papillary carcinoma including crowding, fine pale chromatin or optically clear nuclei, micronucleoli, grooves, pseudoinclusions, membrane irregularity, hard colloid, irregular follicles, psammoma bodies, or small abortive papillae. When identified, these lesions were classified as papillary carcinomas of follicular variant.

Results: 258 of 740 (34.9%) patients had a diagnosis of primary thyroid malignancy. Papillary carcinoma was diagnosed in 243 (94.2%) of 258 cases. An additional 9 (total 252/258, 97.7%) cases showed multifocal papillary microcarcinomas amidst other dominant carcinoma subtypes. The other diagnoses were as follows: 5 (1.9%) cases of medullary, 7 (2.7%) cases of follicular, 2 (0.8%) cases of Hurthle cell, and 1 (0.3%) case of anaplastic (figure 1). The most common papillary carcinoma variant was the follicular variant; identified in 125 of 252 (49.6%) cases. The other variants included 98 (38.9%) cases of classical, 4 (1.6%) cases of tall cell, 2 (0.8%) cases of insular, 9 (3.6%) cases of oncocytic, 2 (0.8%) cases of cystic, and 12 (4.8%) cases of papillary microcarcinoma.

Conclusion: We identified 7 cases (2.7%) of true follicular thyroid cancer in 258 total thyroid malignancies. Both SEER and the NCD were reviewed for reference values. As reported in the NCD, follicular cancers accounted for 13% of thyroid malignancies between 1985 and 1995. SEER reported follicular carcinomas as 6.7% of the total thyroid malignancy cohort between 2001 and 2005. The discrepancy in past reported values and true current proportions (figure 2) of thyroid malignancies likely has several explanations. First, the increasing incidence of thyroid malignancies documented by SEER since 1973 is solely attributable to papillary carcinomas. Pathologists have also recognized that nuclear features required to make a diagnosis of papillary carcinoma can be present in a multi-focal pattern, often merging with otherwise benign-appearing nuclei. With enough scrutiny, a papillary carcinoma diagnosis can be established in many lesions previously classified as follicular carcinomas. There are potential prognostic and epidemiologic implications to this shift in proportions as follicular cancers have been associated with a more aggressive course. Over time, this change in expected proportions may be associated with a change in overall outcomes, particularly among the various papillary carcinoma variants.

†NCD – National Cancer Database. A joint program of the Commission on Cancer and American Cancer Society that captures nearly 75% of all new cancer diagnoses in the United States.
††SEER – Surveillance Epidemiology and End Results. A database maintained by the National Cancer Institute that captures 26% of all newly diagnosed cancers in the United States.