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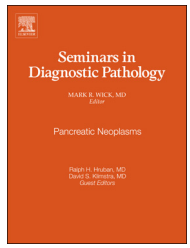

Terminology and nomenclature schemes for reporting thyroid cytopathology: An overview

Jennifer Collins, DO, MPH[a], *Esther Diana Rossi, MD, PhD, MIAC*[b], *Ashish Chandra, MD, FRCPath, DipRCPath (Cytol)*[c], *Syed Z. Ali, MD, FRCPath, FIAC*[d,*]

[a]*Department of Pathology, University of Maryland Medical Center, Baltimore, Maryland*
[b]*Division of Anatomic Pathology and Histology, Policlinico Agostino Gemelli, Univerista Cattolica del Sacro Cuore, Rome, Italy*
[c]*Cellular Pathology, St. Thomas' Hospital, London, UK*
[d]*The Johns Hopkins Hospital, 600 North Wolfe St, Rm PATH 406, Baltimore, Maryland 21287*

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ABSTRACT

The clinical management of thyroid nodules begins with a cytologic diagnosis. Current multidisciplinary approaches to thyroid nodule management rely on clear and concise diagnoses that can be reliably and reproducibly interpreted across institutions. Ultimately, this clinical necessity has led to multidisciplinary bodies throughout the world to develop standardized reporting formats which have themselves evolved over time. Herein we review the three major international nomenclatures for reporting thyroid cytopathology, including, the British Thyroid Association and Royal College of Pathologists (Thy), the Italian Consensus (TIR) and the Bethesda System for Reporting Thyroid Cytopathology. Alignment of these three diagnostic terminologies and the emergence of a single internationally agreed upon one has the potential to lead to more succinct, evidence-driven clinical management algorithms.

Introduction

Fine-needle aspiration (FNA) cytology of the thyroid has been performed for over 60 years and is currently the procedure of choice in the initial management of patients with suspicious thyroid nodules.[1,2] FNA evaluation of thyroid nodules for malignancy has been shown to be the most cost-effective and minimally invasive procedure in the patient's initial clinical management.[3–5] Therefore, it is not surprising that the total number of thyroid FNAs has increased over time.[6,7] Currently, the clinical management of thyroid nodules begins with a cytologic diagnosis. In the recent past, reporting of thyroid FNA results has been inconsistent and non-reproducible, with reporting systems varying at the regional as well as institutional levels. The establishment of multiple reporting systems resulted in highly variable diagnoses, which ultimately caused significant confusion for clinicians. However, the multidisciplinary nature of thyroid nodule management relies on clear and concise diagnoses that can be reliably and reproducibly interpreted from institution to institution. This climate placed significant pressure on the cytology community to recognize the importance of reporting scheme terminology, specifically, concerning its clinical implication. Therefore, it has been in the interest of multidisciplinary teams to create

* *Corresponding author.*
E-mail address: sali@jhmi.edu (S.Z. Ali).

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diagnostic terminology of thyroid cytology that is more standardized and unified. Many authors, within this time period, explored the culture of reporting systems and their value. Two clear deficiencies arose from this body of literature: (1) the lack of standardization in terminology is a hindrance at the level of both pathologic evaluation/correlation as well as clinical decision-making and (2) the unmet need to directly relate the cytopathologic diagnosis, i.e., the positive predictive value of a diagnosis, to the clinical management.[8–10] Ultimately, this recognition led multidisciplinary bodies throughout the world to develop standardized reporting formats, which have themselves evolved over time.[11–13]

Origins of thyroid terminology

In 2007, an NCI-driven conference in the U.S. with more than 150 experts from both pathology and endocrine professional organizations deliberated for two days to generate recommendations and guidelines for thyroid disease diagnosis and management.[14] One important and anticipated outcome from this meeting was the framework for the subsequently published Bethesda thyroid monograph.[11,15] As a result of enormous efforts from over 40 well-known international experts from various disciplines, the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) was created in January 2010 (TBSRTC). The format includes definitions, diagnostic/morphologic criteria, and a brief management plan for each diagnostic category. Six discrete diagnostic categories (DC I–VI) were generated and correlated with the positive predictive value of diagnosing malignancy.[11] This diagnostic scheme allowed for a clinical interpretation and subsequent management algorithm for each of these categories. Thus, for the first time, in a non-gynecologic setting, a multidisciplinary approach formulated a definitive, finite group of diagnostic categories that could be correlated with a clinical management plan.[11,16,17]

In contrast, the UK did have a terminology in existence since 2002, proposed initially by the British Thyroid Association (BTA) and Royal College of Physicians (RCP).[18] This terminology, commonly referred to as the Thy categories (Thy1–5), was recommended along with a descriptive diagnosis and released within their published guidelines.[18] However, this nomenclature was not widely used, and much like the U.S, thyroid cytology reports were in prose only or in prose with allocated laboratory-specific categories. In 2007 (second edition of BTA/RCP guidelines), a subdivision of the original Thy3 was proposed. This was a heterogeneous category utilized for specimens that were equivocal or indeterminate for neoplasia and was subdivided into Thy3(i) and Thy3(ii) categories.[12] This subdivision would allow distinction between a follicular lesion/suspected follicular neoplasm [Thy 3(i)] and those specimens with "worrying findings" that cannot be feasibly placed into Thy2 or Thy4 [Thy3(ii)].[12] The Royal College of Pathologists (RCPath) further edited the Thy reporting system in 2009 to clarify this subdivision more succinctly into Thy3a and Thy3f categories, respectively.[19] This change in the reporting system coincided with the release of TBRSTC from the 2007 NCI conference.[12] Additionally, it proposed the subdivision of the non-diagnostic category to separate out cystic lesions with insufficient colloid or cellularity (Thy1c) in order to distinguish these from operator-dependent non-diagnostic aspirates. A subdivision of the non-neoplastic category was also proposed to separate out cystic lesions with abundant colloid but insufficient cellularity (Thy2c) although the evidentiary basis for this category was lacking. According to one article, these changes appeared to "squeeze the old BTA 'Thy' categories into the new Bethesda categories."[20]

Shortly thereafter, the European Federation of Cytology Societies (EFCS) thyroid-working party symposium met, which included representatives from 14 countries, to discuss the need for standardization of thyroid FNA nomenclature.[20] The outcome was an agreement among all members but one that there was a necessity for international standardization, with only a third wanting to adopt TBSRTC. The majority favored translation of their country-specific terminology to TBSRTC, as was the case for the UK.[20] The recent release (2014) of the third edition of the BTA/RCP guidelines for the management of thyroid cancer endorsed the RCPath terminology scheme, stating that it should be reported in adjunct to the full-text report.[21] Additionally, this edition's guidelines recognize, specifically, the correlative value these categories have with TBSRTC, thus allowing for direct comparison between these two systems.[21]

The Italian Society for Anatomic Pathology and Cytology with the Italian Division of the International Academy of Pathology (SIAPEC-IAP) met in 2007 in part to address diagnostic terminology and "define consensus on the definition of each individual diagnostic category."[13] The proposed five diagnostic categories were described, TIR1–5, and accordingly, this system has been broadly used since its inception.[22] Subsequently, in 2012, the Italian Societies of Endocrinology appointed a panel of experts to update their consensus to align with the recommendations from the 2009 EFCS symposium.[22] The original five-tier diagnostic terminology defined a single indeterminate category, TIR3, to include "all follicular-patterned lesions."[13] In similar fashion to the RCPath guidelines, the Italian consensus utilized an evidence-based system to incorporate the quality of the evidence for the basis of their recommendations. The TIR system was maintained; however, the classification categories were expanded so that the TIR3 was subdivided into A (low-risk indeterminate lesions) and B (high-risk indeterminate lesion). These updates to the TIR terminology were made as an attempt to reduce the rate of surgery for benign disease as well as become comparable to internationally recognized systems, including TBSRTC and RCPath.[11,22]

International unification of terminology

Currently, all three systems have evolved to utilize a tiered system, which functionally are equivocal. This, in fact, was the intent of the updates to both the BTA/RCP and the Italian consensus based on the findings from the development of TBSRTC.[22,23] The criteria for the diagnostic categorization for TBSRTC was constructed on the basis that each discrete category had an associated positive predictive value for malignancy.[17] The intent of this design was to create a