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Original Investigation

Effect of Implementing Community of Practice Modified Thyroid Imaging **Reporting and Data System on Reporting Adherence and Number of Thyroid Biopsies**

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Rationale and Objectives: Thyroid nodules are common in the population, although the rate of malignancy is relatively low (5%-15%). The purpose of this study was to determine if introducing a modified standardized reporting format and management algorithm (Thyroid Imaging Reporting and Data System [TI-RADS]) affects radiologist reporting adherence, number of thyroid biopsies, and other measurable outcomes.

Materials and Methods: All thyroid biopsies performed over two 6-month periods were evaluated at a tertiary care hospital with Research Ethics Board approval. The first period was before implementation of TI-RADS and the second was several months after implementation of TI-RADS (using a modified version made through a multidisciplinary collaboration). The number of biopsies performed was determined in each of the two periods as well as the percent of positive malignancy, wait times, and rates of nondiagnostic/unsatisfactory and inconclusive biopsies, which included atypia of undetermined significance (AUS) and follicular lesion of undetermined significance (FLUS).

Results: The average number of biopsies performed prior to implementing modified Kwak's TI-RADS was 74 thyroid biopsies per month and the average number of diagnostic ultrasounds was 271. After the introduction of modified Kwak's TI-RADS, the average number of thyroid biopsies decreased to 60 per month (an 18.9% reduction, P < .05), and the number of diagnostic ultrasound increased to 287 per month (a 5.9% increase from 2016 to 2017). The average wait time for a thyroid biopsy decreased from 5 to 3 weeks (P < .05). There was a slight increase in the rate of positive malignancy results (from 15% to 18%), although it was not statistically significant. The rate of non-diagnostic/unsatisfactory and inconclusive results (including AUS and FLUS) remained unchanged (18% AUS/FLUS/15% non-diagnostic/unsatisfactory before and 17% AUS/FLUS/15% non-diagnostic/unsatisfactory after TI-RADS introduction, P > .05).

Conclusions: Introduction of a multidisciplinary-approved standardized reporting system with evidence-based management recommendations led to no statistically significant change in the number of diagnostic ultrasounds but a statistically significant reduction in the number of monthly thyroid biopsies and associated reduction in wait times.

Key Words: TI-RADS; thyroid nodules; biopsy; quality assurance; standardization.

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INTRODUCTION

T tudies have estimated that up to 67% of North Americans have thyroid nodules but that of these nodules only 5%–15% will be malignant (1). There has been a 2.4-fold increase in the incidence of thyroid cancer in the past 30 years; this increase in diagnosis is commonly considered to result from better technology and more frequent use of cross-sectional imaging (1-3). Despite an increase in overall thyroid diagnosis, the 5-year mortality rate for thyroid cancer has been stable at a relatively low 5%-7% since 2005 (4). Some studies estimate that up to 50% of thyroid cancers will remain indolent over a patient's life time (3,5,6).

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With more thyroid nodules being detected, emphasis should be placed on consistent imaging technique, template reporting use, and standardized management recommendations by radiologists. One of the main challenges in this sequence of events is determining which nodules require biopsy and which ones are better left alone (Fig 1). A further concern is discerning which *part* of heterogenous nodules requires biopsy (Fig 1).

The overarching goals of standardization include optimizing patient care and improving communication between health care providers. Setting up quality assurance projects can help assess consistent use of imaging techniques, use of a standard lexicon of imaging, and adoption of a consistent reporting structure to ensure that all requesting physicians receive useful information. Implementation of standardization also makes for easier data mining for future research. A system that follows all of these steps may have the desired effect of increasing efficiency and potentially lessening the financial burden on the health care system (7). The breast imaging reporting and data system is an example of a successful endeavor for standardization and is now a mandated reporting system around the world (8).

Kwak et al. sought to implement a similar standardized model for thyroid nodules with the release of the Thyroid Imaging Reporting and Data System (TI-RADS) in 2011. An updated version endorsed by the American College of Radiology (ACR) was released in 2017 (9,10). At our tertiary care hospital, we implemented a modified version of Kwak's TI-RADS, which we called the "Community of Practice (COP)-modified TI-RADS," with the consultation of our multidisciplinary team (who had initially preferred the American Thyroid Association [ATA] guidelines), and sought to analyze radiologist adoption and adherence to these changes using a Plan—Do— Study—Act (PDSA) cycle (Fig 2). We also sought to determine if implementation of TI-RADS affected the number of biopsies, biopsy wait times, positive thyroid malignancy rates, and non-diagnostic/unsatisfactory and AUS/FLUS rates.

METHODS

Data were gathered between two distinct time periods: before (January–August 2015) and after (January–August 2016)

Figure 1. Thyroid nodule to the left shows heterogenous components (long arrow cystic, short arrow solid) while the nodule to the right shows a homogenous component.



Figure 2. Outline of the integration of TIRADS using a PDSA cycle.

TI-RADS implementation. In total, there were 1063 biopsies over the entire study period in both male and female adults (>18 years old) referred to our institution. Data acquired included information from the thyroid ultrasound images, the initial diagnostic thyroid ultrasound reports (ie, what characteristics were mentioned before Kwak's TI-RADS, and use of TI-RADS scoring), and pathological data (ie, final pathological report) for every thyroid fine-needle aspiration biopsy (FNAB).

During the course of this study, our academic hospital modified Kwak et al.'s original TI-RADS framework with contribution from a multidisciplinary collaboration in our hospital consisting of our COP. This collaboration comprised radiologists, pathologists, otolaryngologists, and endocrinologists. The result was what we called the "COP-modified TI-RADS" score; specifically, there was an addition of categories 4F and 4B (Table 1). Within this COP-modified TI-RADS system, a TI-RADS score of 1 constituted a normal gland. A TI-RADS score of 2 was a benign nodule, while TI-RADS 3 was a probably benign nodule. TI-RADS 4A, B, B*, C, and F showed suspicious features; categories A, B, and Download English Version:

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