Structured Thyroid Ultrasound Reports

Clear Communication Improves Management

Corey J. Hiti, MD[1]
Wendy Yang, MD[2]
Michael Campbell, MD FACS[2]
Thomas Loehfelm, MD PhD[1]
UC Davis Medical Center
[1]Department of Radiology, [2]Department of Endocrinology
Sacramento, California

Background

Dr. Preston Hickey, an early editor of the AJR and president of the American Roentgen Ray Society writes an article entitled "Standardization of Roentgen-Ray Reports" in 1922 in which he advocated for standard terminology and structure in reports of the time period.

In 1988, in the face of increasing mammography utilization with disparate quality, the ACR convened the committees that would result in the production of the BI-RADS lexicon and report structure.

In 2007, the ACR Intersociety Conference convened to discuss radiology reporting and released a summary statement advocating the use of structured reports in which reports are organized into sections that contain standardized language. Shortly thereafter, the RSNA established the Structured Reporting Committee and the RadLex committee to develop structured reporting tools.

Purpose

Implement a standard template in the Body Section of a university academic radiology practice to facilitate:

- Clear and consistent communication
- Data mining for ongoing quality improvement
- Quality metrics for radiologists
- Monitoring the impact on clinical decision making

Methods

- Reach consensus with radiology and endocrinology on a classification system
  - Revised Korean Society of Thyroid Radiology Consensus Statement and Recommendations (K-TIRADS) malignancy risk stratification system
- Introduce a structured template on November 1, 2016
  - Use encouraged for all thyroid ultrasound reports.
- Template design included constrained vocabulary for nodule descriptions, and required malignancy risk assignment based on K-TIRADS category 2-5.
  - Consistent structure facilitates automated data extraction by parsing full text radiology reports. Nodule side, location, size, internal content, suspicious features, and K-TIRADS category were automatically extracted from the reports.
- Random reports pre- and post-template introduction reviewed to catalog nodules, determine whether biopsy was performed and, if so, the final pathology
- Template was set as a site default to autopopulate for all thyroid ultrasounds on March 10th, 2017 to improve compliance.

Structured Nodule Descriptions

Right Lobe: [size] cm ([vol] cc) {echotexture}.

Nodules:

1. {Location}, [size] cm, {composition}, {suspicious features}. [Free text.] {KTI-RADS category}.

6. Spongiform
6. Extrathyroidal extension
7. Pure cystic

Boilerplate Text Included in the Structured Template at the End of Every Report

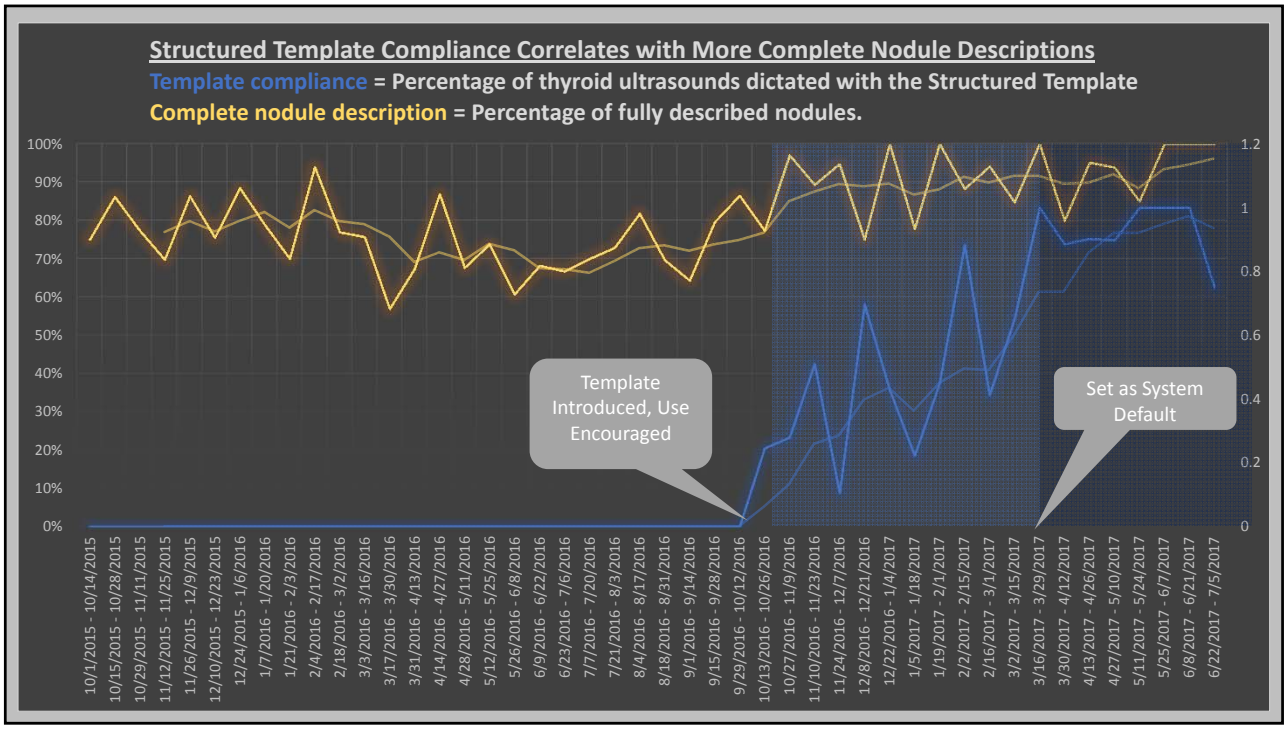
Note that guidelines differ among organizations regarding the management of thyroid nodules, and the decision to biopsy and length of follow-up may vary depending on clinical factors. Based on such factors, FNA may not be indicated for nodules that meet the recommendations below, while FNA may be appropriate for nodules that do not meet the criteria listed below.

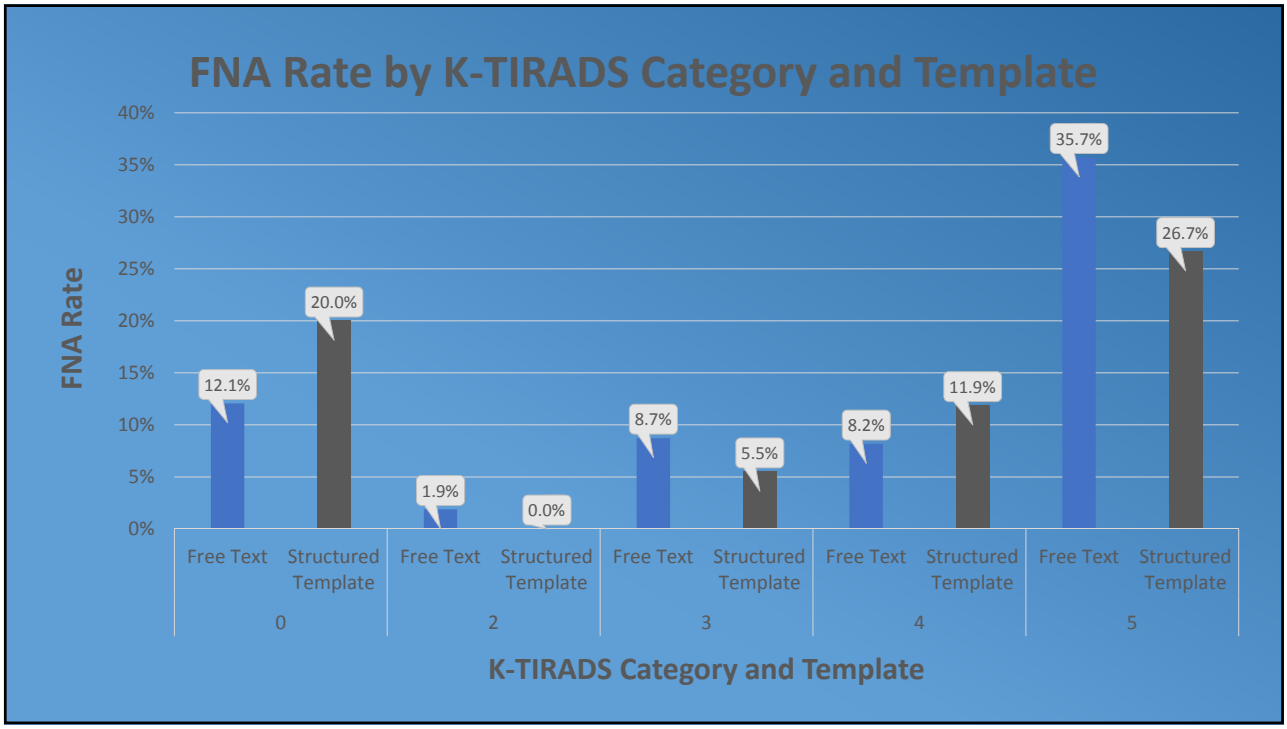
K-TIRADS Consensus Recommendations:

Category 5 – High suspicion – Consider biopsy if > 1 cm
Category 4 – Intermediate suspicion – Consider biopsy if > 1 cm
Category 3 – Low suspicion – Consider biopsy if > 1.5 cm
Category 2 – Benign – May consider biopsy for spongiform nodules > 2 cm

For nodules not meeting criteria for biopsy, consider follow-up ultrasound in 1 year.

Reference: Ultrasonography Diagnosis and Imaging-Based Management of Thyroid Nodules: Revised Korean Society of Thyroid Radiology Consensus Statement and Recommendations, Shin et al., Korean J Radiol 2016;17(3):370-395.


Structured Template Compliance Correlates with More Complete Nodule Descriptions
Template compliance = Percentage of thyroid ultrasounds dictated with the Structured Template
Complete nodule description = Percentage of fully described nodules.
Template Introduced, Use Encouraged
Set as System Default


FNA Rate by K-TIRADS Category and Template
FNA Rate
K-TIRADS Category and Template
12.1%
20.0%
1.9%
0.0%
8.7%
5.5%
8.2%
11.9%
35.7%
26.7%
Free Text
Structured Template
0
2
3
4
5

FNA Appropriateness by Size and KTIRADS Category

K-TIRADS Category	Threshold	Total FNAs	Appropriate FNAs	
			Free Text	Structured
Unk	>= 15 mm	48	78%	100%
2	>= 20 mm	7	43%	N/A
3	>= 15 mm	55	91%	100%
4	>= 10 mm	32	76%	100%
5	>= 10 mm	9	80%	75%

Use of the structured template resulted in the *near complete elimination of inappropriate FNA*, defined as FNA of a nodule smaller than the indicated threshold.

Biopsy Rate and Positive Rate

	Exams	Nodules	FNAs	Cancers	Nodules per Exam	FNA Rate	Positive Biopsy Rate
Free Text	524	1621	95	6	3.1	18.1%	**6.3%**
Structured Template	190	693	31	6	3.6	16.3%	**19.4%**

Conclusions

01

Structured reporting utilizing an independently verified grading system and lexicon led to improvement in the rate of positive biopsies, suggesting that biopsies were requested for more suspicious lesions.

02

Reducing barriers to adoption of the standardized template by making the structured template the default template for the study type led to significantly improved compliance.

03

Nodules were more fully described after the implementation of the template, in accordance with the K-TIRADS lexicon, leading to elimination of inappropriate FNA

References

1.Burnside ES, Sickles EA, Bassett LW, et al. The ACR BI-RADS experience: learning from history. *J Am Coll Radiol* 2009; 6:851-860

2.Dunnick NR, Langlotz CP. The radiology report of the future: a summary of the 2007 Intersociety Conference. *J Am Coll Radiol* 2008; 5:626-629

3.Hickey PM. Standardization of Roentgen-ray reports. *American Journal of Roentgenology* 1922; 9:422-425

4.Langlotz CP. *The Radiology Report: A Guide To Thoughtful Communication for Radiologists and other Medical Professionals*. San Bernardino, CA, 2015

5.Shin JH, Baek JH, Chung J, et al. Ultrasonography Diagnosis and Imaging-Based Management of Thyroid Nodules: Revised Korean Society of Thyroid Radiology Consensus Statement and Recommendations. *Korean J Radiol* 2016; 17:370-395