

ABSTRACT

Background: The Bethesda system for reporting thyroid cytopathology (BSRTC) stratifies thyroid FNAs into 6 main diagnostic categories for clarity of communication among pathologists, surgeons and endocrinologists, and for appropriate triage of patients. Each of the categories has an implied cancer risk that ensures a rational clinical management guideline. This study was designed to determine the frequency of the use of BSRTC by referral laboratories and its implications on patient management.

Design: A retrospective search of our consult database revealed 693 cases with surgical follow-up during the period of January 2008 when we implemented the Bethesda system to December 2011. The cases were stratified based on the type of referral institution. The percentages of the original diagnoses based on the BSRTC were recorded.

Results: Referrals from community hospitals accounted for 80.8% of the 693 cases while private laboratories and academic institutions accounted for 15.6% and 3.6%, respectively. Over the 4-year study period, an average of 73.15% (SD 3.0%) of the original diagnoses were based on the BSRTC. Implementation rates for academic institutions, community hospitals and private laboratories were 72.0%, 73.4% and 71.3%, respectively. Of the 187 cases where the BSRTC was not implemented, 48 (25.7%) were reported without the use of any of the 6 primary diagnostic categories; 12 (6.4%) were reported using 2 diagnostic categories (overwhelmingly atypical/suspicious categories). Seventy-one of these 187 cases (38%) turned out to be malignant on surgical resection. For those cases using the BSRTC, the original diagnoses were "atypia of undetermined significance" (AUS) in 6.1% of the cases. The rate of malignancy on subsequent surgical follow up of these AUS cases was 58.1%.

Conclusions: Five years after the guidelines were proposed, reporting of thyroid FNA still varies significantly from one laboratory to another, creating confusion in some cases and hindering the sharing of clinically meaningful data among laboratories. The BSRTC was not utilized in 1 out of 4 thyroid specimens. There was no statistically significant difference in the rate of utilization of BSRTC among different types of referral laboratories.

BACKGROUND

The Bethesda system for reporting thyroid cytopathology (BSRTC) stratifies thyroid FNAs into 6 main diagnostic categories for clarity of communication among pathologists, surgeons and endocrinologists, and for appropriate triage of patients. Each of the categories has an implied cancer risk that ensures a rational clinical management guideline. Based on the result of thyroid FNAs, a patient may be sent for surgery at a referral institution or the patient may seek a second opinion from a physician at another institution before or even after initiating a treatment program. Many institutions practice routine review of cytopathologic slides before surgical decision making if the patient initially underwent evaluation at another institution. This study was designed to determine the frequency of the use of BSRTC by referral laboratories/institutions and its implications on patient management.

DESIGN

A retrospective search of our consult database revealed 693 cases with surgical follow-up during the period of January 2008 when we implemented the Bethesda system to December 2011. Each case was referred with an outside cytopathologic diagnosis and reviewed by Cytopathologists at Yale. The cases were stratified based on the type of referral institution. The percentages of the original diagnoses based on the BSRTC were recorded. The final histopathologic diagnosis was obtained for each of the cases. Based on the rational clinical management guideline that the Bethesda System recommends, the number of cases with non-implementation of BSRTC was analyzed by a review of the electronic medical records in order to determine the clinical impact of the second opinion.

RESULTS

Referrals from community hospitals accounted for 80.8% of the 693 cases while private laboratories and academic institutions accounted for 15.6% and 3.6% of the referrals, respectively. **Table 1** highlights the comparison of BSRTC among different categories of referring institutions while **Table 2** shows the yearly BSRTC implementation rate. Over the 4-year study period, an average of 73.15% of the original diagnoses were based on the BSRTC. Implementation rates for academic institutions, community hospitals and private laboratories were 72.0%, 73.4% and 71.3%, respectively. The breakdown of diagnoses for cases without implementation of BSRTC is shown in **Figure 1**. Of the 187 cases where the BSRTC was not implemented, 48 (25.7%) were reported without the use of any of the 6 primary diagnostic categories; 12 (6.4%) were reported using 2 primary diagnostic categories (overwhelmingly atypical/suspicious categories) while 127 cases were reported with non-specific diagnosis. The general categories of final histologic diagnosis in cases without implementation of BSRTC are highlighted in **Figure 2**. Seventy-one (38%) of these 187 cases turned out to be malignant on surgical resection while benign neoplastic and benign non-neoplastic conditions accounted for 23 (12.3%) and 93 (49.7%), respectively. For those cases using the BSRTC, the original diagnoses were "atypia of undetermined significance" (AUS) in 6.1% of the cases. The rate of malignancy on subsequent surgical follow up of these AUS cases was 58.1%.

Figure 1. Breakdown of Diagnosis in Cases without Implementation of BSRTC

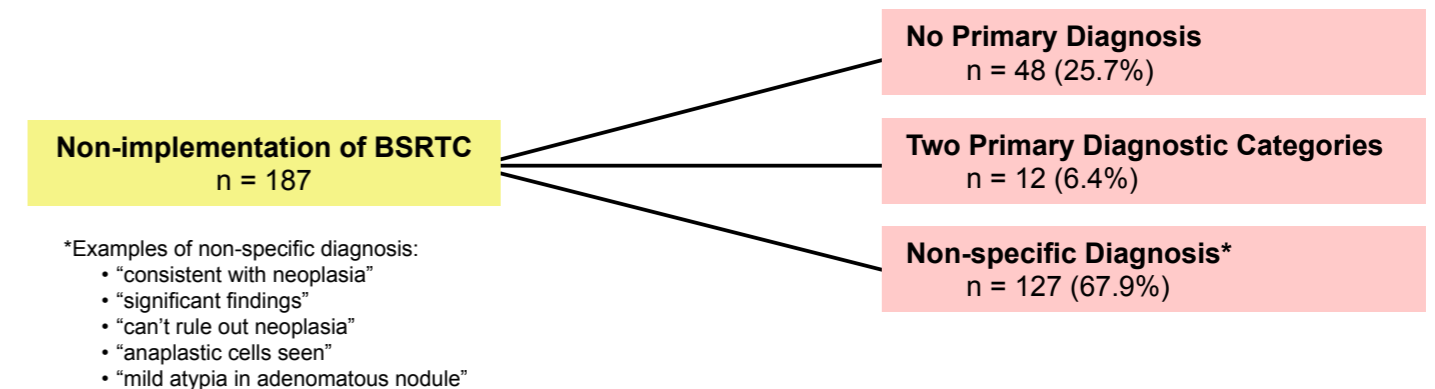


Figure 2. Final Histologic Diagnosis in Cases without Implementation of BSRTC

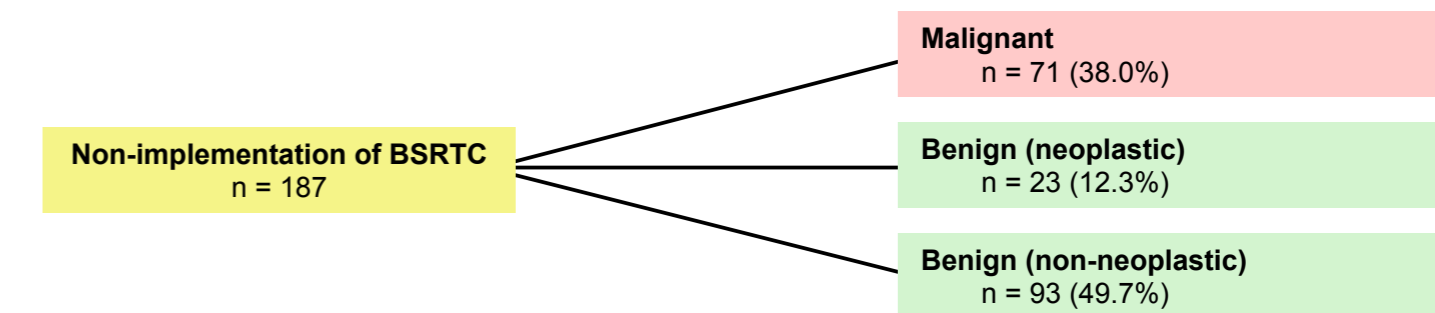


Table 1. Comparison of BSRTC Among Different Categories of Referring Institutions

	Community Hospitals	Private Laboratories	Academic Institutions	Total
Number of cases	560 (80.8%)	108 (15.6%)	25 (3.6%)	693 (100%)
Number of cases with the BSRTC Implementation	412	77	18	500
BSRTC Implementation rate	73.4%	71.3%	72.0%	72.15%

Table 2. Yearly BSRTC Implementation Rate

	2008	2009	2010	2011
Total number of cases	153	169	160	211
Cases with BSRTC Implementation	109	123	124	151
BSRTC Implementation rate	71.2%	72.8%	77.5%	71.6%

CONCLUSIONS

Five years after the guidelines were proposed, reporting of thyroid FNA still varies significantly from one laboratory to another, creating confusion in some cases and hindering the sharing of clinically meaningful data among laboratories. The BSRTC was not utilized in 1 out of 4 thyroid specimens. There was no statistically significant difference in the rate of utilization of BSRTC among different types of referral laboratories. Given the high malignancy rates in cases where BSRTC was not utilized, the implications on patient management can be far-reaching as management could be delayed in these cases because of unclear diagnosis.

REFERENCES

1. Park JH, Kim HK, Kang SW, et al. Second opinion in thyroid fine needle aspiration biopsy by the Bethesda system. *Endocrine Journal*. 2012;59:205-212
2. Tan YY, Kebebew E, Reiff E, et al. Does routine consultation of thyroid fine-needle aspiration cytology change surgical management? *J Am Coll Surg*. 2007;205:8-12
3. Cibas ES, Ali SZ. The Bethesda System for reporting thyroid cytopathology. *Am J Clin Pathol*. 2009;132:658-665