

Evaluation Of Our Reporting Efficacy Based On TBSRTC By Using A Proposed Performance Measure – The Atypia Of Undetermined Significance: Malignant Ratio (AUS:M)

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ABSTRACT

AIM of the study: To evaluate the efficacy of our reporting based on the Bethesda system(TBS) by using a proposed performance measure AUS:M.

Materials & methods: A 2-year prospective study done at department of pathology, Rangaraya Medical College, Kakinada. Patient demographic information, cytopathology diagnosis with sub-classifiers were noted and followed-up for evaluation. Case cohort included total 325 cases

Results: Total 325 cases, of which 30 were diagnosed as AUS/FLUS. AUS rate is 9.2%, AUS malignancy rate was 20% and AUS: M rate is 1.1.

Conclusion: Calculation of AUS : M ratio helps to interpret the diagnostic efficacy of the reporting system and also serving as a monitoring aide in quality improvement of cytodiagnosis of thyroid lesions.

Key words: AUS: M ratio, Performance Measure, TBSRTC

I. INTRODUCTION

The Bethesda System for reporting thyroid cytopathology (TBSRTC) was introduced in 2007, for standardization of reporting thyroid FNA. It's a Six-tiered system – 1) Non diagnostic / Unsatisfactory (ND) 2) Benign 3) Atypia of undetermined significance (AUS) 4) Suspicious for follicular neoplasm (SFN) 5) Suspicious for malignancy (SFM) 6) Malignant (M). All these categories have been given a defined range of malignancy rates and management protocols. The ONLY recommendation given by the TBS for thyroid cytopathology was that the AUS rate should not exceed 7%^[1]. However, a significant variability in the use of the AUS was observed world-wide. Hence a new performance measure is required to assess diagnostic efficacy.

II. AIMS & OBJECTIVES

- 1) To assess our diagnostic efficacy in reporting thyroid lesions based on the Bethesda system for reporting thyroid cytopathology (TBSRTC) with a proposed performance measure i.e AUS:M ratio.
- 2) To identify the errors in under or over diagnosis of thyroid lesions on FNA, if any.

III. MATERIALS & METHODS

Study design: Present study was a 2 year prospective study from August 2014 – July 2016 done at the Department of Pathology, Rangaraya Medical College, Kakinada with a sample size of 325 cases.

Inclusion criteria: Patients with thyroid swellings and for whom cyto-histopathological correlation was available were included in the study.

Staining methods: H&E, MGG were used for staining the cytology smears and H&E was used for staining histopathologic sections.

IV. RESULTS

A total of 906 thyroid cases have undergone FNA and were classified on the basis of Bethesda system. Histopathologic correlation was available for 325 cases only. Out of 325 cases according to TBSRTC, 12(4%) were non-diagnostic, 190(59%) were benign, 30(9%) were AUS, 59(18%) cases were SFN, 7(2%) were SFM and malignant cases were 27(8%)(Figure-1).

Figure-1 showing distribution of cases on FNA

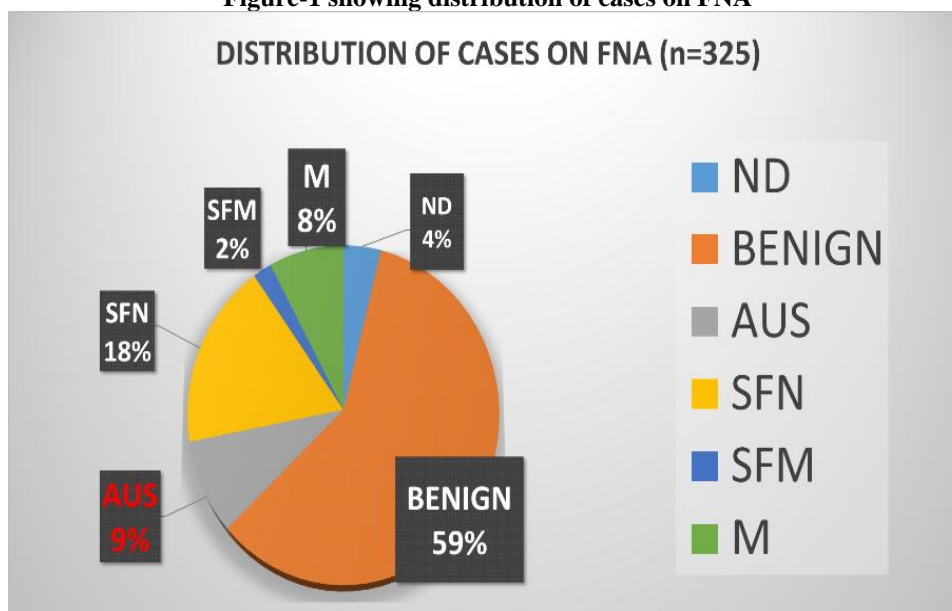
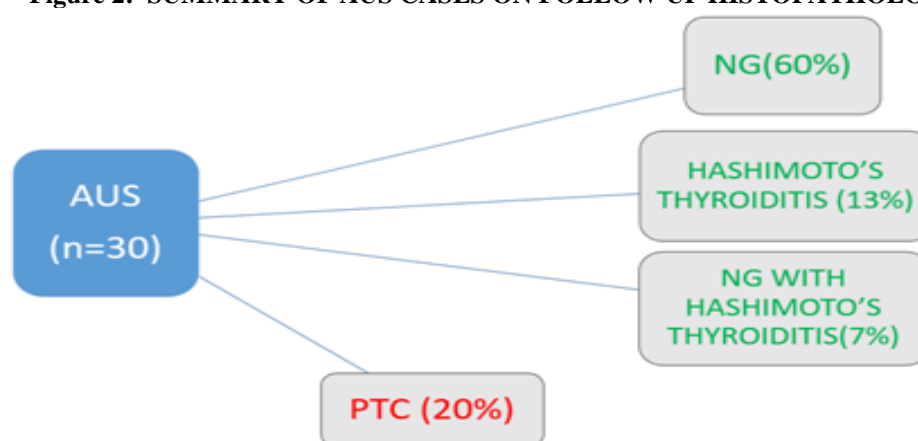


Table – 1: MALIGNANCY RATES ON HISTOPATHOLOGIC FOLLOW UP

TBSRTC CATEGORY	MALIGNANCY RATE (%) IN PRESENT STUDY	RISK OF MALIGNANCY (%)
NON DIAGNOSTIC (ND)	0 %	
BENIGN	8.4 %	0 – 3 %
ATYPIA OF UNDETERMINED SIGNIFICANCE (AUS)	20 %	5 - 15 %
SUSPICIOUS FOR FOLLICULAR NEOPLASM (SFN)	6.7 %	15 – 30 %
SUSPICIOUS FOR MALIGNANCY (SFM)	71.4 %	60 – 75 %
MALIGNANT (M)	96.2 %	97 -99 %

Figure 2: SUMMARY OF AUS CASES ON FOLLOW UP HISTOPATHOLOGY



NG: Nodular gotre; PTC: Papillary carcinoma of thyroid

V. DISCUSSION

PRESSING NEED FOR A PERFORMANCE MEASURE

AUS was a heterogeneous category and has not been categorised to the extent as that of the other categories within TBS. The recommendation by the TBS that the AUS rate should not exceed 7% lacked an evidentiary basis and has proved to be unrealistic for many laboratories. It is much needed to have a performance measure associated with TBS, especially with regard to the AUS category in order to promote uniform practice among laboratories and cytopathologists and to encourage quality improvement.

M category has a malignancy rate approaching 100% in all laboratories, and can serve as the logical “gold standard” to measure other parameters against it. Analogous to the ASCUS:SIL ratio in cervical/vaginal cytology, M category will be the most appropriate denominator for a thyroid performance ratio.

There are strict and specific diagnostic criteria for the usage of SFN, SFM, and M, and the use of these categories individually demonstrates lesser variation when compared with the category AUS. SFN, SFM, and M share similar clinical management recommendations, i.e. all are warrants a surgery. Of the ratios of single indeterminate categories to the M category the AUS:M ratio has demonstrated the greatest variation because this reflects the variation in use of AUS across studies.

Compared with the AUS rate alone, the AUS:M ratio also has the advantage of joining the context of the AUS rate with that of the M rate^[1]. Validity of AUS:M rate can be verified with a follow-up histopathology.

JF Krane et al^[1] proposed required range for AUS: M ratio as 1 to 3. Ratio >3 is indicative of overdiagnosis of AUS or under diagnosis of malignancy. Ratio <1 is mostly attributable to low AUS.

On histopathology followup, rate of malignancy of present study is correlated with recommended risk of malignancy rates in suspicious of malignancy and malignant categories. Whereas benign and AUS categories it is little bit higher (Table-1).

In the present study AUS ratio is 9.2 and it correlates with Vander Laan et al⁽⁶⁾ and Faquin et al⁽⁴⁾ studies (Table-2). AUS:M ratio recommended range is 1-3. In present study it is 1.1 indicating that it is within the recommended range. It also correlated with Kim et al⁽³⁾ study.

Table - 2: Comparison of percentages of distribution of FNA diagnoses using TBSRTC among published studies

DIAGNOSTIC CRITERIA	PRESENT STUDY (%)	VANDER LAAN 2011 (%)	KIM 2011 (%)	FAQUIN 2010 (%)	THEOHARIS 2009 (%)
ND	3.9	12.5	1.8	13.9	11.1
BENIGN	58.4	62.7	58.3	66.9	73.8
AUS	9.2	10.9	16.3	10	3
SFN	18.1	4.2	1.2	2.0	5.5
SFM	2.1	4.5	6.2	3.2	1.3
M	8.3	5.2	16.2	3.9	5.2

Table 3: Comparison of AUS: M ratio among published studies

STUDY	AUS %	MALIGNANT %	AUS : M
Vanderlaan, 2011 (n = 4691)	10.9	5.2	2.1
Faquin (n = 5464)	10	3.9	2.6
Theoharis, 2009 (n = 3,207)	3	5.2	0.6
Kim, 2011 (n = 865)	16.3	16.2	1.0
Present study (n = 325)	9.23	8.3	1.1

VI. SUMMARY

A total of 906 thyroid cases that came for FNAC to the department of pathology, Rangaraya Medical College, Kakinada, during the 2 year study period, of which histologic correlation was available for 325 cases and only these cases were included in the present study. The cases were classified according to The Bethesda System for Reporting Thyroid Cytopathology and the number of AUS cases was found to be 30, having a higher incidence among females. AUS rate in our study was 9.2% and 80% of cases turned out as benign and 20% as malignant on histologic follow – up (Figure-2)

The AUS : M ratio in our study was 1.15 , which was within the limits proposed by JF Krane et al^[2] and it correlated well with Kim et al^[3](Table-3) , suggesting that the diagnostic efficacy of our reporting system according to TBSRTC was satisfactory as it can be evidenced by the histologic follow – up of cases.

VII. CONCLUSION

1. The Bethesda System created uniform protocol for Reporting Thyroid Cytopathology and it is most useful for interlaboratory correlation and interpretation.
2. AUS:M ratio in present study was 1.15 and was within the required limits. Hence we came to know that diagnostic efficacy of our reporting system was satisfactory with regards to TBSRTC.
3. AUS:M ratio can serve as a monitoring aid in quality improvement of cytodiagnosis of thyroid lesions.

LIST OF ABBREVIATIONS USED IN THE TEXT

TBSRTC – THE BETHESDA SYSTEM FOR REPORTING THYROID CYTOPATHOLOGY

TBS – THE BETHESDA SYSTEM

ND – NON – DIAGNOSTIC

AUS – ATYPIA OF UNDETERMINED SIGNIFICANCE

SFN – SUSPICIOUS FOR FOLLICULAR NEOPLASM

SFM – SUSPICIOUS FOR MALIGNANCY

M – MALIGNANT

H&E – HEMOTOXYLIN AND EOSIN

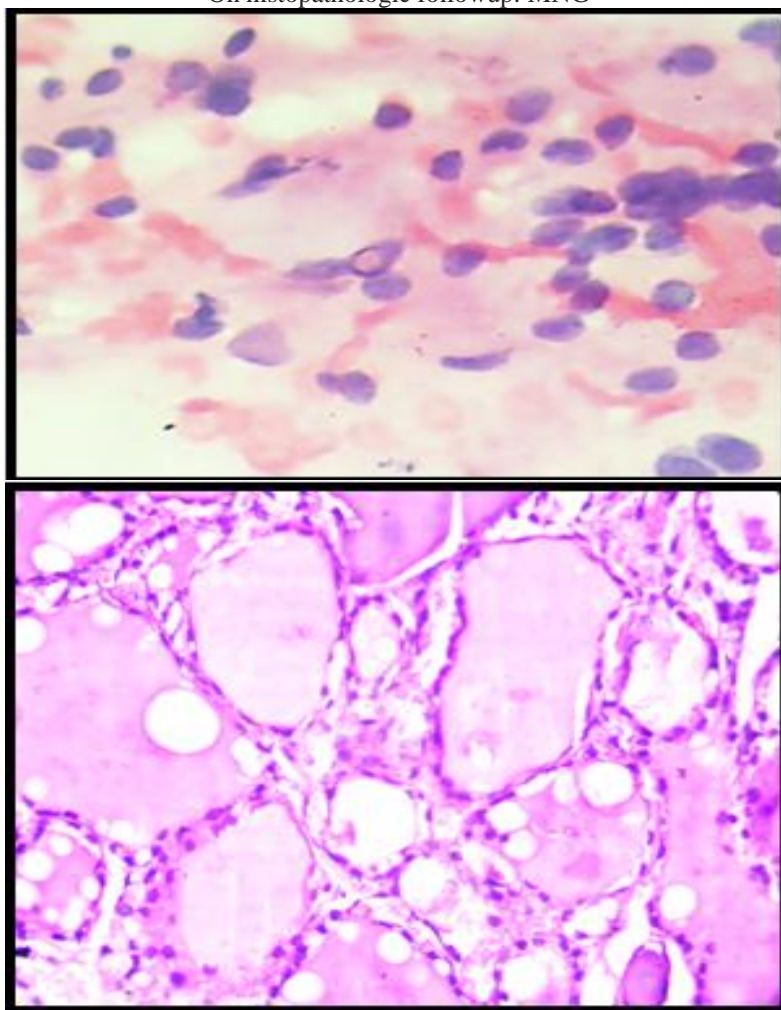
MGG – MAY- GRUNWALD GIEMSA

FNA – FINE NEEDLE ASPIRATION

PHOTO MICROGRAPHS

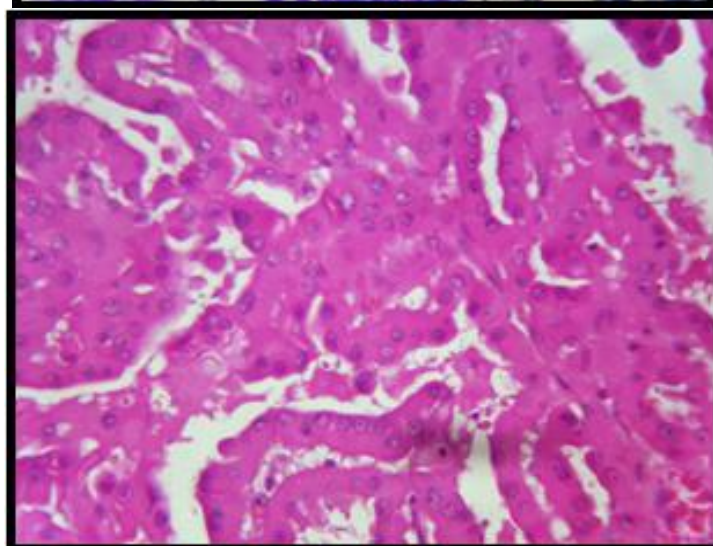
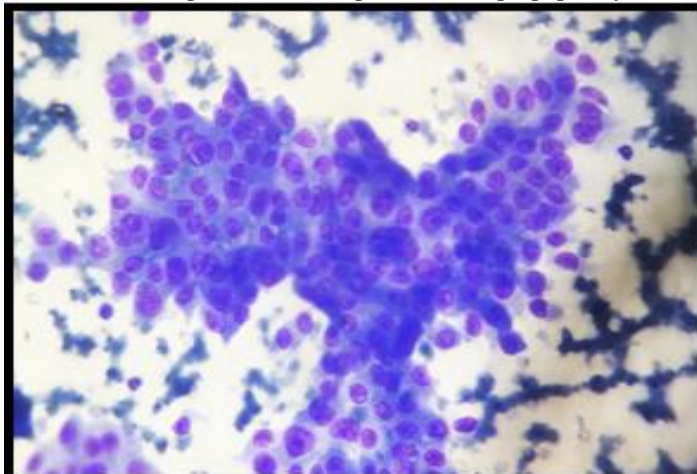
Cytodiagnosis: papillary carcinoma

On histopathologic followup: MNG



Cyto 780/14, H&E,40x Intra nuclear pseudoinclusion. Bio-2246/14,H&E,40x Nodular goitre.

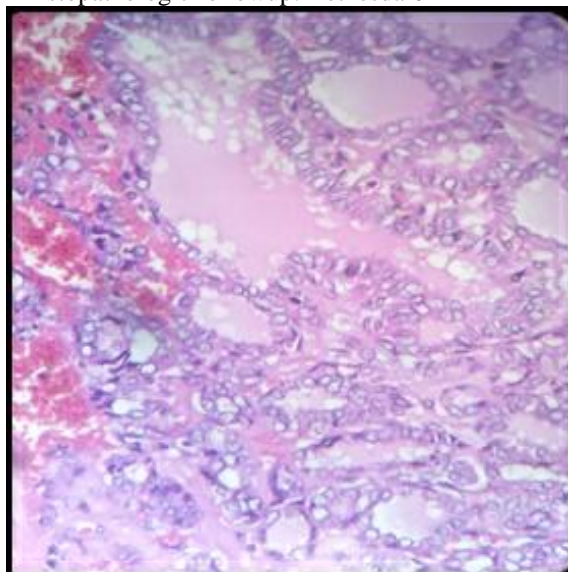
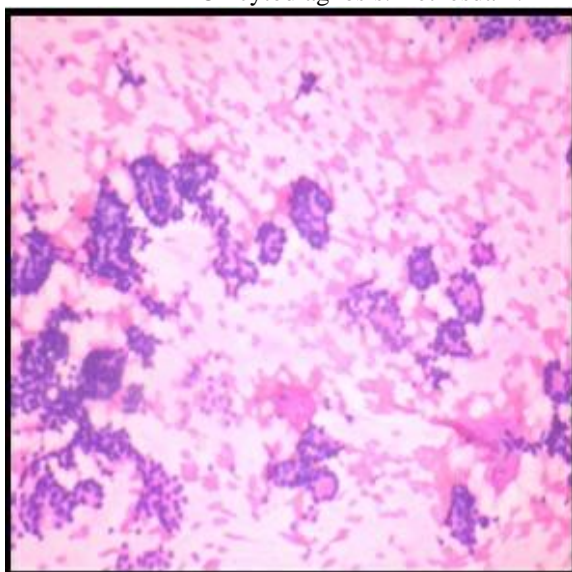
Cytodiagnosis: Hurthle cell neoplasm. On histopath follow up : papillary Ca. Oncocyticvariant



Cyto 1018/15, MGG, 40x Bio:2430/15, H&E, 10x

On cytodiagnosis: Bethesda 4.

On histopathologic followup: Bethesda 6



Cyto 2504/14, H&E, 10x Equal number of micro and
macrofollicles (suspicious for Follicular Neoplasm)
variant of papillary thyroid carcinoma

Bio.2013/15, H&E, 40x. Follicular

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