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**The reasons behind the new  
Bethesda System for reporting  
thyroid cytopathology:  
diagnostic dilemma from  
bench to bedside**



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«ΑΤΤΙΚΟΝ»**

## The new Bethesda System for reporting thyroid cytopathology

*Γιατί μία ακόμα ταξινόμηση στην κυτταρολογία του  
θυρεοειδούς αδέννα ;*

**Terminology.**  
**The professional Societies Recommendations**

<b>PSC 1997</b>	<b>ATA 2006</b>	<b>AACE 2006</b>	<b>Working group 2006</b>
<b>Inadequate</b>	<b>Inadequate</b>	<b>Benign</b>	<b>Benign</b>
<b>Benign</b>	<b>Malignant</b>	<b>Malignant or suspicious</b>	<b>US Lesion</b>
<b>Presence of atypical cells</b>	<b>Indeterminate/ suspicious for neoplasia</b>	<b>Follicular neoplasia</b>	<b>Follicular neoplasia</b>
<b>Suspicious for malignancy</b>	<b>Indeterminate/ Suspicious for carcinoma</b>	<b>Non Diagnostic or Suspicious US</b>	<b>Suspicious Malignant</b>
<b>Malignant</b>	<b>Benign</b>		<b>Unsatisfactory</b>

**PSC : Papanicolaou Society of cytology; Working group : Thyroid 2006;16**

# Terminology.

## The professional Societies Recommendations

### **BTA 2009**

**Thy1 Insufficient for dg**  
**Thy 1c- Cyst fluid with macs only**

**Thy 2 Non neoplastic**

**Thy 2c- cyst fluid with colloid**

**Thy 3a- atypia Neoplasm possible**

**Thy3f- follicular neoplasm**

**Thy4 Suspicious of malignancy**

**Thy 5 Malignant**

# WP report

REVIEW ARTICLE

DOI:10.1111/j.1365-2303.2010.00751.x

## **Diagnostic terminology for reporting thyroid fine needle aspiration cytology: European Federation of Cytology Societies thyroid working party symposium, Lisbon 2009**

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[www.efcs.eu](http://www.efcs.eu)

*Cytopathology, 2010, 21: 86-92*

# Bethesda Terminology

**Non Diagnostic or Unsatisfactory**

**Benign**

**Follicular Lesion of Undetermined Significance or AUS**

**Follicular Neoplasm**  
*(specify if Hürthle  
cell (oncocytic) type)*

**Suspicious for  
malignancy**

**Malignant**

# Bethesda Terminology

Benign	Follicular nodule/hyperplastic nodule
	Follicular adenoma
	Thyroiditis
Lesion suspicious for malignancy/malignant	Papillary carcinoma
	Medullary carcinoma
	Poorly differentiated carcinoma
	Anaplastic carcinoma
	Metastases
	Lymphomas

- **Hürthle cell carcinoma**
- **Well-differentiated follicular carcinomas are excluded**
- **Follicular neoplasm category (Hürthle cells subtype)**

# Working Party Thyroid, Lisbon EC, 2009

## 26 panelists /16 countries

- Austria
- Belgium
- Croatia
- Czech Republic
- Finland
- France
- Germany
- Greece
- Hungary
- Italy
- Norway
- Portugal
- Spain
- Sweden
- Turquie
- United Kingdom

**AUS or Follicular Lesion  
of Undetermined Significance**

**Follicular Neoplasm or  
suspicious for  
a follicular neoplasm**

***(specify if Hürthle  
cells (oncocytic) subtype)***



# AUS/FLUS only ?

- *AUS /follicular lesion of undetermined significance category:*
- be better to include this
- a) in the benign category (with same risk of cancer),
- b) in a « indeterminate category »,
- c) it is not well defined cytologically with a risk of it being used as 'waste-basket' category?

- *The 'follicular neoplasm' category would be better included*
- a) in the AUS category,
- b) in the lesion suspicious for malignancy (LSM) category
- c) in a « indeterminate category »

# Reasons to adopt the Bethesda System in thyroid FNAs

- **Why should we decide to adopt the Bethesda system ?**
- **Advantages/disadvantages ?**
- **What about the clinicians ?**
- **« My clinicians are used with my classification »**
- **« I agree with some categories but not with some others »**

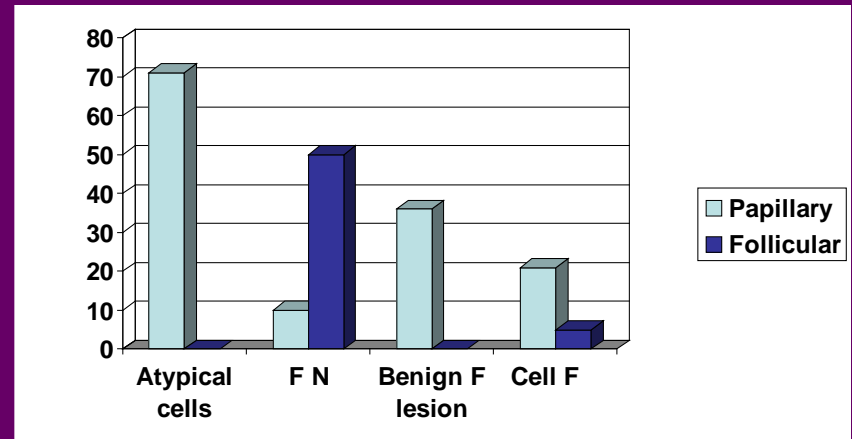
# Thyroid Bethesda Terminology 2009

Terminology 2009	Risk of Malignancy (%)	Usual Management
Non Diagnostic or Unsatisfactory	**	Repeat FNA with US
Benign	0-3	Clinical Follow-up 6-18 months
AUS or Foll lesion of US	5-15	Repeat FNA
Foll Neoplasm or suspicious for a foll neoplasm ( <i>specify if Hürthle cell (oncocytic) type</i> )	15-30	Surgical lobectomy
Suspicious for malignancy	60-75	Near-total thyroidectomy or surgical lobectomy
Malignant	97-99	Near-total thyroidectomy

# Cancer in indeterminate lesions

- Follicular lesion without nuclear atypia : 6.8 % CA
- Follicular lesion with nuclear atypia : 44.4 % CA
- Nuclear atypia : 20 % CA (only Papillary CA)

*R. Goldstein Ann Surg 2002;  
235 : 656-62*

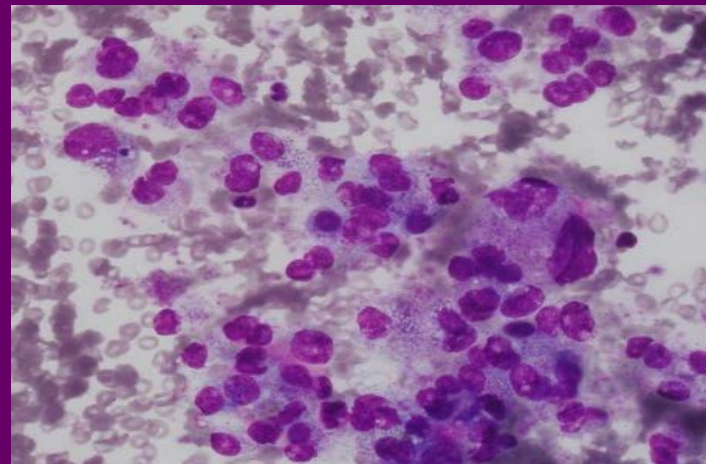
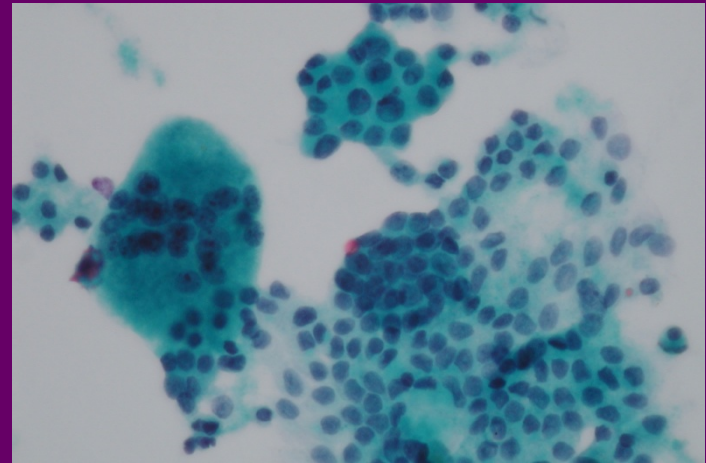


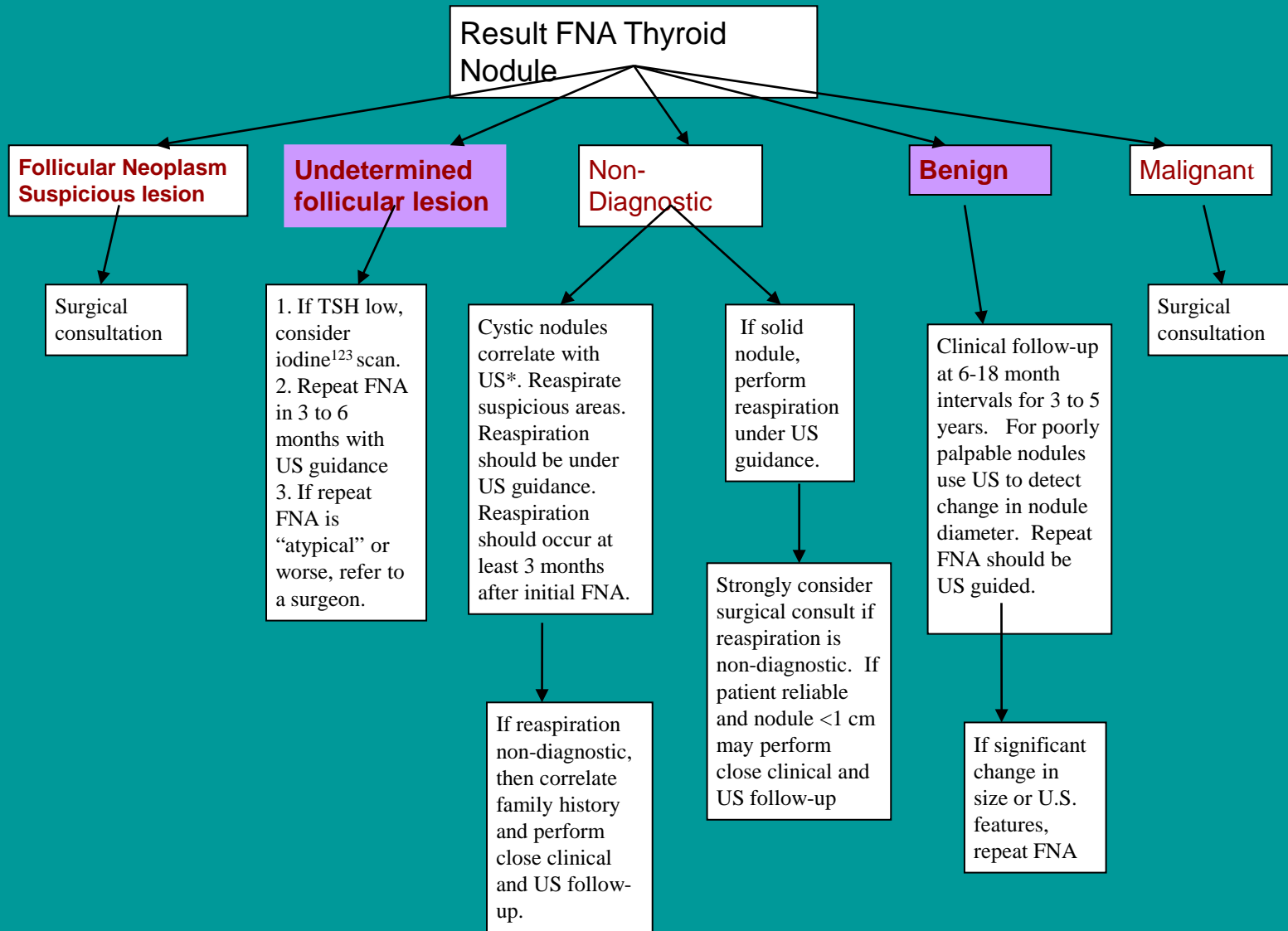
*B. Miller, Am J Surg  
2004; 188 : 459-62*

# Doubtful lesion

- No representative
- Benign
- Doubtful lesion (10-17%)
- Lesion suspicious for malignancy (30-50%)
- Malignant (99-100%)

*Am. J. Med., 1994 ; 97: 152-157*





\*US=ultrasound

# Therapeutic Strategies

<b>Unsatisfactory/ Solid</b>	<b>Follow-up or surgery or Repeat FNA</b>
<b>Benign</b>	<b>US Follow-up or Repeat FNA or surgery in cases of growing</b>
<b>Indeterminate/ suspicious</b>	<b>Repeat FNA or surgery or US Follow-up</b>
<b>Malignant</b>	<b>Surgery</b>

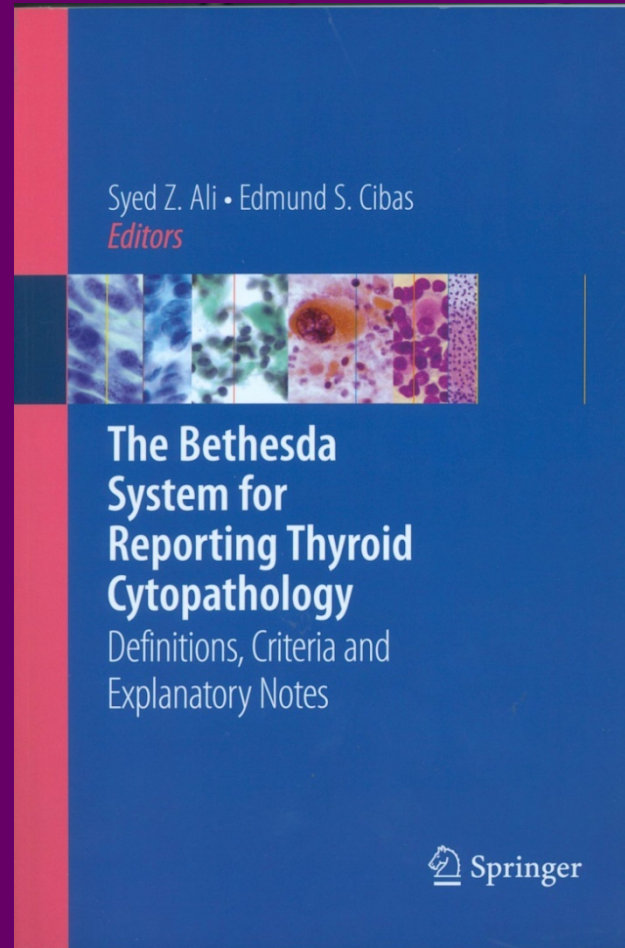
*ATA; AACE; BrTA; AAES;*

# Thyroid Bethesda Terminology 2009

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Suspicious for malignancy	60-75	Near-total thyroidectomy or surgical lobectomy
Malignant	97-99	Near-total thyroidectomy



# NCI/Bethesda Conference 2007



## Publications

- **ZW. Baloch et al, *Cytojournal* 2008;5:6**
- **ZW. Baloch et al, *Diagn Cytopathol* 2008;36:425-37**
- **LJ layfield et al, *Cytopathology* 2008;21: 75-86**
  
- **Atlas: 2010**

# Advantages

- **The use of the same words to describe the same lesions**
- **To analyze the data and to specify the real risk of cancer**
- **To adapt the treatment**
- **To compare the results**
- **To be evolutive**

TBSRTC category	Reference	Total cases in the study	Number of cases within the category	Percentage of cases within the category (%)	Number of histologically confirmed cases	Percentage of histologically confirmed cases (%)	Malignancy rate (%)
Benign	TBSRTC <sup>19</sup>						0–3
	Rabaglia <i>et al.</i> (before TBSRTC) <sup>9</sup>	938	0	0.0	SS	SS	SS
	Rabaglia <i>et al.</i> (after TBSRTC) <sup>9</sup>	765	0	0.0	SS	SS	SS
	Nayar & Ivanovic <sup>29</sup>	5194	3337	64.2	357	10.7	1.7
	Theoharis <i>et al.</i> <sup>30</sup>	2468	1799	72.9	82	4.6	9.8
	Jo <i>et al.</i> <sup>24</sup>	3080	1817	59.0	307	16.9	1.1
	Wu <i>et al.</i> <sup>22</sup>	1382	539	39.0	54	10.0	9.0
	Faquin & Baloch <sup>23</sup>	SS	0	0.0	SS	SS	SS
	Our study group A	500	245	49.0	245	100	3.7
	Our study group B	500	361	72.2	361	100	0.8
	AUS/FLUS	TBSRTC <sup>19</sup>					
Rabaglia <i>et al.</i> (before TBSRTC) <sup>9</sup>		938	78	8.3	37	47.4	35.1
Rabaglia <i>et al.</i> (after TBSRTC) <sup>9</sup>		765	91	11.9	32	35.2	13.0
Nayar & Ivanovic <sup>29</sup>		5194	924	17.8	430	46.5	5.8
Theoharis <i>et al.</i> <sup>30</sup>		2468	89	3.6	27	30.3	48.0
Jo <i>et al.</i> <sup>24</sup>		3080	104	3.4	53	51.0	17.0
Wu <i>et al.</i> <sup>22</sup>		1382	376	27.2	51	13.6	22.0
Faquin & Baloch <sup>23</sup>		SS	509	SS	273	53.6	81.0
Our study group A		500	47	9.4	47	100	23.4
Our study group B		500	25	5.0	25	100	8.0
FN/SPN		TBSRTC <sup>19</sup>					
	Rabaglia <i>et al.</i> (before TBSRTC) <sup>9</sup>	SS	SS	SS	SS	SS	SS
	Rabaglia <i>et al.</i> (after TBSRTC) <sup>9</sup>	SS	SS	SS	SS	SS	SS
	Nayar & Ivanovic <sup>29</sup>	5194	307	5.9	248	80.8	14.5
	Theoharis <i>et al.</i> <sup>30</sup>	2468	166	6.7	102	61.5	34.0
	Jo <i>et al.</i> <sup>24</sup>	3080	298	9.7	177	59.4	25.4
	Wu <i>et al.</i> <sup>22</sup>	1382	116	8.4	49	42.2	27.0
	Faquin & Baloch <sup>23</sup>	SS	348	SS	251	72.1	25.1
	Our study group A	500	6	1.2	6	100	33.3
	Our study group B	500	11	2.2	11	100	0

### Fine needle aspiration cytology of nodular thyroid lesions: a 2-year experience of the Bethesda system for reporting thyroid cytopathology in a large regional and a university hospital, with histological correlation

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### Fine needle aspiration cytology of nodular thyroid lesions: a 2-year experience of the Bethesda system for reporting thyroid cytopathology in a large regional and a university hospital, with histological correlation

#### Abstract

**Objective:** Thyroid fine needle aspiration (FNA) contributes to the appropriate management of nodular thyroid lesions. The introduced categories in the Bethesda system for reporting thyroid cytopathology (TBSRTC) are associated with an implied cancer risk, providing a clinical management guideline. This study aims to evaluate the reproducibility of this implied risk and to compare the results from two different cytopathology departments. **Methods:** Five hundred histologically confirmed FNAs, studied since the introduction of TBSRTC, were obtained from Q238 and T387 FNAs performed in a large regional hospital in Beasikon, Greece (group A) and a university hospital in Athens (group B), respectively. Reports were issued according to TBSRTC. Aspirates were prepared with 'ThinPrep' and evaluated by two experienced cytopathologists. The reproducibility and accuracy were evaluated.

**Results:** The proportion test for suspicious for malignancy (SM) and malignant (M) cytology reports ( $P < 0.0001$ ), and the number of indeterminate cytology ( $P < 0.0001$ ), were significantly higher in group A than in group B, consistent with a higher incidence of thyroid neoplasia in western Greece. Although the malignancy rates were higher in group B than in group A for all categories, except M (A, 99.1%; B, 100%), the difference was only significant for benign neoplasia ( $P = 0.0003$ ). Malignancy rates for all categories in group A were above the TBSRTC recommended range, but were consistent with an increased prevalence of malignancy in that centre. Differences in reporting practice and the variable ranges reported in the literature. There was lower sensitivity ( $P = 0.039$ ) and overall accuracy ( $P = 0.001$ ) in group A relative to group B, but no difference in specificity. **Conclusions:** TBSRTC provides valuable information for the appropriate management of nodular thyroid lesions, both in a university and a large regional hospital.

**Keywords:** thyroid, fine needle aspiration, the Bethesda system for reporting thyroid cytopathology, risk of malignancy, reproducibility, liquid-based cytology

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Cytopathology 2013

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Category	Reference	Total cases in the study	Number of cases within the category	Percentage of cases within the category (%)	Number of histologically confirmed cases	Percentage of histologically confirmed cases (%)	Malignancy rate (%)
SFM	TBSRTC <sup>19</sup>						60–75
	Rabaglia <i>et al.</i> (before TBSRTC) <sup>9</sup>	SS	SS	SS	SS	SS	SS
	Rabaglia <i>et al.</i> (after TBSRTC) <sup>9</sup>	SS	SS	SS	SS	SS	SS
	Nayar & Ivanovic <sup>29</sup>	5194	97	1.9	83	85.6	53.0
	Theoharis <i>et al.</i> <sup>30</sup>	2468	39	1.6	30	76.9	87.0
	Jo <i>et al.</i> <sup>24</sup>	3080	71	2.3	56	78.9	70.0
	Wu <i>et al.</i> <sup>22</sup>	1382	36	2.6	18	50.0	67.0
	Faquin & Baloch <sup>23</sup>	SS	SS	SS	SS	SS	SS
	Our study group A	500	53	10.6	53	100	96.2
	Our study group B	500	16	3.2	16	100	87.5
	M	TBSRTC <sup>19</sup>					
Rabaglia <i>et al.</i> (before TBSRTC) <sup>9</sup>		SS	SS	SS	SS	SS	SS
Rabaglia <i>et al.</i> (after TBSRTC) <sup>9</sup>		SS	SS	SS	SS	SS	SS
Nayar & Ivanovic <sup>29</sup>		5194	255	4.9	225	88.2	96.5
Theoharis <i>et al.</i> <sup>30</sup>		2468	145	5.9	112	77.2	100
Jo <i>et al.</i> <sup>24</sup>		3080	216	7.0	154	71.3	98.1
Wu <i>et al.</i> <sup>22</sup>		1382	37	2.7	19	51.4	100
Faquin & Baloch <sup>23</sup>		SS	SS	SS	SS	SS	SS
Our study group A		500	134	26.8	134	100	99.3
Our study group B		500	61	12.2	61	100	100

AUS/FLUS, atypia of undetermined significance/follicular lesion of undetermined significance; FN/SPN, follicular neoplasm/suspicious for follicular neoplasm; M, malignant; SFM, suspicious for malignancy; SS, selective study; TBSRTC, the Bethesda system for reporting thyroid cytopathology.

	ND/UNS	BN	AUS/FLUS	FN/SPN	SFM	M	Total
<b>Benign</b>							
Colloid nodule	3	93	6				102
Graves disease		2					2
Thyroiditis (all types)	3	60	17		1		81
Adenomatoid nodule	4	74	13		1	1	93
Follicular adenoma		7		4			11
Hürthle cell adenoma							
<b>Malignant</b>							
Papillary carcinoma	4	7	9	2	49	125	196
Medullary carcinoma	1	2			2	6	11
Follicular carcinoma			1				1
Poody differentiated carcinoma						1	1
Undifferentiated carcinoma						1	1
Lymphoma			1				1
<b>Total</b>	<b>15 (3%)</b>	<b>245 (49.0%)</b>	<b>47 (9.4%)</b>	<b>6 (1.2%)</b>	<b>53 (10.6%)</b>	<b>134 (26.8%)</b>	<b>500 (100%)</b>
<b>Malignancy rate (%)</b>	<b>33.3</b>	<b>3.7</b>	<b>23.4</b>	<b>33.3</b>	<b>96.2</b>	<b>99.3</b>	<b>42.2</b>

	ND/UNS	BN	AUS/FLUS	FN/SPN	SFM	M	Total
<b>Benign</b>							
Colloid nodule	12	230	4				246
Graves disease		3	1				4
Thyroiditis (all types)		89	8				97
Adenomatoid nodule	13	35	8	1	2		59
Follicular adenoma		1	2	6			9
Hürthle cell adenoma				4			4
<b>Malignant</b>							
Papillary carcinoma	1	3	2		14	57	77
Medullary carcinoma						3	3
Follicular carcinoma							
Poody differentiated carcinoma							
Undifferentiated carcinoma						1	1
Lymphoma							
<b>Total</b>	<b>26 (5.2%)</b>	<b>361 (72.2%)</b>	<b>25 (5.0%)</b>	<b>11 (2.2%)</b>	<b>16 (3.2%)</b>	<b>61 (12.2%)</b>	<b>500 (100%)</b>
<b>Malignancy rate (%)</b>	<b>3.8</b>	<b>0.8</b>	<b>8.0</b>	<b>0.0</b>	<b>87.5</b>	<b>100.0</b>	<b>16.2</b>

# Risks for « misapplication »

- **Habits of own personal or institutional terminologies in Cytopathology**
- **Lack of WHO's classifications for Cytopathology**
- **TBS : english language**
- **No official translation or transcription performed by the National Societies of Cytology**
- **No training for Terminologies organized in most of the European countries**

# Questionnaire

<b>Adhering to BTS</b>	<b>'Translation template' with BTS</b>	<b>Adhering to BTS and 'translation template' with BTS</b>	<b>None of the two proposals</b>
<b>6</b>  <b>2 countries (France; Greece) recommend BTS</b>	<b>11</b>	<b>2</b>	<b>2</b>

**21 participants**

# Conclusion

- TBS is a unique opportunity to improve the management of patients having thyroid nodules
- EFCS recommended to the National Societies to publish guidelines
- 2010/11: « terminology » test with slides will be available on EFCS website
- Training

