BETHESDA REPORTING SYSTEM

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The Benefits of a Uniform Reporting System for Thyroid Cytopathology

- Improve communication
- Facilitate cytological-histological correlation
- Facilitate research into the epidemiology, molecular biology, pathology, and diagnosis of thyroid diseases
- Allow easy and reliable sharing of data from different laboratories for collaborative studies

TBSRTC – DIAGNOSTIC CATEGORIES

- NONDIAGNOSTIC or UNSATISFACTORY
- BENIGN
- ATYPIA OF UNDETERMINED SIGNIFICANCE (AUS) or FOLLICULAR LESION OF UNDETERMINED SIGNIFICANCE (FLUS)
- FOLLICULAR NEOPLASM or SUSPICIOUS FOR A FOLLICULAR NEOPLASM (SFN)
  - specify if Hurthle cell (oncocytic) type
- SUSPICIOUS FOR MALIGNANCY (SM)
- MALIGNANT

TBSRTC 1- Probabilistic approach and Relationship to Clinical Algorithms

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk of Malignancy (%)</th>
<th>Usual Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nondiagnostic</td>
<td>1-4</td>
<td>Repeat FNA w/ US</td>
</tr>
<tr>
<td>Benign</td>
<td>0-3</td>
<td>Follow</td>
</tr>
<tr>
<td>AUS or FLUS</td>
<td>10-15</td>
<td>Repeat FNA</td>
</tr>
<tr>
<td>SFN</td>
<td>15-30</td>
<td>Lobectomy</td>
</tr>
<tr>
<td>SM (usually papillary CA)</td>
<td>60-75</td>
<td>Lobectomy or total thyroidectomy</td>
</tr>
<tr>
<td>Malignant</td>
<td>97-99</td>
<td>Total thyroidectomy</td>
</tr>
</tbody>
</table>

ATA 2015, Recommendation 35B
For patients with thyroid cancer >1 cm and <4 cm without extrathyroidal extension, and without clinical evidence of any lymph node metastases (cN0), the initial surgical procedure can be either a bilateral procedure (near-total or total thyroidectomy) or a unilateral procedure (lobectomy). Thyroid lobectomy alone may be sufficient initial treatment for low-risk papillary and follicular carcinomas; however, the treatment team may choose total thyroidectomy to enable RAI therapy or to enhance follow-up based upon disease features and/or patient preferences.
**TBSRTC – Non Diagnostic**

- **Incidence:** 2-20% (<10%)
- **Specimen Processed and Examined**
- ** Adequacy Criterion**
  - At least 6 groups, each with at least 10 benign-appearing, well-visualized follicular cells. (LBC? – same criteria?)
- **Exceptions**
  - Chronic lymphocytic thyroiditis
  - Abundant colloid
  - Any atypia
- **Reaspirate 3 mo (with US)**

**Recommendations**

- Pure acellular heavy colloid
  - Aspirates composed only of pure heavy colloid may be followed without reaspiration
- Cystic aspirates with watery colloid, blood and histiocytes require correlation with ultrasound findings.
- If US has “concerning features”, a repeat FNA under US guidance should be performed at least 3 months later.
- If repeat FNA is “Non-diagnostic”, correlation with family history and close clinical and US follow-up is appropriate.

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**Table 2. Comparison of nondiagnostic results between the first and second repeated FNAC**

<table>
<thead>
<tr>
<th></th>
<th>Nondiagnostic</th>
<th>Diagnostic</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st repeat</td>
<td>98 (43.6%)</td>
<td>127 (56.4%)</td>
<td>225</td>
<td>100.0%</td>
</tr>
<tr>
<td>2nd repeat</td>
<td>8 (36.8%)</td>
<td>14 (63.2%)</td>
<td>22</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>106 (42.9%)</td>
<td>141 (57.1%)</td>
<td>247</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

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**Table II. Bethesda categories of 2005 thyroid FNA samples, distributed by type of care.**

<table>
<thead>
<tr>
<th>Bethesda Category (n%)</th>
<th>Type of Care</th>
<th>Gp*</th>
<th>E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non diagnosticb</td>
<td>115/11.0</td>
<td>78/7.5</td>
<td>191/15.5</td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>743/75</td>
<td>831/81.8</td>
<td>1574/78.5</td>
<td></td>
</tr>
<tr>
<td>Atypical</td>
<td>49/4.9</td>
<td>96/9.3</td>
<td>145/6.7</td>
<td></td>
</tr>
<tr>
<td>Suspicious malignancy</td>
<td>60/6.0</td>
<td>83/8.6</td>
<td>143/6.7</td>
<td></td>
</tr>
<tr>
<td>Malignant</td>
<td>90/9.0</td>
<td>73/7.5</td>
<td>166/8.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>991/100</td>
<td>1014/100</td>
<td>2005/100</td>
<td></td>
</tr>
</tbody>
</table>

*General Practitioners (Gp) and Endocrinologists (E).

**Table III. Non-diagnostic and malignancy rates for thyroid FNAB in the literature.**

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Total</th>
<th>Total</th>
<th>Total</th>
<th>Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nelson et al (1957)</td>
<td>735</td>
<td>560</td>
<td>112</td>
<td>14%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Mauskopf et al (1963)</td>
<td>1041</td>
<td>155</td>
<td>207</td>
<td>6%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Yee &amp; Schapiro (1970)</td>
<td>3500</td>
<td>155</td>
<td>14%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schiller et al (1973)</td>
<td>2000</td>
<td>155</td>
<td>8%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kneeland et al (1982)</td>
<td>155</td>
<td>155</td>
<td>12%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pinated et al (1990)</td>
<td>155</td>
<td>155</td>
<td>12%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yee et al (1995)</td>
<td>155</td>
<td>155</td>
<td>12%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaw et al (2000)</td>
<td>155</td>
<td>155</td>
<td>12%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>This study</td>
<td>155</td>
<td>155</td>
<td>12%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**TBSRTC – BENIGN**

- **INCIDENCE: 60-65%**
- **THIS CATEGORY INCLUDES**
  - Hyperplastic/adenomatoid nodule.
  - Colloid nodule
  - Chronic lymphocytic thyroiditis
  - Graves's disease
- **F/U BY CLINICAL AND POSSIBLY US EXAMINATION**

**TBSRTC – AUS/FLUS**

- **PPV 10-30%**

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**COLLOID NODULE**

- Sparingly to moderately cellular
- Abundant colloid
- Benign follicular cells (nuclear features of papillary CA absent)
- Predominantly macrofollicles

**Hashimoto thyroiditis**

**Subacute thyroiditis (de Quervain)**

- Viral etiology, heredity (antigen HLA-B35)
- Follows acute respiratory infection
- May be unilateral (single lobe)
- Solitary nodule

- Moderate cellularity
- Cellular debris, small amounts of colloid, regressive changes of follicular cells
- Lymphocytes, PMNs and macrophages
- Multinucleated giant cells (reaction to colloid)

**DO NOT FIT EASILY INTO BENIGN OR SUSPICIOUS CATEGORIES**

- RECOMMENDED MANAGEMENT: REPEAT PNA
- AVOID OVERUSE OF THIS CATEGORY (10% USEFUL BENCHMARK OR RELATION AUS:M: 1-3)
- A SINGLE DIAGNOSIS CARRIES A LOW RISK
- IMPACT OF NEW MOLECULAR TESTS
- POST-AUS DIAGNOSIS: 50% - BENIGN AND 50% - MORE SIGNIFICANT LESION (FOLLICULAR NEOPLASM OR ABOVE) OR REPEAT AUS
**Why some specimens are classified as AUS/FLUS?**

- Something is wrong with the specimen – poor preservation, drying, etc.
- There are disturbing features in the cells (nuclear enlargement, irregularity, clearing, rare grooves) but the amount of material is insufficient for diagnosis.
- Diffuse but mild nuclear clearing with incipient irregularities of the nuclear membrane, some crowding and pseudostratification.

**TBSRTC – SUSPICIOUS FOR A FOLLICULAR NEOPLASM OR FOLLICULAR NEOPLASM**

- INCIDENCE: 7-18%
- SIGNIFICANT ARCHITECTURAL ATYPIA
  - A predominance of microfollicles and/or trabecula
  - RAISING THE POSSIBILITY OF FOLLICULAR CARCINOMA
  - DISTINCTION BETWEEN FOLLICULAR ADENOMA AND CARCINOMA
  - SURGERY (usually lobectomy) IS NEEDED FOR DEFINITIVE DIAGNOSIS

**TBSRTC – SUSPICIOUS FOR A HURTHLE CELL NEOPLASM**

- COMPOSED EXCLUSIVELY OF HURTHLE CELLS
- DIFFERENTIAL DIAGNOSIS IS DIFFERENT (MEDULLARY CA)
- DISTINCTION BETWEEN HCA AND HCC
- SURGERY (usually lobectomy) IS NEEDED FOR DEFINITIVE DIAGNOSIS
- FOLLICULAR NEOPLASM, HURTHLE CELL TYPE (ONOCYTIC VARIANT)

WHO Blue Book, Endocrine Pathology, May 2017

**TBSRTC – SUSPICIOUS FOR MALIGNANCY**

- SUSPICIOUS FOR PTC
- SUSPICIOUS FOR MEDULLARY CARCINOMA
  - Serum calcitonin level
- SUSPICIOUS FOR MALIGNANT LYMPHOMA
  - Recommendation to repeat FNA with flow cytometry
- SUSPICIOUS FOR METASTATIC CANCER

**TBSRTC – MALIGNANT**

- PAPILLARY CARCINOMA (including variants)
- MEDULLARY CARCINOMA
- POORLY DIFFERENTIATED CARCINOMA
- ANAPLASTIC CARCINOMA
- LYMPHOMA
- METASTATIC CANCERS
- OTHERS

**NIFTP**

(Non-invasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features)

**It's Not Cancer: Doctors Reclassify a Thyroid Tumor**

*The New York Times*

March 17, 2017

*It’s Not Cancer: Doctors Reclassify a Thyroid Tumor*
If EFV-PTC were considered as a non-malignant entity, what would be the alterations in malignancy ratios of each TBSRTC categories?

<table>
<thead>
<tr>
<th>TBSRTC</th>
<th>ROM with NIFTP (%)</th>
<th>Optional Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nondiagnostic</td>
<td>0-5</td>
<td>None</td>
</tr>
<tr>
<td>Benign</td>
<td>0-3</td>
<td>None</td>
</tr>
<tr>
<td>AUS</td>
<td>10-30 (6-18)</td>
<td>None</td>
</tr>
<tr>
<td>SFN</td>
<td>25-60 (10-40)</td>
<td>Yes</td>
</tr>
<tr>
<td>SFM</td>
<td>50-75 (45-60)</td>
<td>Yes</td>
</tr>
<tr>
<td>Malignant</td>
<td>97-99 (94-96)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Histopathologic Diagnostic Criteria for NIFTP

1. Encapsulation or clear demarcation
2. Follicular growth pattern with <1% papillae, no psammoma bodies & <30% solid/trabecular/insular growth pattern
3. Nuclear score of 2 or 3
4. No vascular or capsular invasion
5. No tumour necrosis
6. No high mitotic activity

AUS, Benign, SFN, SFM categories are based on the complete sampling of the TBSRTC component of the lesion.

Nondiagnostic and Malignant categories are based on the TBSRTC component and not on the NIFTP component.

http://www.niftp.org/Criteria_for_NIFTP.html