Extent of Initial Surgery for Differentiated Thyroid Cancer

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No conflicts of interest or financial relationships to disclose
Objectives

1. Define the indications for total versus partial thyroidectomy

2. Define the indications for central and lateral neck dissection, including how DTC and MTC differ in this at initial surgery

3. Understand the relative benefits and risks of complications from surgery
Contemporary “2009” Surgical Therapy for Differentiated Thyroid Cancer

**Total Thyroidectomy or Near-total:**

- PTC $\geq 1$ cm
- PTC $< 1$ cm with contralateral disease, metastases, local invasion, XRT history, FMH of PTC

Completion thyroidectomy for FTC $\geq 1$ cm

**Lobectomy:**

- PTC or FTC $< 1$ cm that is unifocal, without invasion or metastases

ATA 2009 Guidelines level “A”, AACE, SSO
**Contemporary “2015” Surgical Therapy for Differentiated Thyroid Cancer**

**Total Thyroidectomy or Near-total:**
- PTC $>4$ cm
- gross extrathyroidal extension (clinical T4)
- clinically apparent lymph node mets (N1)
- distant metastases (M1)

**Lobectomy or TT/near TT:**
- PTC or FTC $>1$ cm and $<4$ cm
- without extrathyroidal extension
- without involved LN (cN0)

*Recommendation 35 “strong with moderate-quality evidence”; ATA Guidelines 2015*
Why Total or Near-Total Thyroidectomy?

- Reduces local recurrence (multicentric disease, intrathyroidal metastases)
- Improves disease-specific mortality (Bilimoria Ann Surg 2007)
- Facilitates diagnostic and therapeutic RAI
- Facilitates interpretation of Tg for monitoring cancer recurrence

**BUT LOBECTOMY HAS MERITS**

- Not all need RAI or “routine RAI”
- Some may avoid LT4 dependence
- Outcomes appear comparable
Defining Total or Near-Total Thyroidectomy
What Remains *After* Total or Near-Total thyroidectomy
Expectations of Modern Thyroid Surgery

**Benefits** (Cure)

**Risks**

- Infection & Bleeding (hematoma) ½%
- Hypocalcemia 1% (transient 10%)
- Nerve injury/hoarseness 1-2% (transient 10%)

Modern era of surgical sub-specialization: "experienced thyroid surgeon"
Innovations in Modern Thyroid Surgery

**MIVAT**

Miccoli, *Head & Neck Onc* 2010

**TOVAT: transoral**

Benhidjeb, *Surg Endosc* 2010

**ROBOTICS**

Chung, *JACS* 2009

**TASIET: transareolar**

Fan, *Surg Endosc* 2010
Neck Dissection for Differentiated Thyroid Cancer at Initial Surgery

**Therapeutic:** Accompanies initial TT when lymph nodes are clinically involved
RECOMMENDATION 36
(A) Therapeutic central-compartment (level VI) neck dissection for patients with clinically involved central nodes should accompany total thyroidectomy to provide clearance of disease from the central neck. (Strong recommendation, Moderate-quality evidence)

RECOMMENDATION 37
Therapeutic lateral neck compartmental lymph node dissection should be performed for patients with biopsy-proven metastatic lateral cervical lymphadenopathy. (Strong recommendation, Moderate-quality evidence)

2015 ATA Guidelines
Why Perform Cervical Lymphadenectomy?

- Remove disease: clinically +LN in adults 10-20%, children 80%; prophylactic dissections 80%
- Staging: +LN worsen prognosis in select patients
- Local invasion/tissue destruction with time
- RAI and immune system may not destroy all LN metastases
Lymph Node Disease Manifests

- As a lateral neck mass
- As a thyroid/central neck mass
- Asymptomatic nodal disease identified synchronously with newly diagnosed thyroid mass
- Ideally before surgery
- At times (especially in central neck) only during surgery
Mechanisms of Lymph Node Evaluation: Ultrasound and CT

**Ultrasound**

- What areas: central neck (6), both lateral necks (levels 1-5)
- Advised *before* all initial thyroid surgery and now at time of initial evaluation of thyroid nodules

ATA 2015, AIUM 2013, Kouvaraki et al Surgery 2004
Computer Tomography (CT)

- Contrast always gives clearer anatomy
- Indications
  - ✓ Extensive thyroid cancer
  - ✓ Extensive nodal disease
  - ✓ Suspicion of aerodigestive invasive disease
  - ✓ Suspicion of mediastinal disease
  - ✓ Suspicion of distant metastatic disease
Consensus Statement on the Terminology and Classification of Central Neck Dissection for Thyroid Cancer

ATA/AAES/AAO-HNS/AHNS

Carty et al

THYROID
Volume 19, Number 11, 2009
© Mary Ann Liebert, Inc.
DOI: 10.1089/thy.2009.0159
Terminology of Neck Dissections for Thyroid Cancer
Terminology of Neck Dissections for Thyroid Cancer

modified radical, compartmental or selective, radical (rare), sampling/”berry-picking” (rare)
Modified Radical Neck Dissection

Preserves
SCM
internal jugular vein
spinal accessory nerve
**Frequency of Lateral Neck Lymph Node Involvement**

Level 1: <5%
Level 2: ~53%
  - 2a: 53%
  - 2b: 15%
Level 3: ~70%
Level 4: ~66%
Level 5: ~25%
  - 5a: 8%
  - 5b: 21%

Eskander et al. *Thyroid* 2013
Integral Steps for Lateral Neck Dissections

Selective Neck Dissection: Key Landmark Exposure and Surgical Strategy
Luk Lauren, Milas Mira, and Shindo Maisie
Lateral Neck Dissection

Courtesy Dr. Zvonimir Milas, Charlotte Medical Center
Lateral Cervical Lymph Nodes
Total thyroidectomy with matted central neck lymph node metastases (pathology lymph node counting example)
Central Neck Dissection

Courtesy Dr. Zvonimir Milas, Charlotte Medical Center
Patient: 24 yo woman with PTC

**Final path**

- PTC 3 cm, right lobe
- PTC 1 cm, left lobe
- 3/9 +LN, central neck
- Occasional tall cell features
- No extrathyroidal extension

**Surgical specimen**

**Post-op**

- Tg 0.3
- +TgAB
- TSHR mRNA <1
Neck Dissection for Differentiated Thyroid Cancer at Initial Surgery

Prophylactic: May be performed for central neck with initial TT when lymph nodes are clinically uninvolved, especially for advanced (T3 or T4) primaries (ATA 2009 level “C”).

Prophylactic central neck dissection can be avoided in most small (T1 or T2), noninvasive, clinically node-negative PTC and most FTC (level “C”). Prophylactic lateral neck dissection is not recommended.
Neck Dissection for Differentiated Thyroid Cancer at Initial Surgery: 2015 ATA

RECOMMENDATION 36

(B) Prophylactic central-compartment neck dissection (ipsilateral or bilateral) should be considered in patients with papillary thyroid carcinoma with clinically uninvolved central neck lymph nodes (cN0) who have advanced primary tumors (T3 or T4) or clinically involved lateral neck nodes (cN1b), or if the information will be used to plan further steps in therapy. (Weak recommendation, Low-quality evidence)

(C) Thyroidectomy without prophylactic central neck dissection is appropriate for small (T1 or T2), noninvasive, clinically node-negative PTC (cN0) and for most follicular cancers. (Strong recommendation, Moderate-quality evidence)
Prophylactic lateral-compartment neck dissection not advised not performed
## Extent of Initial Surgery: DTC versus MTC

<table>
<thead>
<tr>
<th>Procedure</th>
<th>DTC</th>
<th>MTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Thyroidectomy</td>
<td>Most often</td>
<td>Always</td>
</tr>
<tr>
<td>Therapeutic Lateral and Central Neck Dissection</td>
<td>Always</td>
<td>Always</td>
</tr>
<tr>
<td>Prophylactic Lateral Neck Dissection</td>
<td>Never</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Prophylactic Central Neck Dissection</td>
<td>Sometimes</td>
<td>Always</td>
</tr>
</tbody>
</table>
Extent of Initial Surgery for Differentiated Thyroid Cancer

- Thyroid cancer is a surgical disease
- "Extent" or "old is new again" or "what comes around goes around"
- Ultrasound improves
  - Diagnostic accuracy
  - Timeliness
- Comprehensive or optimal surgery once
- Ability to relieve patient anxiety
**After Thyroid Surgery**

**MANAGEMENT**
- Hypothyroidism
- Hypocalcemia
- Pain/nausea
- Activities/recovery
- Inpatient/outpatient
- Diagnostic confirmation
- Treatment plan

**COMPLICATIONS**
- Hoarseness
- Hypocalcemia
- Hematoma/Seroma
- Infection
- Chyle leak
- Cervical nerve issues
- *Improper US/FNA*
- *Lack of US pre-op*
Strategic Approach to Surgery by Endocrine Surgeons

• “Protect the nerve, save the parathyroids, and oh-by-the-way while you are there, do not forget to remove the thyroid.”

Collin Weber MD (Emory)

• “90% of the surgery is performed before the patient gets to the operating room”
"We always hope for the easy fix: the one simple change that will erase a problem in a stroke. But few things in life work this way. Instead, success requires making a hundred small steps go right - one after the other, no slipups, no goofs, everyone pitching in."
Resources

Controversies in Thyroid Surgery
John B. Hanks
William B. Inabinet III
Editors

Thyroid Surgery
PREVENTING AND MANAGING COMPLICATIONS
EDITED BY:
Paolo Miccoli | David J. Terris
Michele N. Minuto | Melanie W. Seybt

PARATHYROID SURGERY
Fundamental and Advanced Concepts
David J. Terris
William S. Duke
Janice L. Pasieka

Springer
WILEY-BLACKWELL
PLURAL PUBLISHING
HOARSENESS and “Voice Changes”
Protection of the Recurrent Laryngeal Nerve (RLN)

Courtesy J. Mitchell, Cleveland
Hoarseness

✓ 1-2% permanent
✓ 10-15% temporary
✓ Recovery expected by 6 months
✓ Normal speaking voice does NOT exclude nerve injury
  ....before or after surgery....
✓ Raspy/hoarse voice does NOT mean nerve injury
✓ Voice quality/tone/pitch
Prevention and Treatment

• Set expectations pre-op

“A surgeon who says he’s never had a nerve injury is either not honest enough or not experienced enough.”

Peter Angelos MD, PhD

“Giant” 500 grams*

“Large” 50 grams

“Normal” 15 grams
Prevention and Treatment

- Set expectations pre-op
- Laryngeal ultrasound/laryngoscopy
- Identify & keep RLN in view
- NIM monitoring
- Laryngoscopy post-op
- Referral to laryngologist early
- Procedures to rehabilitate voice
- “Tincture of time”
- Be available and supportive
HYPOCALCEMIA and Parathyroids
Hypocalcemia

✓ 12% temporary
✓ <1%-2% permanent
✓ Normal Dietary Daily Needs
  500-600 mg BID-TID calcium
  1000-4000 IU vit D
✓ Risk higher with Graves’ disease, central neck dissection, prior surgeries, GI malabsorption
Therapy of Symptomatic Hypocalcemia

Oral calcium supplements (500mg/hr)
Vitamin D-25 (OTC)
Vitamin D 1, 25 (Rocaltrol)
Magnesium (400 mg BID)
Potassium
Rarely IV Calcium (calcium gluconate)
Rarely parathyroid transplantation
NatPara (Injectable PTH)
Tincture of time
BIOAVAILABILITY VARIES

<table>
<thead>
<tr>
<th>Salt</th>
<th>Elemental Ca</th>
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<tr>
<td>Calcium Acetate</td>
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<tr>
<td>Calcium Carbonate</td>
<td>19.9 mEq</td>
</tr>
<tr>
<td>Calcium Citrate</td>
<td>10.5 mEq</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>13.6 mEq</td>
</tr>
<tr>
<td>Calcium Glubionate</td>
<td>3.29 mEq</td>
</tr>
<tr>
<td>Calcium Gluceptate</td>
<td>4.08 mEq</td>
</tr>
<tr>
<td>Calcium Gluconate</td>
<td>4.65 mEq</td>
</tr>
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</table>
Applies to Harvard Vanguard Endocrinology patients undergoing total thyroidectomy, completion thyroidectomy, or surgery for PRIMARY hyperparathyroidism at Beth Israel Deaconess Hospital.

**CALCIUM MANAGEMENT FOR HARVARD VANGUARD PATIENTS ON ENDOCRINE SURGERY SERVICE AT BETH ISRAEL DEACONESS HOSPITAL**

**IN THE HOSPITAL—BIDMC STAFF**

- All patients start **standard oral regimen** immediately post-op:
  - Increased calcium carbonate to 1250 mg Q 6 hrs (each 1250 mg tablet contains 500 mg elemental calcium)
  - Calcitriol (Rocaltrol) 0.25 mcg once a day

- Check calcium in AM (fasting) on POD 1
  - Calcium < 7.5
    - Increase calcium carbonate to 2500 mg (two 1250-mg tablets = 1000 mg elemental calcium) Q 6 hrs
    - Increase calcitriol (Rocaltrol) to 0.5 mcg once a day
    - Recheck calcium in afternoon
    - Discharge when calcium ≥ 7.8
  - Calcium 7.5–8.0
    - Increase calcium carbonate to 2500 mg (two 1250-mg tablets = 1000 mg elemental calcium) Q 6 hrs
    - Continue calcitriol (Rocaltrol) 0.25 mcg once a day
    - Recheck calcium in afternoon
    - Discharge when calcium ≥ 7.8
  - Calcium 8.1–8.9
    - Discharge home on calcium carbonate 1250 mg (500 mg elemental calcium) 4 times daily, and calcitriol (Rocaltrol) 0.25 mcg once daily
  - Calcium ≥ 9.0
    - Stop calcitriol (Rocaltrol)
    - Discharge on calcium carbonate 1250 mg (500 mg elemental calcium) 3 times daily

- **PATIENTS WHO ARE DISCHARGED ON DAY OF SURGERY (and therefore do not have a POD 1 calcium level) should be started on the **standard oral regimen** with calcium and calcitriol (Rocaltrol) outlined above and discharged on this regimen with instructions to have a calcium level drawn at Harvard Vanguard on POD 3. If POD 3 falls on a Saturday, the calcium level should be drawn on Friday before noon (POD 2); if POD 3 falls on a Sunday, the calcium level should be drawn on Monday before noon (POD 4). Other than this, follow same instructions below as for all other patients.

- **ALL PATIENTS UPON DISCHARGE:**
  - Educate regarding signs and symptoms of hypocalcemia
  - Provide prescription for 10-day supply of calcitriol (Rocaltrol) if being discharged on Rocaltrol

Provide instructions for purchasing OTC calcium tablets: patients should be specifically instructed to purchase OsCal tablets. Any OsCal brand tablet (including
Serum Calcium

- <7.0 mg/dl
- 7-8 mg/dl
- >8.0 mg/dl

500 mg po q1 hr
Calcitriol 0.5 mcg BID
Calcium gluconate
Monitor labs and ECG
Does NOT go home

Ionized Calcium

- <1.0 mmol/L
- 1.0-1.1 mmol/L
- >1.0 mmol/L

“Standard”
Plus
& Thinking required

“Standard”
Plus

500 mg Ca TID with meals
1000 IU vitD qd
Increase if symptoms

“Standard”

“Standard”

& Thinking required

Does NOT go home
Prevention and Treatment

- Set expectations pre-op
- Calcium supplements before surgery for Graves’ disease
- PTH measurement
- Educate about symptoms
- Have “antidotes” ready
HEMATOMA and SEROMA
Bleeding/Neck hematoma

✓ 1% need to return to surgery
✓ Transfusion rarely needed
✓ Deep or superficial bleeding
✓ Risk factors: HTN, Graves’ disease, anticoagulation, huge or substernal goiters, re-operations
✓ NO CPAP post-op
Post Operative Hematoma

- **Timing**
  - Of 13,817 patients (thyroid and parathyroid); 42 patients with hematoma

![Pie chart showing the timing of hematoma](chart.png)

- 43% Within 6 hours
- 38% 7-24 hours
- 19% > 24 hours

32ccs lighter. Clear fluid. All is well. Thank you!
INFECTION

✓ Rarest complication
✓ Pre-operative antibiotics NOT necessary
✓ Outpatient antibiotics rare
✓ Tape/surgical glue allergies: steroid creams
The Wagner Steri-strip Classification

TOP 10 STERI-STRIPPING ERRORS TO AVOID

1. Too far apart
2. Too close together
3. Strips beyond end of incision
4. Overlapping strips
5. Too crooked
6. Wound gaps
7. Wound buckles
8. Too long
9. Too short
10. Unevenly spaced

JUST RIGHT!!
How to Cope with Complications

Communication
Be honest
Be available
Be present
Be courageous
Be encouraging
Be patient

Patients are scared
Until they are well,
you are not done

“Life requires courage. Courage animates us and is therefore essential to the human experience.”

Taken from Dynamic Catholic’s DECISION POINT
Update from WCTC 2017 on surgically relevant topics

- Low-risk Disease
- NIFTP
- New molecular markers
- New Bethesda grading

Goal: To facilitate optimal matching of treatment to disease severity

......avoid surgery.....lobectomy only.....
“This is a pleasant woman who had neck pain. She saw her PCP…thyroid ultrasound was ordered. Unfortunately the technician told her that she has a hypervascular nodule, that looks cancerous, and she should be taking care of it. She presented today for the thyroid biopsy. She feels that nodule is growing in her neck. She is extremely anxious and she lost a lot of sleep over this particular thyroid nodule. TSH 1.2. She is using naturopathic medication for her anxiety disorder. “
ADDENDUM Cytology Report

Diagnosis
Left Lower Thyroid: Atypia of undetermined significance (Bethesda Category III).

Microscopic Description: The ThinPrep shows small follicular cells with uniform nuclei admixed with clusters of atypical follicular cells with enlarged irregular nuclei, intranuclear chromatin clearing and subtle intranuclear grooves in a background of thick colloid and rare lymphoid tangles.

Gross Description: Received in cytolyt are 30 ml of clear fluid for cellular enhancement. Received is a 1.5 ml molecular ThyroSeq tube. tc

PHOTOMICROGRAPH

Specimen 1: Left Lower Thyroid
Microfollicular arrangements.

Specimen 1: Left Lower Thyroid
Atypical follicular cells.

Comments
The Thyroid Cancer Mutation Panel (Thyroseq) is pending and the findings will be reported separately and as an addendum.
## ROM Updates in Next Bethesda

<table>
<thead>
<tr>
<th>Category</th>
<th>2009</th>
<th>Revised</th>
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<tbody>
<tr>
<td>Non-Diagnostic</td>
<td>0-4%</td>
<td>5-10%</td>
</tr>
<tr>
<td>Benign</td>
<td>0-3%</td>
<td>0-3%</td>
</tr>
<tr>
<td>AUS/FLUS</td>
<td>5-15%</td>
<td>10-30%</td>
</tr>
<tr>
<td>Susp for Follicular Neoplasm</td>
<td>15-30%</td>
<td>25-40%</td>
</tr>
<tr>
<td>Susp for Hurthle Cell Neoplasm</td>
<td>15-30%</td>
<td>25-40%</td>
</tr>
<tr>
<td>Suspicious for Malignancy</td>
<td>60-75%</td>
<td>50-75%</td>
</tr>
<tr>
<td>Malignant</td>
<td>97-99%</td>
<td>97-99%</td>
</tr>
</tbody>
</table>

*Courtesy Bill Faquin MD, PhD*
Revised ATA Guidelines - Includes Molecular Testing Option

<table>
<thead>
<tr>
<th>Category</th>
<th>Management</th>
<th>ROM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Diagnostic</td>
<td>Repeat with U/S</td>
<td>0-4%</td>
</tr>
<tr>
<td>Benign</td>
<td>Clin + U/S F/U</td>
<td>0-3%</td>
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<tr>
<td>AUS/FLUS</td>
<td>Repeat FNA, Molecular, Lobectomy</td>
<td>5-15%</td>
</tr>
<tr>
<td>Susp for Follicular Neoplasm</td>
<td>Molecular, Lobectomy</td>
<td>15-30%</td>
</tr>
<tr>
<td>Susp for Hurthle Cell Neoplasm</td>
<td>Molecular, Lobectomy</td>
<td>15-30%</td>
</tr>
<tr>
<td>Suspicious for Malignancy</td>
<td>Lobectomy, Total thyroid, Molecular</td>
<td>60-75%</td>
</tr>
<tr>
<td>Malignant</td>
<td>Total thyroidectomy</td>
<td>97-99%</td>
</tr>
</tbody>
</table>

*Courtesy Bill Faquin MD, PhD*
FINAL DIAGNOSIS:
THYROID, LEFT LOWER, FNA, OSS F16NY1-0105993/C16NY1-0103252, 5/9/2016, FROM CBLPATH, INC., MOLECULAR & GENOMIC PATHOLOGY LABORATORY TESTING:

Next Generation Sequencing Panel for Thyroid Cancer (ThyroSeq v2)

RESULTS:

THADA fusion (THADA/IGF2BP3) IDENTIFIED, see INTERPRETATION below.

INTERPRETATION
In this case, a fusion involving the THADA and IGF2BP3 genes was identified. THADA is known to participate in rearrangements in thyroid nodules (1,2), and in our validation series was observed in ~5% of thyroid cancers. All fusion-positive nodules in our series were encapsulated follicular variant of papillary carcinoma without invasion, many of which can, based on the recently introduced criteria (3), be diagnosed as “Non-invasive follicular thyroid neoplasms with papillary-like nuclear features” (NIFTP). One publication reported rearrangements involving the THADA gene in benign follicular adenomas (2). Based on these data, it is most likely that the nodule carrying THADA/IGF2BP3 fusion is a low-grade encapsulated follicular variant of papillary cancer or a NIFTP, and, in specific clinical situations, many of these nodules may be successfully treated by hemithyroidectomy. Correlation with cytological, imaging, and other clinical data is recommended.

Ref:

The tested sample is NEGATIVE for point mutations and indels in the hotspots of the following genes:
AKT1  BRAF  CTNNB1  EIF1AX  GNAS  NRAS  HRAS  KRAS  PIK3CA  PTEN  RET  TERT  TP53  TSHR

The tested sample is NEGATIVE for 42 gene fusions involving the following genes:
RET  PPARG  NTRK1  NTRK3  ALK  BRAF

THADA fusion suggesting NIFTP
“Do I really have to have my whole thyroid removed?

“I googled this…and it sounds like to me this is not even a cancer….so do I need surgery at all?”
Comment: The nodule is comprised of small follicles, some of which contain colloid. Follicular cells are small and round. Nuclear chromatin is punctate and there are small chromocenters. Papillary architecture, chromatin clearing, and cytoplasmic intranuclear inclusions are not observed. Features are consistent with follicular adenoma. Slide reviewed at the morning QA slide conference with all in attendance concurring with the diagnosis and interpretation. RR/aim
Update from WCTC 2017 on surgically relevant topics

- NIFTP

**JAMA Oncol. 2016;2(8):1023-1029**

**Nomenclature Revision for Encapsulated Follicular Variant of Papillary Thyroid Carcinoma**

A Paradigm Shift to Reduce Overtreatment of Indolent Tumors

Yuri E. Nikiforov, MD, PhD; Raja R. Seethala, MD; Giovanni Tallini, MD; Zubair W. Baloch, MD, PhD; Fulvio Basolo, MD; Lester D. R. Thompson, MD; Justine A. Barletta, MD; Bruce M. Wenig, MD; Abir Al Ghuzlan, MD; Kennichi Kakudo, MD, PhD; Thomas J. Giordano, MD, PhD; Venancio A. Alves, MD, PhD; Elham Khanafshar, MD, MS; Sylvia L. Asa, MD, PhD; Adel K. El-Naggar, MD; William E. Gooding, MS; Steven P. Hodak, MD; Ricardo V. Lloyd, MD, PhD; Guy Maytal, MD; Ozgur Mete, MD; Marina N. Nikiforova, MD; Vanla Nosé, MD, PhD; Mauro Papotti, MD; David N. Poller, MB, ChB, MD, FRCPath; Peter M. Sadow, MD, PhD; Arthur S. Tischler, MD; R. Michael Tuttle, MD; Kathryn B. Wall; Virginia A. Livolsi, MD; Gregory W. Randolph, MD; Ronald A. Ghossein, MD
Update from WCTC 2017 on surgically relevant topics

• NIFTP

Before: noninvasive encapsulated follicular variant of papillary thyroid cancer

Now: noninvasive follicular thyroid neoplasm with papillary-like nuclear features

JAMA Oncol. 2016;2(8):1023-1029
Diagnostic Criteria for NIFTP (“very low risk of adverse outcome”)

1. Encapsulation
2. Follicular growth pattern
3. Nuclear features of PTC
4. No vascular or capsular invasion
5. No tumor necrosis
6. No high mitotic activity

JAMA Oncol. 2016;2(8):1023-1029
Figure 2. Putative Scheme of Thyroid Carcinogenesis

<table>
<thead>
<tr>
<th>Growth Pattern</th>
<th>Nuclear Features of PTC</th>
<th>Main Oncogene</th>
<th>Stage 1</th>
<th>Stage 2</th>
</tr>
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<tbody>
<tr>
<td>Papillary</td>
<td>Yes</td>
<td>BRAF</td>
<td>Papillary microcarcinoma</td>
<td>Classic PTC</td>
</tr>
<tr>
<td>Follicular</td>
<td>Yes</td>
<td>RAS</td>
<td>NIFTP</td>
<td>Invasive EFVPTC</td>
</tr>
<tr>
<td>Follicular</td>
<td>No</td>
<td>RAS</td>
<td>Follicular adenoma</td>
<td>Follicular thyroid carcinoma</td>
</tr>
</tbody>
</table>
**NIFTP**

**Clinical questions:**
- What is the natural history of non-resected NIFTP?
- What is the proper extent of surgery? For >4 cm?
  “needs to be removed but lobectomy sufficient”

**Conceptual questions:**
- Evolving vocabulary beyond binary system (benign/cancer)
  “Not a benign tumor”
  “Low-risk neoplasm”

**Molecular profile:**
RAS, PPARγ, THADA fusion, E1F1AX, BRAF K601E

Baloch et al Endocrine Practice 2017; 2016; LiVolsi Diagnostic Cytopathology 2017; Xu/Tallini/Ghossein Endocr Pathol 2017; Rosario Endocr Pathol 2017
"I went to Shanghai for my annual check-up. For $200 we did all of this in one day."
超声所见：
甲状腺左叶大小约3.9x1.3x1.6cm，甲状腺右叶大小约4.0x1.4x1.2cm，峡部厚0.2cm，甲状腺形态大小正常，右叶见大小约0.66x0.78cm的低回声结节，纵横比>1，内可见强回声囊，左叶可见大小约0.18x0.13cm的囊性结节，内可见强回声点，余甲状腺实质回声尚均匀，CDFI：甲状腺内彩色血流信号未见明显异常。
双侧颈前扫查未见明显肿大淋巴结回声。

病理诊断：
（右甲结节针吸）：提示甲状腺乳头状癌。
Update from WCTC 2017 on surgically relevant topics

• Low-risk Disease

Observation for papillary thyroid microcarcinoma? Not all micro PTC behave the same…
Who can avoid surgery?
Who can have unilateral surgery/lobectomy?
Accurate assessment of anatomic surroundings…
Genetic milieu?
The Future of Surgery
Dr. Mamoona Khokhar

UMDNJ Medical School, AOA
Brown University (Surgery Residency)
Columbia University (Endocrine Surgery)

Surgical Education
Ultrasound
Global Medicine
Adrenalectomy, all approaches

Banner – University Medical Center Phoenix
Endocrine Surgery Center
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SUMMARY

- Practice shift towards less extensive surgery at initial operation for DTC
- Ultrasound remains key
- Managing patient’s expectations for cure and surgical recovery
- Stay tuned for updates in 2020