NEW ENGLAND CHAPTER OF AACE

Endocrine-Surgical Collaborative Program

SATURDAY, APRIL 8, 2017
MASSACHUSETTS EYE AND EAR (MEEI)
243 CHARLES ST BOSTON, MA 02114

Online Registration Address:
https://www.aace.com/chapters/new-england
ATA Low Risk Thyroid Cancer

Yuri Nikiforov
Anna Sawka
Greg Randolph
Surgical management of low-risk thyroid cancer

1- ATA Low risk
2- MPTC observation
3- NIFTP
4- Complications
Relevant Financial Disclosures - None
Incidence

We do have a problem...
• Review of **OVERDIAGNOSIS** of thyroid cancer over the past two decades in selected high-income countries

• Excess “Diagnosis of thyroid tumors that would not, if left alone, result in symptoms or death”
Dramatic rise in Thyroid cancer- mainly small PTC beyond the # predicted by multistage modelling
Armitage & Doll

Mortality  UNCHANGED
Changes in age-specific incidence rates per 100,000 of thyroid cancer in Women: observed vs expected* (from selected countries, 1988-2007)

* under the multistage model of carcinogenesis
Country site: # of overdiagnosed cases
Between 1988-2007
USA = 228,000
Italy = 65000
France = 46000
Japan = 36000
Australia = 10000
Between 1993-2007
South Korea = 77000
...but mortality stable

Chen Cancer 2009
And after surgery we do a lot …

### Table 3 | Association between imaging and disease specific survival in thyroid cancer

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Disease specific survival Adjusted hazard ratio (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neck ultrasound</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1 (reference)</td>
<td>0.087</td>
</tr>
<tr>
<td>Yes</td>
<td>1.14 (0.98 to 1.27)</td>
<td></td>
</tr>
<tr>
<td><strong>Radioiodine (iodine 131) scan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1 (reference)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Yes</td>
<td>0.70 (0.60 to 0.82)</td>
<td></td>
</tr>
<tr>
<td><strong>PET scan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1 (reference)</td>
<td>0.25</td>
</tr>
<tr>
<td>Yes</td>
<td>0.91 (0.77 to 1.07)</td>
<td></td>
</tr>
</tbody>
</table>

Analysis based on patients with complete set of information (n = 22776)
Surgical management of low-risk thyroid cancer

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Massachusetts Eye and Ear • Beth Israel Deaconess Medical Center • Boston Children’s Hospital
Brigham and Women’s Hospital • Massachusetts General Hospital
2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer

The American Thyroid Association (ATA) Guidelines Taskforce on Thyroid Nodules and Differentiated Thyroid Cancer

ATA - Degree of Thyroid Surgery
2015 RECOMMENDATION 35

• A) For patients with thyroid cancer >4 cm, or with gross extrathyroidal extension (clinical T4), or clinically apparent metastatic disease to nodes (clinical N1) or distant sites (clinical M1), the initial surgical procedure should include a near-total or total thyroidectomy and gross removal of all primary tumor unless there are contraindications to this procedure. (Strong Recommendation, Moderate-quality evidence)

• B) 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. (Strong Recommendation, Moderate-quality evidence)

• C) If surgery is chosen for patients with thyroid cancer <1 cm without extrathyroidal extension and cN0, the initial surgical procedure should be a thyroid lobectomy unless there are clear indications to remove the contralateral lobe. Thyroid lobectomy alone is sufficient treatment for small, unifocal, intrathyroidal carcinomas in the absence of prior head and neck irradiation, familial thyroid carcinoma, or clinically detectable cervical nodal metastases. (Recommendation, Moderate-quality evidence)
2015 RECOMMENDATION 35

• A) For patients with thyroid cancer >4 cm, or with gross extrathyroidal extension (clinical T4), or clinically apparent metastatic disease to nodes (clinical N1) or distant sites (clinical M1), the initial surgical procedure should include a near-total or total thyroidectomy and gross removal of all primary tumor unless there are contraindications to this procedure. (Strong Recommendation, Moderate-quality evidence)

  – Total thyroidectomy as the primary initial surgical treatment option for nearly all differentiated thyroid cancers has been reported to have improved survival \(^a\), low recurrence rates \(^b-d\), allows for routine use of RAI remnant ablation, and facilitated detection of recurrent/persistent disease during follow-up

\(^b\)Grant CS, Hay ID, Gough IR, Bergstralh EJ, Goellner JR, McConahey WM 1988 Local recurrence in papillary thyroid carcinoma: is extent of surgical resection important? Surgery 104:954-962
\(^d\)Mazzaferri EL, Kloos RT 2001 Clinical review 128: Current approaches to primary therapy for papillary and follicular thyroid cancer. J Clin Endocrinol Metab 86:1447-1463
B) 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). (Strong Recommendation, Moderate-quality evidence)
2015 RECOMMENDATION 35

- Factors supporting unilateral surgery for low to intermediate risk patients:
  
  Contralateral US, No ETE, No nodes

- A selective approach towards use of RAI in low to intermediate risk patients has also prompted critical reassessment of the extent of surgery required.

- With proper patient selection, loco-regional recurrence rates of less than 1-4% and completion thyroidectomy rates of less than 10% can be achieved following thyroid lobectomy.

a-e.

- Barney BM, Hitchcock YJ, Sharma P, Shrieve DC, Tward JD 2011 Overall and cause-specific survival for patients undergoing lobectomy, near-total, or total thyroidectomy for differentiated thyroid cancer. Head Neck 33:645-649
- Haigh PI, Urbach DR, Rotstein LE 2005 Extent of thyroidectomy is not a major determinant of survival in low- or high-risk papillary thyroid cancer. Ann Surg Oncol 12:81-89
- Vaisman F, Shaha A, Fish S, Michael 2011 Initial therapy with either thyroid lobectomy or total thyroidectomy without radioactive iodine remnant ablation is associated with very low rates of structural disease recurrence in properly selected patients. Clin Endocrinol (Oxf) 75:112-119
C) If surgery is chosen for patients with thyroid cancer <1 cm without extrathyroidal extension and cN0, the initial surgical procedure should be a thyroid lobectomy unless there are clear indications to remove the contralateral lobe. Thyroid lobectomy alone is sufficient treatment for small, unifocal, intrathyroidal carcinomas in the absence of prior head and neck irradiation, familial thyroid carcinoma, or clinically detectable cervical nodal metastases. (Strong Recommendation, Moderate-quality evidence)
In this low risk conversation...what about nodes???

Can you have “low risk” nodes???
All animals are equal, but some animals are more equal than others. A proclamation by the pigs.

Animal Farm by George Orwell

All nodes are not created equal.
Incidence of Macromet in Relation to Age of Patients

Clinically apparent = Macroscopic nodal disease
1-Physical exam
2-Radiographic – US and or CT
3- Grossly abnormal at surgery

Detection by US or intraop
Gemsenjar 03, Cranshaw 08, Gilliland 92, Hay 98, Bardet 08
Micromet prevalence overall

- Micromet in clinically N0 neck operated on prophylactically (9 studies)
  -23-81%
Micromet surgical results

• Noguchi 70 prophylactic neck dissections >50% LN <3mm

• Roh 08 prophylactic central dissections mean LN size 3.5mm +/-2.4mm (range 1-10mm)

• Verges 10 prophylactic central dissections max LN <5mm in 66% and <10mm in 95%
Macromets 35%
Micromets 21-81%
The **Prognostic Significance of Nodal Metastases** from Papillary Thyroid Carcinoma Can Be Stratified Based on the **Size** and Number of Metastatic Lymph Nodes, as Well as the Presence of Extranodal Extension

Gregory W. Randolph,¹ Quan-Yang Duh,² Keith S. Heller,³ Virginia A. LiVolsi,⁴ Susan J. Mandel,⁵ David L. Steward,⁶ Ralph P. Tufano,⁷ and R. Michael Tuttle⁸ for the American Thyroid Association Surgical Affairs Committee’s Taskforce on Thyroid Cancer Nodal Surgery
PTC rates of nodal recurrence

- cN0: 4%
- Micro+: 6%
- Macro+: 21%

Wada 08, Bardet 08, Ito 04,05,09, Gemsenjagen 03, Cranshaw 08
2015 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), 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 may be appropriate for **small (T1 or T2), noninvasive, clinically node-negative PTC (cN0) and for most follicular cancer.** (Strong Recommendation, Moderate-quality evidence)
pCND and Staging

“Microscopic upstaging”

- **Doherty 2010**: prophylactic CND:
  - 29% of pts > 45 years upstaged by prophylactic CND

- **Shindo 2006**: prophylactic CND:
  - 39% of pts > 45 years upstaged by prophylactic CND

- **Serra 2005**: prophylactic CND:
  - 39% upstaged by prophylactic CND
RECOMMENDATION 36

No microscopic upstaging

- The information from prophylactic central neck dissection must be used cautiously for staging information. Since microscopic nodal positivity occurs frequently, prophylactic dissection often converts patients from clinical N0 to pathologic N1a, upstaging many patients over age 45 from American Joint Committee on Cancer (AJCC) stage I to stage III. However, microscopic nodal positivity does not carry the recurrence risk of macroscopic clinically detectable disease.

b. Randolph GW, Duh QY, Heller KS, Livolsi VA, Mandel SJ, Steward DL, Tufano RP, Tuttle RM 2012 The prognostic significance of nodal metastases from papillary thyroid carcinoma can be stratified based on the size and number of metastatic lymph nodes, as well as the presence of extranodal extension. Thyroid 22:1144-1152
2015 RECOMMENDATION 48

No Braf prognostic testing -- pCND

- C) While not routinely recommended for initial post-operative risk stratification in DTC, the mutational status of BRAF, and potentially other mutations such as TERT, have the potential to refine risk estimates when interpreted in the context of other clinico-pathologic risk factors. (Weak recommendation, Moderate-quality evidence)
Clinically apparent = Macroscopic nodal disease

1. Physical exam
2. Radiographic – US and or CT
3. Grossly abnormal at surgery

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The American Thyroid Association (ATA) Guidelines Taskforce on Thyroid Nodules and Differentiated Thyroid Cancer*
RECOMMENDATION 8

Thyroid nodule diagnostic FNA is recommended for (Figure 2, Table 6):

- **A)** Nodules > 1 cm in greatest dimension with **high suspicion sonographic pattern** (Strong recommendation, Moderate-quality evidence)

- **B)** Nodules > 1 cm in greatest dimension with **intermediate suspicion sonographic** (Strong recommendation, Low-quality evidence)

- **C)** Nodules > 1.5 cm in greatest dimension with **low suspicion sonographic pattern** (Weak recommendation, Low-quality evidence)

FNA is now Ultrasonographically stratified

- **D)** Nodules > 2 cm in greatest dimension with **very low suspicion sonographic pattern** (e.g. – spongiform). Observation without FNA is also a reasonable option (Weak recommendation, Moderate-quality evidence)

Thyroid nodule diagnostic FNA is not required for (Figure 2, Table 6):

- **E)** Nodules that **do not meet the above criteria**. (Strong recommendation, Moderate-quality evidence)

- **F)** Nodules that are **purely cystic** (Strong recommendation, Moderate-quality evidence)
RECOMMENDATION 8

FNA equipoise of 1- cancer awareness on one hand with 2- clinical significance/need to know on the other
4 important recommendations/suggestions:

(1) FNA is not required for thyroid nodules less than 1 cm that appear to be confined to the thyroid;

(2) active surveillance can be considered as an alternative to immediate surgery in patients with very low risk tumors,

(3) restrict surgery (currently the Standard of Care) to lobectomy and avoid radioactive iodine in those with low risk features; and

(4) conduct further research (preferably in the setting of IRB-approved clinical trials)
Papillary Thyroid MicroCarcinoma: Active surveillance - A viable option for low-risk PMC

Long Hx of observation trials:
prostate, Urethral, Non Hodgkins Lymphoma
Long Hx of observing microscopically + nodal disease in PTC
Clinical Trials of Active Surveillance of Papillary Microcarcinoma of the Thyroid

Akira Miyauchi¹,²

- 22 Year experience with active surveillance for PMC
- The Kuma Hospital physicians developed & validated an active surveillance approach as an alternative to immediate surgical resection in cytologically confirmed low risk PMC
- By testing the hypothesis that decision to operate PMC can be made by observation and intervening by surgery when signs of slight progression & that this delay in surgery does not cause any harm
Methods

- trial started in 1993
- Diagnosis by: US guided FNA
- current knowledge about PMC and incidences of latent thyroid cancer given to the patients
- PMC
- High risk- immediate surgery
- Low risk- chose immediate surgery vs Observation

- Observation → 6 month US → then once a year
- Surgery performed if OR by 3mm novel lymph node mets
- High Risk: Lymph node mets/ distant mets/extrathyroidal extension/ high grade cytology/growth during prev observation/ tumors located near RLN/ attached to trachea
- Low risk: None of the above
Fig. 3 Schematic drawings on the risks of invasion to the tracheal and recurrent laryngeal nerve of papillary microcarcinoma.

**Risk of the Tracheal Invasion of PMCT:**
- Obtuse angle: High-risk
- Nearly right angle or unclear: Intermediate risk
- Acute angle: Low-risk

**Risk of the RLN Invasion of PMCT:**
- Absence of normal rim: High-risk
- Presence of normal rim: Low-risk
Results

- 2000 low risk PMC – 1235 observed
- Enlargement by 3mm or $\geq 8\%$ in 10 yrs
- New LN mets = 3.8% in 10 yrs
Patient Age Is Significantly Related to the Progression of Papillary Microcarcinoma of the Thyroid Under Observation

Yasuhiro Ito, Akira Miyauchi, Minoru Kihara, Takuya Higashiyama, Kaoru Kobayashi, and Akihiro Miya
FIG. 3. Proportion of patients in the entire series whose PTMC developed into clinical disease.

FIG. 4. Relationship between age and proportion of patients whose PTMC showed enlargement by 3 mm or more.

FIG. 5. Relationship between age and proportion of patients whose PTMC showed novel appearance of lymph-node metastasis.

FIG. 6. Relationship between age and proportion of patients whose PTMC developed into clinical disease.
A Clinical Framework to Facilitate Risk Stratification When Considering an Active Surveillance Alternative to Immediate Biopsy and Surgery in Papillary Microcarcinoma

Juan P. Brito, Yasuhiro Ito, Akira Miyauchi, and R. Michael Tuttle
Framework for Clinical Decision Making:

Three interrelated but distinct domains

1. Tumor/neck US characteristics:
   - size & location of tumor
   - molecular profile
   - nodal involvement

2. Patient characteristics:
   - age
   - pregnancy/child bearing potential
   - family history
   - willingness
   - Compliance

3. Medical team characteristics:
   - multidisciplinary team
   - state of the art US facility
   - experience
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Head Neck Surgery

Massachusetts Eye and Ear • Beth Israel Deaconess Medical Center • Boston Children’s Hospital
Brigham and Women’s Hospital • Massachusetts General Hospital
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; Vania 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

[+] Author Affiliations

JAMA Otolaryngology. Published online April 14, 2016. doi:10.1001/jamaotolaryngology.2016.0386
**Figure 2. Putative Scheme of Thyroid Carcinogenesis**

<table>
<thead>
<tr>
<th>Growth Pattern</th>
<th>Nuclear Features of PTC</th>
<th>Main Oncogene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary</td>
<td>Yes</td>
<td>BRAF</td>
</tr>
<tr>
<td>Follicular</td>
<td>Yes</td>
<td>RAS</td>
</tr>
<tr>
<td>Follicular</td>
<td>No</td>
<td>RAS</td>
</tr>
</tbody>
</table>

EFVPTC indicates encapsulated follicular variant of PTC; NIFTP, noninvasive follicular thyroid neoplasm with papillary-like nuclear features; PTC, papillary thyroid carcinoma.
Changing the Cancer Diagnosis: The Case of Follicular Variant of Papillary Thyroid Cancer—Primum Non Nocere and NIFTP

Steven Hodak, R. Michael Tuttle, Guy Maytal, Yuri E. Nikiforov, and Gregory Randolph
Societal endorsements:

Although recently articulated – widely understood the concept of NIFTP - endorsed by following societies:

- American Academy of Otolaryngology Head and Neck Surgery
- American Head and Neck Society
- Endocrine Society
- British Association of Endocrine and Thyroid Surgeons
- Japanese Thyroid Association
- International Neural Monitoring Study Group
- World Congress on Thyroid Cancer
- Latin American Thyroid Association
- Brazilian Society of Head and Neck Surgery
- Brazilian Society of Endocrinology and Metabolism
Noninvasive Follicular Thyroid Neoplasm With Papillary-Like Nuclear Features (NIFTP): a Changing Paradigm in Thyroid Surgical Pathology and Implications for Thyroid Cytopathology

Zubair W. Baloch MD, PhD; Raja R. Seethala MD; William C. Faquin MD, PhD; Mauro G. Papotti MD; Fulvio Basolo MD; Guido Fadda MD; Gregory W. Randolph MD; Steven P. Hodak MD; Yuri E. Nikiforov MD, PhD; and Susan J. Mandel MD

Cancer Cytopathology Month 2016
FNA of NIFTP
Reclassification as NIFTP and its impact on ROM

**Currently** - The ROM for each of the indeterminate categories in TBSRTC, with or without molecular refinement, has been predicated on the classification of noninvasive EFVPTC as malignancy.

**Reclassification to NIFTP:**
Data is limited but demonstrate

1. **ROM for the indeterminate categories**
   AUS/FLUS, FN/SFN, & SM

2. **no appreciable change** in ROM for benign & malignant

Thus, a **clear indication** that-
EFVPTC comprises a significant proportion of malignant diagnoses associated with the indeterminate categories.
Howitt et al → FNA did not classify any noninvasive FVPTCs as Malignant
others → a minor percentage was classified as malignant

With above limited data, the magnitude of impact of NIFTP on the ROM for TBSRTC categories cannot be predicted.
- Effects will differ based on case demographic & institutional frequency of a surgical pathology diagnosis of indeterminate

**15% for indeterminate**

<table>
<thead>
<tr>
<th>FNA Diagnosis</th>
<th>Faquin 2016&lt;sup&gt;21a&lt;/sup&gt;</th>
<th>Strickland 2015&lt;sup&gt;20&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total No. of Cases</td>
<td>% ROM Excluding NIFTP</td>
</tr>
<tr>
<td>ND</td>
<td>70</td>
<td>25.3</td>
</tr>
<tr>
<td>Benign</td>
<td>426</td>
<td>9.3</td>
</tr>
<tr>
<td>AUS/FLUS</td>
<td>397</td>
<td>31.2</td>
</tr>
<tr>
<td>FN/SFN</td>
<td>304</td>
<td>33.2</td>
</tr>
<tr>
<td>SM</td>
<td>179</td>
<td>82.6</td>
</tr>
<tr>
<td>Malignant</td>
<td>450</td>
<td>99.1</td>
</tr>
</tbody>
</table>

Abbreviations: AUS/FLUS, atypical/follicular lesion of undetermined significance; FN/SFN, follicular neoplasm/suspicious for follicular neoplasm; FNA, fine-needle aspiration; ND, nondiagnostic; NIFTP, noninvasive follicular tumor with papillary-like nuclei; ROM, risk of malignancy; SM, suspicious for malignancy.

<sup>a</sup>This was a multi-institutional study.
NIFTP - Degree of Thyroid Surgery
Thyroid Surgical Complications

• No personal knowledge – just from my reading!!
Voice and Calcium

The Scylla and Charybdis of Thyroid Complications
Permanent hypoparathyroidism after total thyroidectomy

The multicentre & registries era

- ACS CoC: 10%
- BAETS Audit: 12.1%
- SWEDISH Reg: 6.4%
- GERMAN MC: 9-25%
Schilddrüsenchirurgie: Generalist oder Spezialist?

Thyroid Surgery: Generalist or Specialist?

Dralle H, Sekulla C. Schilddrüsenchirurgie... Zentralbl Chir 2005; 130: 428 – 433
Minimum number of thyroidectomies to achieve a RLN-palsy rate of <1% per year per surgeon.
Permanent hypopara rate of <1%
As we think about thyroidectomy

- Recognize that
  Total >>>>> Hemi complications

More surgery.....more complications
Increasing trends in overall thyroid surgeries and total thyroidectomies, but decreasing partial thyroidectomy rates between 1990-1999 and 2000-2009 (P < .001).

- 21,270 cases, 51 hospital
- Maryland HSCRC database
Thyroidectomy charges growth rate by surgeon volume, United States

- Low surgeon volume (≤9 surgeries/year)
- Intermediate surgeon volume (10-99 surgeries/year)
- High surgeon volume (≥100 surgeries/year)
Total Thyroidectomy is Associated with Increased Risk of Complications for Low- and High-Volume Surgeons

Adam Hauch, MD, MBA¹, Zaid Al-Qurayshi, MBChB, MPH¹, Gregory Randolph, MD, FACS², and Emad Kandil, MD, FACS¹

- A cross-sectional analysis of all patients who underwent total and unilateral thyroidectomy between 2003-2009 = 62,722 procedures
- Discharge information from the Health Care Utilization Project- National Inpatient Sample (HCUP-NIS) administrative database
Rate of complication by types of thyroidectomy and by surgeon volume

- Higher risk of complication with total thyroidectomy
- Increased risk persists among High volume surgeons

Annals of Surgical Oncology, 2014 Hauch A, Al-Qurayshi, Z, Randolph GW, Kandil E
RAI Thyroid Bed Uptake After Total Thyroidectomy: A Novel SPECT-CT Anatomic Classification System

Rebecca Zeuren, MS, RN, ANP-BC; Agnese Biagini, MD; Ravinder K. Grewal, MD; Gregory W. Randolph, MD, FACS, FACE; Dipti Kamani, MD; Mona M. Sabra, MD; Ashok R. Shaha, FACS; R. Michael Tuttle, MD
Autopsy studies demonstrate that normal thyroid gland is often found in the ligament of Berry.*

The thyroid gland is encompassed in a discontinuous pseudocapsule derived from midline deep cervical fascia rather than a well-defined anatomical fibrous capsule.**

*Sasou et al, Head Neck, 1998
141 DTC patients operated on at MSKCC
Total thyroidectomy and RAI ablation

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>%</th>
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<tbody>
<tr>
<td>Visible uptake on diagnostic scan (123I)</td>
<td></td>
<td>93%</td>
</tr>
<tr>
<td>Uptake (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td>0.01-8.24</td>
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<tr>
<td>Visible uptake on Post therapy SPECT/CT</td>
<td>Yes</td>
<td>98.6%</td>
</tr>
<tr>
<td>Suppressed Tg at RRA</td>
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<td></td>
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<tr>
<td>&lt; 0.6 ng/ml</td>
<td></td>
<td>53%</td>
</tr>
<tr>
<td>&lt; 1.0 ng/ml</td>
<td></td>
<td>73%</td>
</tr>
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</table>
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Head Neck Surgery
3rd World Congress on Thyroid Cancer
July 27 – 30, 2017
The Westin Boston Waterfront
Boston, Massachusetts

A global multi-disciplinary meeting of all specialists involved in the field of Thyroid Cancer and Thyroid Nodules.

Steering Committee
Gregory W. Randolph, MD, Harvard Medical School
Bryan McIver, MD, Moffitt Cancer Center
Ezra Cohen, MD, University of California San Diego
Jeremy Freeman, MD, University of Toronto
Bryan Haugen, MD, University of Colorado Health Sciences Center
Jatin P. Shah, MD, Memorial Sloan-Kettering Cancer Center
Ashok R. Shaha, MD, Memorial Sloan-Kettering Cancer Center
Steven I. Sherman, MD, UT MD Anderson Cancer Center
Ian J. Witterick, MD, University of Toronto

www.thyroidworldcongress.com
Thank you