Thyroid Surgery: Lobectomy, total thyroidectomy, LN biopsies or only watchful waiting?

Jacob Moalem, MD, FACS
Associate Professor
Endocrine Surgery and Endocrinology
URMC
Agenda

1. When is lobectomy alone vs total thyroidectomy warranted?

2. Understand when watchful waiting may be medically indicated

3. Role of preoperative neck ultrasound, lymph node biopsy/surgery
ROLE OF PREOPERATIVE NECK ULTRASOUND, LYMPH NODE BIOPSY/SURGERY
Role of neck US:

➢ In every case

➢ An extension of physical exam, no matter the indication

✓ Recurrent PTC
✓ Newly diagnosed PTC
✓ Thyroid nodule eval
✓ pHPT
Recurrent PTC

➢ Risk stratification

✧ How many areas of concern are there?
✧ How deep in the TE groove?
✧ In an area previously dissected?

➢ Establish diagnosis prior to embarking upon high – risk redo surgery
Example cases: OD

➢ 24, F.  Thyroidectomy for Graves’ disease 2015

➢ Incidental 7, 3 mm mPTC

➢ July 2018 US : 9 mm hypoechoic mass in thyroid bed – recurrent cancer vs. LN metastasis.  FNA - PTC
Office US:

1. It looks like cancer
2. Mass is clearly visible, in its entirety → should be relatively easily reachable.
3. Mass is rather anterior → should be safely resectable
4. Mass is located 3.5 cm caudal to the incision → most likely a level 6 node rather than a thyroid bed recurrence, and should therefore be more easily resectable
OD – OR Findings

- US – guided localization
- Mass easily identified
- Area not previously disturbed
- Central compartment dissection performed

Path:
- Recurrent PTC in 1/14 LN’s, 9 mm, +ve ETE
Role of US – example 2

- 34 YOM, 2015 – TTX, central, left lateral neck dissection
- Bilateral PTC, 6 central, 2 lateral nodes positive
- Radioiodine 156 mCi
- TG 4.2 (TSH .43), stimulated to 27
- Uptake scan: left thyroid bed uptake, no distal uptake
- US: left central 3, 5 mm nodules
- FNA : PTC
<table>
<thead>
<tr>
<th>Test</th>
<th>1/18/2017 10:59</th>
<th>7/10/2017 13:54</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>0.78</td>
<td>0.26 (L)</td>
</tr>
<tr>
<td>T4</td>
<td></td>
<td>8.6</td>
</tr>
<tr>
<td>Free T4</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Thyroglobulin,Qn</td>
<td>3.3</td>
<td>1.54</td>
</tr>
<tr>
<td>Thyroglobulin Ab</td>
<td>&lt;20</td>
<td>&lt;0.9</td>
</tr>
</tbody>
</table>
RECOMMENDATION 71

Therapeutic compartmental central and/or lateral neck dissection in a previously operated compartment, sparing uninvolved vital structures, should be performed for patients with biopsy-proven persistent or recurrent disease for central neck nodes $\geq 8$ mm and lateral neck nodes $\geq 10$ mm in the smallest dimension that can be localized on anatomic imaging.

(Strong recommendation, Moderate-quality evidence)
Newly diagnosed cancer – confluent adenopathy
Role of CT Scan in advanced DTC (rec 33):

Preoperative use of cross-sectional imaging studies with IV contrast is recommended as an adjunct to US for patients with clinical suspicion for advanced disease

➢ Locally invasive primary tumor
➢ Bulky nodal involvement – retropharyngeal, upper mediastinal
Role of axial imaging in advanced PTC:

➢ 61 M, Hoarse for 6 months

➢ 4 cm left thyroid mass, immobile, rock hard

➢ Palpable 3 cm lateral neck node

➢ US neck – 4 cm left cancer, posterior margin indistinct
  - left neck lymphadenopathy
When should LN Biopsy be done?

➢ When it will influence operative management.
  ✷ Will surgery be recommended if positive? If negative?
  ✷ Patient acceptance of large surgery
39 YO M

- 3/2016 – TTX, bilateral central and right MRLND
  - 1.5 cm non-encapsulated PTC
  - 9/12 nodes +ve in central neck, 0.5 cm largest
  - 2/26 nodes +ve in lateral neck, 2.5 cm largest, +ETE

- 6/2016 – 150 mCi
- TG, TG Ab undetectable
- Thyroid scan – no uptake
- 5/2018 – US neck:
CD - Cont

- FNA neck mass – histiocytes and cellular debris
- Core Biopsy - Skeletal muscle and fibrous tissue with eosinophilic amorphous material
- Redo neck dissection
- Neck, right lateral, excision:
  - Chronic inflammatory and cystic changes.
  - Foreign body type giant cell reaction to suture material.
  - Suggestive granulomatous inflammation.
  - No thyroid tissue or malignancy identified.
Primary HPT

➢ 59 YOF with h/o untreated “subclinical hyperthyroidism”, afib, now diagnosed with pHPT
Is Preoperative Investigation of the Thyroid Justified in Patients Undergoing Parathyroidectomy for Hyperparathyroidism?

David J. Bentrem,¹ Peter Angelos,¹ Mark S. Talamonti,¹ and Ritu Nayar²

Introduction

The prevalence of associated thyroid pathology in patients undergoing neck exploration for hyperparathyroidism (HPT) has been reported to range from 20%–60% (1–3). The coexistence of benign and malignant thyroid lesions in patients undergoing surgery for HPT remains a matter of debate and concern in the present era of minimally invasive surgery.
The Incidence of Concomitant Hyperparathyroidism in Patients with Thyroid Disease Requiring Surgery

Sara Murray, M.D., Rebecca S. Sippel, M.D., FACS, and Herbert Chen, M.D., FACS

The incidence, presentation, and clinical outcome of concomitant HPT in 1,049 thyroidectomized patients.
-- 2 --

WHEN MAY WATCHFUL WAITING BE MEDICALLY INDICATED?
How Common Is This Cancer?
Compared to other cancers, thyroid cancer is relatively rare.

<table>
<thead>
<tr>
<th>Common Types of Cancer</th>
<th>Estimated New Cases 2018</th>
<th>Estimated Deaths 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Breast Cancer (Female)</td>
<td>266,120</td>
<td>40,920</td>
</tr>
<tr>
<td>2. Lung and Bronchus Cancer</td>
<td>234,030</td>
<td>154,050</td>
</tr>
<tr>
<td>3. Prostate Cancer</td>
<td>164,690</td>
<td>29,430</td>
</tr>
<tr>
<td>4. Colorectal Cancer</td>
<td>140,250</td>
<td>50,630</td>
</tr>
<tr>
<td>5. Melanoma of the Skin</td>
<td>91,270</td>
<td>9,320</td>
</tr>
<tr>
<td>6. Bladder Cancer</td>
<td>81,190</td>
<td>17,240</td>
</tr>
<tr>
<td>7. Non-Hodgkin Lymphoma</td>
<td>74,680</td>
<td>19,910</td>
</tr>
<tr>
<td>8. Kidney and Renal Pelvis Cancer</td>
<td>65,340</td>
<td>14,970</td>
</tr>
<tr>
<td>9. Uterine Cancer</td>
<td>63,230</td>
<td>11,350</td>
</tr>
<tr>
<td>10. Leukemia</td>
<td>60,300</td>
<td>24,370</td>
</tr>
<tr>
<td>12. Thyroid Cancer</td>
<td><strong>53,990</strong></td>
<td><strong>2,060</strong></td>
</tr>
</tbody>
</table>

Thyroid cancer represents 3.1% of all new cancer cases in the U.S.
A Overall thyroid cancer incidence and incidence by histologic type

- Overall
- Papillary
- Follicular
- Medullary
- Anaplastic
- Other

Rate per 100,000 Person-Years

Year of Diagnosis
B Papillary thyroid cancer incidence

By tumor stage
- Localized
- Regional
- Distant
- Unknown

By tumor size
- ≤1.0 cm
- 1.1-2.0 cm
- 2.1-4.0 cm
- >4.0 cm
- Unknown

Rate per 100,000 Person Years

Year of Diagnosis

JAMA. 2017;317(13):1338-1348
Projecting Cancer Incidence and Deaths to 2030: The Unexpected Burden of Thyroid, Liver, and Pancreas Cancers in the United States
Projecting Cancer Incidence and Deaths to 2030: The Unexpected Burden of Thyroid, Liver, and Pancreas Cancers in the United States

Abstract

Cancer incidence and deaths in the United States were projected for the most common cancer types for the years 2020 and 2030 based on changing demographics and the average annual percentage changes in incidence and death rates. Breast, prostate, and lung cancers will remain the top cancer diagnoses throughout this time, but thyroid cancer will replace colorectal cancer as the fourth leading cancer diagnosis by 2030, and melanoma and uterine cancer will become the fifth and sixth most common cancers, respectively. Lung cancer is projected to remain the top cancer killer throughout this time period. However, pancreas and liver cancers are projected to surpass breast, prostate, and colorectal cancers to become the second and third leading causes of cancer-related death by 2030, respectively. Advances in screening, prevention, and treatment can change cancer incidence and/or death rates, but it will require a concerted effort by the research and healthcare communities now to effect a substantial change for the future. Cancer Res; 1–9. ©2014 AACR.
Differentiated thyroid cancer

Estimated New Cases in 2018: 53,990
% of All New Cancer Cases: 3.1%

Estimated Deaths in 2018: 2,060
% of All Cancer Deaths: 0.3%

Percent Surviving 5 Years: 98.1%
(2008-2014)

Graph showing the number of new cases and deaths per 100,000 persons from 1992 to 2015.
The thyroid cancer paradox

- “The cancer you want to get”
- Rare deaths

- Life-long follow up
- Rising prevalence
- Imperfect surveillance
- Treatment-associated morbidity
  - operative
  - reoperative
Washington State Cancer Patients Found To Be At Greater Risk For Bankruptcy Than People Without A Cancer Diagnosis

➢ Retrospective analysis that used a variety of medical, personal, legal, and bankruptcy sources covering the Western District of Washington State in US Bankruptcy Court between 1995–2009
• 2.6x higher bankruptcy rate
• Younger patients had 2-5x higher rate than older (65+)

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>No. of cancer patients and controls</th>
<th>Hazard rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cancer</td>
</tr>
<tr>
<td>Breast</td>
<td>68,390</td>
<td>2.41</td>
</tr>
<tr>
<td>Colorectal</td>
<td>34,488</td>
<td>3.02</td>
</tr>
<tr>
<td>Leukemia/lymphoma</td>
<td>39,486</td>
<td>3.00</td>
</tr>
<tr>
<td>Lung</td>
<td>48,454</td>
<td>3.80</td>
</tr>
<tr>
<td>Melanoma</td>
<td>21,500</td>
<td>2.08</td>
</tr>
<tr>
<td>Prostate</td>
<td>65,932</td>
<td>2.32</td>
</tr>
<tr>
<td><strong>Thyroid</strong></td>
<td><strong>9,960</strong></td>
<td><strong>3.46</strong></td>
</tr>
<tr>
<td>Uterine</td>
<td>12,692</td>
<td>2.28</td>
</tr>
<tr>
<td>Other</td>
<td>94,778</td>
<td>2.97</td>
</tr>
<tr>
<td>All</td>
<td>395,680</td>
<td>2.65</td>
</tr>
</tbody>
</table>
September is National Thyroid Cancer Awareness Month, but for me, it's also Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Oct, Nov, & Dec.
Thyroid microcarcinomas (mPTC) – Japanese experience

- Account for 30% of PTC

- A mass screening study for thyroid cancer in Japanese adult women detected mPTC in 3.5% of the examinees
  - close to the incidence of latent thyroid cancer
  - >1,000x the reported prevalence of clinical thyroid cancer

- LN metastasis was pathologically detected in up to 2/3
  - Unsuspected in 40%
An Observation Trial Without Surgical Treatment in Patients with Papillary Microcarcinoma of the Thyroid

Yasuhiro Ito, Takashi Uruno, Keiichi Nakano, Yuuki Takamura, Akihiro Miya, Kaoru Kobayashi, Tamotsu Yokozawa, Fumio Matsuzuka, Seiji Kuma, Kanji Kuma, and Akira Miyauchi

- 732 consecutive patients with mPTC over 8 years
- Observation vs. surgical treatment unless:
  - Adjacent to the trachea, or possibly invading RLN
  - FNAB suggesting high-grade malignancy
  - LN highly suspicious (or proven) for metastasis in lateral neck
- 162/732 chose observation initially
  - 56 crossed over to surgical arm during the study
- Surgical group: 571 + 56 = 627
<table>
<thead>
<tr>
<th>Variables</th>
<th>Observation group</th>
<th>Surgical treatment group&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>52.3 ± 12.3 years</td>
<td>51.9 ± 11.4 years</td>
</tr>
<tr>
<td></td>
<td>(23–80 years)</td>
<td>(16–83 years)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5 (3.1%)</td>
<td>39 (6.2%)</td>
</tr>
<tr>
<td>Female</td>
<td>157 (96.9%)</td>
<td>587 (93.8%)</td>
</tr>
<tr>
<td><strong>Tumor size</strong></td>
<td>6.9 ± 3.0 mm</td>
<td>7.5 ± 1.9 mm</td>
</tr>
<tr>
<td></td>
<td>(3–10 mm)</td>
<td>(3–13 mm)</td>
</tr>
<tr>
<td><strong>Suspicion of multiple carcinoma foci</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30 (18.5%)</td>
<td>196 (31.3%)</td>
</tr>
<tr>
<td>No</td>
<td>132 (81.5%)</td>
<td>430 (68.7%)</td>
</tr>
<tr>
<td><strong>Suspicion of lymph node metastases</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 (6.8%)</td>
<td>121 (19.3%)</td>
</tr>
<tr>
<td>No</td>
<td>151 (93.2%)</td>
<td>505 (80.7%)</td>
</tr>
<tr>
<td>Time of follow-up</td>
<td>Total</td>
<td>Size (mm)</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>0 (beginning of follow-up)</td>
<td>162</td>
<td>6.9 ± 1.8**</td>
</tr>
<tr>
<td>One year</td>
<td>130</td>
<td>7.0 ± 2.3</td>
</tr>
<tr>
<td>Two years</td>
<td>145</td>
<td>6.8 ± 3.0</td>
</tr>
<tr>
<td>Three years</td>
<td>90</td>
<td>7.8 ± 2.4*</td>
</tr>
<tr>
<td>Four years</td>
<td>72</td>
<td>7.8 ± 2.2**</td>
</tr>
<tr>
<td>Five years or more&lt;sup&gt;b&lt;/sup&gt;</td>
<td>58</td>
<td>7.0 ± 2.4</td>
</tr>
</tbody>
</table>

<sup>a</sup> Number of patients (%)

<sup>b</sup>
Results, Observation group:

➢ >70% of mPTC’s did not increase in size

➢ In 18 patients (11%) tumor grew to >1 cm
   ✦ 10 chose continued observation → no further change

➢ Lateral neck nodes appeared in only 2 patients
Results, Surgical group

65 crossover patients:

- Tumor size had increased in 13 (23.2%), decreased in 7 (12.5%), and was unchanged in the remaining 36 (64.3)

- Outcomes, disease distribution was similar to patients who chose surgery at outset of study

Ito et al, Thyroid 13, 4, 2003
Lymph node dissection results

**Surgical group**

- **Total thyroidectomy in 44%, lobectomy in remainder**
- **Central compartment dissection in 594 (95%)**
- **Lateral neck dissection in 51%**

<table>
<thead>
<tr>
<th></th>
<th>Performed</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central neck</td>
<td>594 (50.5%)</td>
<td>258 (43.4%)</td>
</tr>
<tr>
<td>Lateral neck</td>
<td>317</td>
<td>141 (44.5) *</td>
</tr>
</tbody>
</table>

* of 141 patients with lateral neck nodes, metastases had been suspected by preoperative US in only 55 (39%)
Low-risk papillary microcarcinoma of the thyroid: A review of active surveillance trials

Y. Ito, A. Miyauchi*, H. Oda

Table 2
Results and findings of observation for low-risk PMC at Kuma Hospital and the Cancer Institute Hospital.

<table>
<thead>
<tr>
<th>Kuma Hospital 12–15</th>
<th>Cancer Institute Hospital 17–19</th>
</tr>
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<tbody>
<tr>
<td>1. Of 1235 patients, 8% and 3.8% showed size enlargement and novel node metastasis, respectively, at 10-year observation.</td>
<td>1. Of 230 patients (300 lesions), 7% and 1% showed size enlargement and novel node metastasis, respectively, during observation.</td>
</tr>
<tr>
<td>2. The PMC of young patients are likely to progress, and those of old patients are most unlikely to grow. Although the number of patients is small, none of the young patients with TSH suppression showed progression.</td>
<td>2. The TSH value was not linked to the progression of PMC during observation.</td>
</tr>
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<td>3. Only 8% of the patients showed PMC progression during pregnancy, and rescue surgery after delivery was successful.</td>
<td>3. PMC with rich blood supply or lack of strong calcification on ultrasound were signs of high growth activity. Rich vascularity often decreased over time.</td>
</tr>
<tr>
<td>4. In Japan, the medical cost of observation was lower than that of immediate surgery.</td>
<td>4. None of the patients who underwent surgery after the detection of progression signs showed significant recurrence or died of PTC.</td>
</tr>
<tr>
<td>5. None of the patients who underwent surgery after the detection of progression signs showed significant recurrence or died of PTC.</td>
<td></td>
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Review
Low-risk papillary microcarcinoma of the thyroid: A review of active surveillance trials
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</table>
Natural History and Tumor Volume Kinetics of Papillary Thyroid Cancers During Active Surveillance

R. Michael Tuttle, MD; James A. Fagin, MD; Gerald Minkowitz, MD; Richard J. Wong, MD; Benjamin Roman, MD, MSHP; Snehal Patel, MD; Brian Untch, MD; Ian Ganly, MD, PhD; Ashok R. Shaha, MD; Jatin P. Shah, MD; Mark Pace, MBBS, FRACP; Duan Li, MD; Ariadne Bach, MD; Oscar Lin, MD; Adrian Whiting, BS; Ronald Ghessein, MD; Inigo Landa, PhD; Mona Sabra, MD; Laura Boucai, MD; Stephanie Fish, MD; Luc G. T. Morris, MD, MSc

Figure 1. Cumulative Incidence of Increase in Tumor Diameter and Volume Among Papillary Thyroid Cancers During Active Surveillance

- A Diameter increase of ≥3 mm
- B Volume increase of >50%

<table>
<thead>
<tr>
<th>Time, y</th>
<th>No. at risk 291</th>
<th>243</th>
<th>145</th>
<th>78</th>
<th>39</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Cumulative Event Incidence, %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time, y</th>
<th>No. at risk 291</th>
<th>236</th>
<th>138</th>
<th>71</th>
<th>34</th>
<th>15</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Cumulative Event Incidence, %</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Figure 2. Percentage Change in Tumor Volume During Active Surveillance for Each Patient

Of 284 patients undergoing active surveillance with complete 3-D measurements, tumor size decreased >50% in 19 patients (6.7%), was stable in 229 (80.2%), and increased >50% in 36 (12.7%). In 7 patients (2.4%), tumor volume could not be calculated because of the lack of reproducible 3-D measurements. Tumor diameter increased ≥3 mm in 11 (3.8%).
Extent of thyroidectomy: Recommendation 35

➢ (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 radiation, familial thyroid carcinoma, or clinically detectable cervical nodal metastases.

✧ (Strong recommendation, Moderate-quality evidence)
WHEN IS LOBECTOMY ALONE VS TOTAL THYROIDECTOMY WARRANTED?
How to choose: Lobe vs. TTX

➢ Benign disease
➢ ATUS/FN
➢ Cancer
Total vs. lobe: Considerations in Benign disease

➢ Consider R neck separately from left neck

➢ Unilateral vs bilateral nodules
  ♦ How confident are we in FNA?
  ♦ How resistant is the patient to ongoing surveillance?

➢ Symptoms – are they lateralizable? Bilateral?

➢ Risk: How challenging is the operation predicted to be?
Total vs. lobe – example case

- 46 YO F, no risk factors for thyroid cancer, found to have large thyroid nodule during evaluation for dysphagia.
- US: R 2.2 cm complex nodule, left 3.6 cm solid nodule
- TSH – 1.4, FNA of dominant nodule – benign.

Options discussed:
- Expectant management (+/- FNA of the right nodule)
- Left lobectomy (after FNA of right nodule)
- Total thyroidectomy
Total vs. lobe – example case #2

- 68 YO F, no risk factors for thyroid cancer, found to have 12 cm substernal goiter on evaluation for incidental mediastinal mass.

- Asymptomatic. Pemberton’s negative

- US: R 3.5 cm solid nodule, left large substernal goiter

- TSH – 1.4, FNA of dominant nodule – benign.

- Options discussed:
  - Expectant management (+/- FNA of the right nodule)
  - Left substernal lobectomy (after FNA of right nodule)
  - Total thyroidectomy
Retrospective of 2,675 lobectomies for MNG or SN 1991 to 2017:
- 852 (31.85%) for MNG, and 1,823 (68.15%) for SN

394 (15%) underwent reoperation:
- 261 (30.6%) with MNG
- 133 (7.29%) with SN (p<0.0001).
- 85% of recurrences were as MNG, 3.5% as carcinomas.
UNILATERAL BENIGN MNG VS SN: CONTRALATERAL RECURRENCE RATES AFTER LOBECTOMY (AAES, 2018)

➢ Mean time to recurrence was 14.8 years, no difference between groups.

➢ Patients with no recurrence were younger (47±15 vs 54±13, p<0.0001).

➢ Male patients were less likely to recur, p<0.0001.

➢ Conclusions: Although recurrence rates for MNG compared to SN are higher (30.6% vs 7.29%), lobectomy for unilateral MNG is reasonable and can be regarded as the procedure of choice given the long time to recurrence requiring completion thyroidectomy.
Lobectomy vs. Total in IDN/DTC

Benefits:

➢ PTC is often multifocal
➢ Enables $^{131}$I treatment
➢ Enhances sensitivity of TG
➢ Enables thyroid scanning

Questionable relevance

Often not needed
Lobectomy vs. Total in IDN/DTC

**Benefits:**
- PTC is often multifocal
- Enables $^{131}$I treatment
- Enhances sensitivity of TG
- Enables thyroid scanning

**Risks:**
- Bilateral RLN palsy
- Hypoparathyroidism
- Lifelong LT4 requirement
- High chance of “unnecessary surgery”
Patient perspective
TTX vs. Lobectomy - IDN

- Marries considerations of patients with known benign nodules who require surgery and those of patients with known thyroid cancer

- AUS: Are abnormalities architectural or nuclear?

- Were molecular analytics performed? Do they have sufficient potential to influence the patient’s decision making?

- If IDN proves to be a cancer, how likely is it that radioiodine will be required?
  - Size
  - Likelihood of ETE
Operative choice in IDN – useful considerations

➢ How would you react/respond to the idea of having to return to the OR for completion thyroidectomy

✦ Knowledge that it is often not as complete as upfront total thyroidectomy

➢ If you chose total thyroidectomy, and the pathology report showed no cancer, would you be happy with the diagnosis, or upset with your choice of operation?
25-year risk of death among 52,117 patients with localized (<2 cm) PTC treated by either lobectomy or total thyroidectomy
Lobectomy vs. total in small PTC - considerations

- Contralateral pathology?
- Requirement for RAI postop?
  - Lymph nodes
  - ETE
  - Aggressive subtype of PTC
- Surgeon / endocrinologist comfort in doing less
(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)
Extent of thyroidectomy: Recommendation 35

(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)
### ATA Rec 51: Who needs RAI?

**Table 14. Characteristics According to the American Thyroid Association Risk Stratification System and AJCC/TNM Staging System That May Impact Postoperative Radioiodine Decision-Making**

<table>
<thead>
<tr>
<th>ATA risk Staging (TNM)</th>
<th>Description</th>
<th>Body of evidence suggests RAI improves disease-specific survival?</th>
<th>Body of evidence suggests RAI improves disease-free survival?</th>
<th>Postsurgical RAI indicated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATA low risk T1a N0,Nx M0,Mx</td>
<td>Tumor size ≤1 cm (uni-or multifocal)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ATA low risk T1b,T2 N0, N x M0,Mx</td>
<td>Tumor size &gt;1–4 cm</td>
<td>No</td>
<td>Conflicting observational data</td>
<td>Not routine&lt;sup&gt;b&lt;/sup&gt;—May be considered for patients with aggressive histology or vascular invasion (ATA intermediate risk).</td>
</tr>
<tr>
<td>ATA low to intermediate risk T3 N0,Nx M0,Mx</td>
<td>Tumor size &gt;4 cm</td>
<td>Conflicting data</td>
<td>Conflicting observational data</td>
<td>Consider&lt;sup&gt;b&lt;/sup&gt;—Need to consider presence of other adverse features. Advancing age may favor RAI use in some cases, but specific age and tumor size cutoffs subject to some uncertainty.&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>ATA low to intermediate risk T3 N0,Nx M0,Mx</td>
<td>Microscopic ETE, any tumor size</td>
<td>No</td>
<td>Conflicting observational data</td>
<td>Consider&lt;sup&gt;b&lt;/sup&gt;—Generally favored based on risk of recurrent disease. Smaller tumors with microscopic ETE may not require RAI.</td>
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</table>

<sup>a</sup> Age and tumor size cutoffs are subject to some uncertainty.

<sup>b</sup> Additional considerations and discussions are recommended for patients when multiple risk factors are present or in the presence of other adverse features.
# ATA Rec 51: Who needs RAI?

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<tr>
<td>ATA low to intermediate risk T1-3 N1a M0,Mx</td>
<td>Central compartment neck lymph node metastases</td>
<td>No, except possibly in subgroup of patients ≥45 years of age (NTCTCSG Stage III)</td>
<td>Conflicting observational data</td>
<td>Consider&lt;sup&gt;b&lt;/sup&gt;—Generally favored, due to somewhat higher risk of persistent or recurrent disease, especially with increasing number of large (&gt;2–3 cm) or clinically evident lymph nodes or presence of extranodal extension. Advancing age may also favor RAI use.&lt;sup&gt;a&lt;/sup&gt; However, there is insufficient data to mandate RAI use in patients with few (&lt;5) microscopic nodal metastases in central compartment in absence of other adverse features.</td>
</tr>
<tr>
<td>ATA low to intermediate risk T1-3 N1b M0,Mx</td>
<td>Lateral neck or mediastinal lymph node metastases</td>
<td>No, except possibly in subgroup of patients ≥45 years of age</td>
<td>Conflicting observational data</td>
<td>Consider&lt;sup&gt;b&lt;/sup&gt;—Generally favored, due to higher risk of persistent or recurrent disease, especially with increasing number of macroscopic or clinically evident lymph nodes or presence of extranodal extension. Advancing age may also favor RAI use.&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ATA high risk T4 Any N Any M</td>
<td>Any size, gross ETE</td>
<td>Yes, observational data</td>
<td>Yes, observational data</td>
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<tr>
<td>ATA high risk M1 Any T Any N</td>
<td>Distant metastases</td>
<td>Yes, observational data</td>
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Trends in management of DTC – Major caveat

➢ Much of the evidence for less aggressive management comes from large Endocrine Surgery units with well-oiled multidisciplinary teams including expert surgeons, endocrinologists, radiologists, and pathologists
Remnant Uptake as a Postoperative Oncologic Quality Indicator

David F. Schneider, Kristin A. Ojomo, Herbert Chen, and Rebecca S. Sippel

FIG. 2. Remnant uptake and recurrence. Remnant uptake data are represented as the mean uptake to dose ratio (UDR), and error bars indicate the standard error of the means. UDRs are compared between patients who recurred and those who did not recur (A) as well as patients with increasing postoperative thyroglobulin to those with stable or decreasing thyroglobulin (C). The recurrence rates for five different divisions in UDR are also shown (B).
surgeon volume is associated with completeness of resection

FIG. 3. Remnant uptake by surgeon volume. Data are represented as the mean UDR, and error bars indicate the standard error of the means. UDRs are compared between high-volume and low-volume surgeons.

- 16,954 patients undergoing total thyroidectomy:
  - 47% had thyroid cancer and 53% benign disease

### TABLE 4. Adjusted Relative Odds of Postoperative Complications After Total Thyroidectomy Performed by Low-volume Surgeons Compared With High-volume Surgeons

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<tr>
<th>Annual Surgeon Volume (Number of Cases/y)</th>
<th>Surgeons (n = 4627) %</th>
<th>Patients (n = 16,954) %</th>
<th>% Increase Odds of Complications (vs High-volume)</th>
<th>95% CI</th>
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*Relative percent estimates were derived from a multivariable restrictive cubic splines model where the odds of experiencing any complication modeled against annual surgeon volume, while adjusted for patient age, sex, comorbidities, year of procedure, and diagnosis.

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The impact of surgical volume on patient outcomes following thyroid surgery

Emad Kandil, MD, FACS, a Salem I. Noureldine, MD, b Ali Abbas, MD, MPH, a,c and Ralph P. Tufano, MD, MBA, FACS, b New Orleans, LA, and Baltimore, MD

Fig 1. (A) Summary of the distribution of thyroid surgeons and cases by the 3 surgeon-volume groups. (B) Summary of the access to surgeon volume according to the thyroid procedure indications (P < .001).

Fig 2. Distribution of postoperative complications across thyroid conditions and surgeon volume; univariate analysis.
Volume-outcome relationship in thyroid surgery:

➢ Low surgeon volume is clearly associated with:
  ✷ Less complete resections
  ✷ Higher rates of complications
  ✷ Higher hospital charges