Surgery for Benign Thyroid Disease

Mira Milas MD, FACS
Associate Professor of Surgery
Director, The Thyroid Center
Cleveland Clinic

UCSF Head and Neck Endocrine Surgery
San Francisco, CA
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Outline
Indications for Surgery
Extent of Surgery
Strategic Considerations for Treatment
Clinical Case Illustrations

Ten Common Reasons to Consider Thyroidectomy for Benign Disease
1. Goiter with compressive symptoms
2. Enlarging thyroid nodules
3. Mediastinal goiter
4. Toxic goiter
5. Graves’ disease
6. Solitary toxic adenoma
7. Repeatedly inadequate FNA
8. Indeterminate FNA
9. Radiation treatment of head/neck
10. Cosmesis

Spectrum of Thyroid Anatomical Abnormalities with Benign Disease
Extent of Thyroid Resection

LOBECTOMY
Hemithyroidectomy

Subtotal Thyroidectomy

Isthmusectomy
Nodulectomy

Defining Total or Near-Total Thyroidectomy

What Remains After Total or Near-Total Thyroidectomy

Expectations of Modern Thyroid Surgery

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"
1. Goiter with compressive symptoms

- Total thyroidectomy
- FNA only if it will alter Rx plan
- Spectrum: mild symptoms to alleviation of symptoms or airway impingement, possibly sleep apnea
- 7-20% rate of incidental thyroid cancer

Dean & Gharib, Best Pract Res Clin Endocrinol Metab 2008; Grodsky Surgery 2008

2. Enlarging thyroid nodules

- FNA valuable, especially if other lobe is normal
- Lobectomy if unilateral disease
- Total thyroidectomy if contralateral disease
Strategic Considerations

- Discussion of extent of surgery
  recurrence: 11% lobe vs 5% subtotal vs 0.5% total
- Discussion of potential LT4 therapy
  hypothyroidism in 14% after lobectomy
- Discussion of the potential findings of cancer
- “Benign condition” vs “there is no such thing as a small surgery”
  do benefits exceed risks?
  are patient expectations appropriate?

Yetkin Endocr Pract 2010; Olson Surgery 2007; Asari Surgery 2010; Barczynski World J Surg 2010; Cooper ATA guidelines Thyroid 2006/2009; Stoll Surgery 2009

3. Mediastinal Goiter

- Total Thyroidectomy
- FNA may be informative if other lobe is normal
- Need for sternotomy is rare (3.5-15%) but multidisciplinary planning is wise
- Complications 2-4x higher (RLN injury, bleeding, respiratory failure, DVT, transfusion, LOS)
- Mortality 8x higher
- Risk factors: older age, co-morbidities, low-volume centers
- Predictors of need for sternotomy: unclear

Pieracci & Fahey JACS 2007, de Perrot Thorac Cardiovasc Surg 2007

Neck Ultrasound Imaging:
An Intra-operative tool

3. Mediastinal Goiter

<table>
<thead>
<tr>
<th>“Clinical”</th>
<th>clinical</th>
<th>“on neck examination without hyperextension, a portion remains permanently retrosternal”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hsu’s</td>
<td>clinical/radiological</td>
<td>“below the sternal manubrium”</td>
</tr>
<tr>
<td>Kocher’s</td>
<td>clinical/radiological</td>
<td>“some portion remains permanently retrosternal”</td>
</tr>
<tr>
<td>Torre’s</td>
<td>clinical</td>
<td>“lower position permanently below sternal notch with neck in hyperextension”</td>
</tr>
<tr>
<td>Eschapase’s</td>
<td>surgical/anatomical</td>
<td>“totally or partially located in the mediastinum that, in operating position, has its edge at least 3 cm below the sternal manubrium”</td>
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<tr>
<td>Lahey’s</td>
<td>surgical/anatomical</td>
<td>“goiter which needs enexesis to be performed in the upper mediastinum”</td>
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<tr>
<td>Lindskog’s</td>
<td>radiological</td>
<td>“thyroid growth up to the level of the fourth thoracic vertebrae on x-ray examination”</td>
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<tr>
<td>Crile’s</td>
<td>anatomical</td>
<td>“thyroid growth up to the aortic arc”</td>
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<tr>
<td>Katlic’s</td>
<td>clinical</td>
<td>“at least 50% is retrosternal”</td>
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<tr>
<td>“Subcarinal”</td>
<td>anatomical</td>
<td>“reaches the carina tracheae”</td>
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</tbody>
</table>

Rios Surgery 2010
4. Toxic goiter
5. Graves’ disease
6. Solitary toxic adenoma

- Total thyroidectomy for toxic goiter and Graves’
- Lobectomy for solitary adenoma
- CT scan if necessary for goiter: non-contrast
- Indications for surgical Rx of Graves’ disease: ophthalmopathy, goiter size/nodules, reproduction plans, medical/RAI failure
- US screening of all patients with Graves’ disease nodules 16% by US vs 2% I-123 scan thyroid cancer in 48% nodular Graves’

Cappelli Eur J Rad 2008
5. Graves’ disease: preoperative preparation with SSKI

AACE/AIUM July 2010

5. Graves’ disease: examples of papillary thyroid cancer

AACE/AIUM July 2010

7. Repeatedly inadequate FNA
8. Indeterminate FNA

• “Diagnostic lobectomy”
• Cancer risks
  5-10% for inadequate
  10-30% for indeterminate FNA/follicular neoplasm

Informed discussion of options for initial or 2-stage total thyroidectomy in patients with indeterminate FNA

TSHR mRNA Detects Circulating Thyroid Cancer

• Blood sample (3 tubes)
• Separate mononuclear cells
• Extract total RNA
• Quantitative RT-PCR
• TSHR mRNA >1 ng/ug
Clinical Utility of TSHR mRNA: Diagnosis of Cancer in Follicular Neoplasms

<table>
<thead>
<tr>
<th>TSHR mRNA alone</th>
<th>mRNA &amp; US Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>No Cancer</td>
</tr>
<tr>
<td>SN 76%</td>
<td>SN 97%</td>
</tr>
<tr>
<td>SP 96%</td>
<td>SP 84%</td>
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<tr>
<td>PPV 96%</td>
<td>PPV 88%</td>
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<tr>
<td>NPV 77%</td>
<td>NPV 95%</td>
</tr>
<tr>
<td>ACC 85%</td>
<td>ACC 91%</td>
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Milas et al, Annals of Surgery 2010

9. Head and neck radiation

- FNA used variably among specialties
- Total thyroidectomy
- Screen for concomitant parathyroid disease

10. Cosmesis

Summary

- Ensure the benefits of surgery for a benign condition outweigh the operative risks
- Strategic or comprehensive approach to the whole patient, not just “thyrocentric” care
- US is key component of management
Thank You

- Endocrinology
- Endocrine Surgery
- Head and Neck Surgery
- Genomic Medicine Institute
- Pathology
- Radiology
- Medical and Radiation Oncology

Endocrinology and Metabolism Institute

Cleveland Clinic