Evaluation of Thyroid Nodules in Primary Care

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CANP – Newport Beach 2014
Disclosure Information

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• FINANCIAL DISCLOSURE:
  • I have no financial interest related to this presentation.

• UNLABELED/UNAPPROVED USES DISCLOSURE:
  • No unlabled or unapproved uses for medications will be covered in this presentation.
Objectives

1. Distinguish between benign nodules from those that are malignant or highly suspicious for malignancy
2. Design an initial diagnostic plan of care for the patient who presents with a thyroid nodule
3. Evaluate laboratory and radiologic exams to determine appropriate follow-up and referral of the patient with benign or malignant thyroid nodule
You just found a thyroid mass during a routine evaluation for a sore throat

What now???
A & P: Hypothalmic-Pituitary-Thyroid Axis

TRH from Hypothalmus stimulates Pituitary Gland to produce TSH

Images: Mike Wilde
TSH from Pituitary stimulates Thyroid Gland to produce $T_3$ and $T_4$
A & P: Hypothalmic-Pituitary-Thyroid Axis

- Circulating $T_3$ & $T_4$ feed back to Hypothalmus & TRH
- Without TRH, Pituitary TSH
- Without TSH, Thyroid $T_3$ and $T_4$
- Peripheral conversion of $T_4$ to $T_3$
Physiology - Euthyroid

- T3 and T4 in balance
- Negative Feedback System
  - works similar to home heater thermostat
Pathophysiology- Hypothyroid

- Inadequate $T_3$ & $T_4$
  - Pituitary Gland produces more & more TSH (TSH↑)
  - Cause somatic symptoms: slow, dry
Pathophysiology - Hyperthyroid

- Overactive gland or nodule
- Too much $T_3$ & $T_4$
  - Feeds back to Hypothalmus & Pituitary Gland
  - Turns off the TSH
Thyroglobulin, Iodine & $T_3$ & $T_4$
Neck Mass

- Goiter
  - Diffusely enlarged thyroid gland
  - Could be multi-nodular
  - Iodine deficiency
- Nodules: benign vs malignant
  - Hyperactive nodule: fx independently from TSH stim. – rarely cancer
  - Hypoactive nodule – more likely to be malignant

Image: Public Domain Almazi commons.wikimedia.org/wiki/File:Goitre.jpg
History to Gather

- Palpable mass or non-mobile
- Dysphasia/Hoarse Voice
- Childhood exposure to ionizing radiation
- FH – Thyroid cancer or Multiple Endocrine Neoplasm
Physical Exam

- Thyroid evaluation – posterior approach
- Cervical lymph nodes

Image: OSCEumbrella youtube.com/watch?v=exGgjm55Stw
Diagnostic Tests

- Blood
- Radiologic
- Cytology & Tissue
# AHRQ Rating Scheme: Strength of Recommendations

<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Strongly recommends. Can improve important health outcomes. Well-designed, well-conducted studies</td>
</tr>
<tr>
<td>B</td>
<td>Recommends. Can improve important health outcomes.</td>
</tr>
<tr>
<td>C</td>
<td>Recommends. Based on expert opinion.</td>
</tr>
<tr>
<td>D</td>
<td>Recommends against. Based on expert opinion.</td>
</tr>
<tr>
<td>E</td>
<td>Recommends against. Does not improve health outcomes or harms outweigh benefits.</td>
</tr>
<tr>
<td>F</td>
<td>Strongly recommends against. Does not improve health outcomes or harms outweigh benefits.</td>
</tr>
<tr>
<td>I</td>
<td>Recommends neither for nor against. The panel concludes that the evidence is insufficient to recommend for or against</td>
</tr>
</tbody>
</table>

Adapted from: AHRQ, 2009
Serum studies

- **TSH***
- **T₃ & T₄**
- Thyroglobulin
- Anti-Thyroglobulin antibodies

* Strong supporting evidence
Radiologic studies

- Thyroid Ultrasound
  - Presence, size & location
  - Benign vs suspicious features
  - Suspicious lymph nodes
- Radionuclide scan – “hot vs cold”
  - Hyperfunctioning – malignancy rare
  - Hypofunctioning – malignancy more common

Cytologic & Tissue Exams

• FNA
  • Benign
  • Malignant
  • Non-Diagnostic
  • Thyroidectomy

• Tissue Biopsy
  • General or HEENT surgeon

Case Study /Work-up a nodule

- Subjective
  - 45 y/o female c/o sore throat x 2d
  - No other sx’s
  - No voice change, dysphagia, or noticeable mass
  - Hx of routine dental & orthodontic x-rays in childhood
  - No FH thyroid or endocrine cancer
Case Study (continued)

- **Objective**
  - Palpable 1cm nodule over left side of thyroid.
  - No cervical lymphadenopathy
  - TSH – 1.4 (0.4 - 4.0 mIU/L)
WORKUP OF THYROID NODULE DETECTED BY PALPATION OR IMAGING

Low TSH → History, Physical, TSH → Normal or High TSH

123I or 99Tc Scan → Not Functioning

Hyperfunctioning

Evaluate and Rx for Hyperthyroidism

Nodule on US Do FNA (See R5a–c)

Elevated TSH

Evaluate and Rx for Hypothyroidism

Nondiagnostic

Repeat US-Guided FNA

Malignant PTC

Pre-op US

Surgery

RESULTS of FNA

Close Follow-Up or Surgery (See Text)

Not Hypofunctioning

Diagnostic US

No Nodule on US

Normal TSH

FNA not Indicated

Source: Cooper et. al, 2009
Benign Nodules

- Thyroid Adenomas
- Hyperplastic Nodules
- Thyroid Cysts
- Thyroiditis
  - Hashimotos (autoimmune)
  - Sub-acute (viral, post partum)
  - Suppurative (abscess)
Treatment of Benign Nodules

- Correct any deficiencies/infection
  - Iodine intake
  - Hyper or hypo thyroid
- Hyperfunctioning nodule
  - Medical tx, Ablation
- Thyroiditis
  - Hyperthyroid may become hypothyroid
Referral & Follow-up: Benign Nodule

- Endocrinology Referral
- Serial UTZ 6-18 mos after 1st FNA
  - Stable size: F/U 3-5 years
  - Increase in size: Rpt FNA w/UTZ, if persistent: Surgery
- Recurrent cystic nodules: Surgery
Thyroid Cancer on the Rise

**Rising Rates** – 60,000 estimated new cases in 2013

More women affected than men

Source: SEER, National Cancer Institute
Malignant Thyroid Carcinomas

- Papillary: 86%
- Follicular: 9%
- Medullary: 2%
- Anaplastic: 1%

Source: National Cancer Institute
Referral & Follow-up:
Malignant, Suspicious or Indeterminate Disease

- Endocrinology
- Surgery Referral
  - General Surgery
  - HEENT Surgery
Treatment of Thyroid Cancer

• Surgery
  • Lobectomy or near-total/total thyroidectomy
  • Central-compartment & lateral neck dissection
  • Completion thyroidectomy
• Radioactive Iodine $^{131}$ Ablation (RAI)
  • Low Iodine Diet prior to I$^{131}$
Treatment (continued)

- TSH suppression therapy
- External beam irradiation
- Chemotherapy (currently not recommended)
- Surgical resection of metastases
- Referral to clinical trials
F/U Medullary & Anaplastic TC

- Endocrinology to manage
- Much more complicated F/U
- High rate of metastasis
- Higher mortality rate
- More complex surgeries and neck dissections – trach
Case Study Continues…

• Three years later
• Insurance change
• Patient returns to your office S/P near-total thyroidectomy, taking levothyroxine
Follow up

- Positive for Papillary Carcinoma
- TSH: 0.08 (0.4 – 4.0)
- Thyroglobulin (TG): undetectable
  - Suppressed vs non-suppressed
- Ultrasound: WNL
Long Term Follow-up
Papillary and Follicular TC

- TSH suppression
- Cervical Ultrasound F/U
- Periodic Thyroglobulin levels
  - Suppressed vs non-suppressed
  - Recombinant human thyrotropin (rhTSH)-mediated therapy
- Iodine $^{131}$ body scan
TSH suppression

- Decreased risk of recurrence
- Hypothyroid range (<0.1mUL)
- Levothyroxine (T₄) recommended
  - Long half life
  - Use same brand
  - May have brand at generic price
- Triiodothyronine (T₃)
Thyroglobulin (Tg) & Tg Antibodies

- Tg from functioning thyroid tissue
  - Post thyroidectomy & RAI, s/b zero
- Tg antibodies artificially lower Tg levels
- Suppressed vs non-suppressed Tg
  - Test while taking $T_4$ (suppressed)
  - Recombinant human thyrotropin (rhTSH)-mediated therapy
Ultrasound & Body Scan

- UTZ of neck & lymph node eval
- Whole Body Scan I $^{131}$
Follow-up of Low Risk Patients
Follicular and Papillary TC

- Consultation with endocrinology
- Continued TSH suppression
  - Use $T_4$ to suppress TSH $<0.1$
- Annual UTZ
- Tg & anti-Tg antibodies q6-12 mos
  - Should remain undetectable & neg
Referrals: Professional & Patient

Free Patient Resources
www.thyca.org

Do you or someone you know have
Thyroid Cancer?

ThyCa's free services can help.

- One-to-One Support
- Support Groups
- Award-Winning Web Site
- Downloadable Low-Iodine Cookbook
- Newsletters
- Awareness brochures
- Thyroid Cancer Awareness Month
- Workshops
- Conferences

Ask us for free materials.

Visit www.thyca.org  E-mail thyca@thyca.org
Call 1-877-588-7904

ThyCa, Thyroid Cancer Survivors’
Association, Inc.,

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A national, non-profit 501 (c)(3) organization of thyroid cancer
survivors, family members, and health care professionals.
References


References (cont.)