


**9:45 – 10:45 am**

**Clinical Practice Guidelines for the Management of Thyroid Disorders**

**SPEAKER**  
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**Presenter Disclosure Information**

The following relationships exist related to this presentation:

- ▶ Gregory Brent, MD: No financial relationships to disclose.

**Off-Label/Investigational Discussion**

- ▶ In accordance with pmiCME policy, faculty have been asked to disclose discussion of unlabeled or unapproved use(s) of drugs or devices during the course of their presentations.

**Clinical Practice Guidelines for the Management of Thyroid Disorders**

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**Objectives**

- Utilize clinical practice guidelines to diagnose and manage thyroid nodules
- Utilize clinical practice guidelines to diagnose and manage hypothyroidism
- Utilize clinical practice guidelines to diagnose and manage hyperthyroidism

**Recent Clinical Practice Guidelines to Guide Management of Thyroid Diseases**

- Management Guidelines for Patients with Thyroid Nodules and Differentiated Thyroid Cancer-ATA-2015
- Hyperthyroidism and other Causes of Thyrotoxicosis-ATA/AACE-2011
- Clinical Practice Guidelines for Hypothyroidism in Adults-ATA/AACE-2012
- Guidelines for the Treatment of Hypothyroidism-ATA-2014
- The Use of L-T4 +L-T3 in the Treatment of Hypothyroidism-ETA-2012
- Guidelines for the Diagnosis and Management of Thyroid Disease During Pregnancy and Postpartum-ATA-2011, Endo Soc 2012, ETA 2014

ATA = American Thyroid Association; Endo Soc =The Endocrine Society; AACE = American Association of Clinical Endocrinologists; ETA = European Thyroid Association.

**Thyroid Nodules**

## Management of Thyroid Nodules

- Increasing incidence of thyroid cancer
- Evaluation of patients with thyroid nodules, use of imaging and indications for fine needle aspiration
- Managing nodules within a multinodular goiter
- Management of functioning nodules

## Case 1

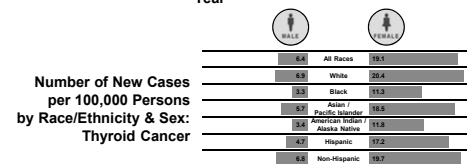
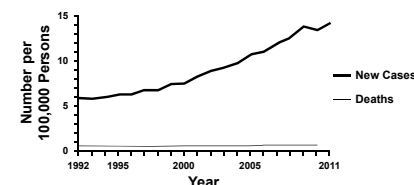
- A 48 year old man is in a motor vehicle accident and sustains a neck injury. A neck MRI is performed and is negative for cervical spine injury, but an incidental finding is noted of a 2 x 2 cm nodule in the right lobe of the thyroid. The patient has no family history of thyroid cancer and no history of radiation exposure.
- Physical exam is remarkable for right thyroid lobe prominence, but no discrete palpable thyroid nodules and no palpable lymph nodes.



## Case 1-Questions

1. Which tests should be obtained?
2. Should additional imaging be ordered?
3. Should the nodule undergo fine needle aspiration?
4. What is the risk of malignancy?

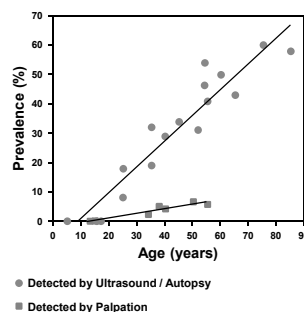
## Thyroid Cancer



Natl Cancer Inst SEER 2014.

## Thyroid Nodule Prevalence

- By age 30, ~20% of the population has a thyroid nodule (women>men)
- Likelihood of malignancy is higher in the extremes of age (<20 years, >70 years)
- Lifetime likelihood is ~ 60%



Mazzaferri EL. NEJM. 1993;328:553-559.

## Should a patient with a suspected thyroid nodule have an ultrasound?

- Thyroid sonography should be performed in all patients with known or suspected thyroid nodules

STRONG RECOMMENDATION HIGH-QUALITY EVIDENCE

Haugen. ATA Nodule Guidelines Thyroid (in review) 2015.

### What is the appropriate laboratory and imaging evaluation for patients with clinically or incidentally discovered thyroid nodules?

#### Serum TSH measurement

- Serum TSH should be measured during the initial evaluation.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

- If the serum TSH is subnormal, a radionuclide thyroid scan should be performed.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

- If the serum TSH is normal or elevated, a radionuclide scan should **not** be performed as the initial imaging evaluation.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

#### Serum thyroglobulin measurement

- Routine measurement of serum thyroglobulin (Tg) is **not** recommended.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

Haugen. ATA Nodule Guidelines Thyroid (in review) 2015.

### Thyroid Nodule Sonographic Patterns and Malignancy Risk

Sonographic Pattern	US Features	Malignancy Risk	Consider Biopsy
<b>High Suspicion</b>	Solid hypoechoic nodule or solid hypoechoic component of a partially cystic nodule <b>with</b> suspicious features	>70-90%	≥1 cm
<b>Intermediate Suspicion</b>	Hypoechoic solid nodule with smooth margins <b>without</b> suspicious features	10-20%	≥1 cm
<b>Low Suspicion</b>	Isoechoic or hyperechoic solid nodule, or partially cystic nodule with eccentric solid areas, <b>without</b> suspicious features	5-10%	≥1.5 cm
<b>Very Low Suspicion</b>	Spongiform or partially cystic nodules <b>without</b> suspicious features	<3%	≥2 cm
<b>Benign</b>	Purely cystic nodules (no solid component)	<1%	No Biopsy

#### Suspicious Features

Irregular margins (infiltrative, microlobulated), microcalcifications, taller than wide shape, rim calcifications with small extrusive soft tissue component, evidence of extrathyroidal extension

Haugen. ATA Nodule Guidelines Thyroid (in review) 2015.

### How are nodules within a multinodular goiter evaluated?

- Multiple thyroid nodules >1cm should be evaluated in the same fashion as patients with a solitary nodule >1cm, multiple nodules may require FNA.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

- Nodules with a suspicious sonographic pattern should be aspirated preferentially

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

- If none of the nodules have a high or moderate suspicion sonographic pattern, the likelihood of malignancy is low and it is reasonable to aspirate only the largest nodules (>2cm) while observing the others with serial US examinations.

WEAK RECOMMENDATION LOW-QUALITY EVIDENCE

Haugen. ATA Nodule Guidelines Thyroid (in review) 2015.

### How are suspected hyperfunctioning nodules evaluated?

- Suspect an autonomous nodule if serum TSH is low or low-normal in patients with multiple nodules(s).
- A technetium 99 mTc pertechnetate or <sup>123</sup>I thyroid scan should be considered and directly compared to the ultrasound images to determine the functionality of each nodule >1 cm.
- FNA should then be considered only for isofunctioning or nonfunctioning nodules.

WEAK RECOMMENDATION LOW-QUALITY EVIDENCE

Haugen. ATA Nodule Guidelines Thyroid (in review) 2015.

### How is ultrasound used to follow nodules with benign cytology?

- The follow up of thyroid nodules with **benign cytology** diagnoses is based upon the **ultrasound pattern**.

- Nodules with high suspicion:** repeat US and US FNA

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

- Nodules with low to intermediate suspicion:** repeat US at 12-24 months. If evidence of growth repeat

WEAK RECOMMENDATION LOW-QUALITY EVIDENCE

- Nodules with very low suspicion:** If US is repeated, it should at >24 months

NO RECOMMENDATION INSUFFICIENT EVIDENCE

Haugen. ATA Nodule Guidelines Thyroid (in review) 2015.



### Case 1 – Answers

**48 year old male with incidentally found 2 x 2 cm thyroid nodule**

#### 1. Which tests should be obtained?

An ultrasound should be performed and a serum TSH should be measured.

#### 2. Should additional imaging be ordered?

If serum TSH is suppressed, a radionuclide scan should be ordered.

#### 3. Should the nodule undergo fine needle aspiration?

Yes, all nodules >1-2 cm and confirmed by ultrasound in patients with a normal or elevated TSH should undergo FNA.

#### 4. What is the risk of malignancy?

Without other risk factors or suspicious ultrasound features, the malignancy risk is approximately 5-10%.

# Hypothyroidism

## Thyroid Hormone Therapy in Hypothyroidism

- Evaluation of patient with suspected hypothyroidism
- Thyroid hormone dosing
- Decision to treat subclinical hypothyroidism
- TSH targets
- T4 compared to T4/T3 combination
- Interference from other drugs
- Thyroid hormone therapy in the elderly

## Case 2

- A 42 year old man is seen to establish care at a new primary care center. He has been generally healthy, except for hypercholesterolemia treated with atorvastatin. He has noted some increased fatigue and a generally low energy level. He complains of a 5# weight gain and difficulty losing weight.
- **Family History**
  - Mother – Hypothyroid, Maternal Grandmother – Hypothyroid
- **Physical Examination**
  - P71, BP-132/83 Weight 187#, Height 68"
  - BMI 28.4
  - Neck-no thyroid enlargement detected
  - Chest and Cardiac-normal
  - Extremities-normal



## Case 2

TSH 7.45 mIU/L (nl .55-4.78)

Free T4 1.2 ng/dL (0.8-1.8)

1. Is the patient hypothyroid?
2. Are additional tests necessary?
3. Should he be treated with thyroxine?
4. If treatment is initiated, what dose should be started?
5. What are the potential benefits of treatment?

### *Why is levothyroxine monotherapy considered to be the standard of care for hypothyroidism?*

- Efficacy in resolving the symptoms of hypothyroidism
- Long-term experience of its benefits
- Favorable side effect profile
- Ease of administration
- Good intestinal absorption
- Long serum half-life (7-10 days)
- Low cost

STRONG RECOMMENDATION   MODERATE-QUALITY EVIDENCE

Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### *Is there a clinical rationale for prescribing brand name levothyroxine preparations in preference to generic levothyroxine?*

- Prescription of brand name levothyroxine, or maintenance of the same identifiable generic formulation of levothyroxine, is advised.
- Switches between levothyroxine products could potentially result in variations in the administered dose and should generally be avoided.

WEAK RECOMMENDATION   LOW-QUALITY EVIDENCE   FOR GENERAL POPULATION

Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### What is the best approach to initiating and adjusting levothyroxine therapy?

- Thyroid hormone therapy should be initiated as an initial full replacement, or as partial replacement with gradual increments in the dose titrated upward using serum TSH as the goal.
- Dose adjustments should be made when there are large changes in body weight, with aging, and with pregnancy.
- TSH assessment 4-6 weeks after any dosage change.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### What are the potential deleterious effects of excessive levothyroxine?

- The deleterious health effects of iatrogenic thyrotoxicosis include atrial fibrillation and osteoporosis.
- Avoid subnormal serum TSH values, particularly TSH values below 0.1 mIU/L, especially in older persons and postmenopausal women.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### What factors determine the levothyroxine dose required by a hypothyroid patient for reaching the appropriate serum TSH goal?

- Patient's weight, lean body mass, pregnancy status, etiology of hypothyroidism, degree of TSH elevation, age, and general clinical context, including the presence of cardiac disease, should all be considered.
- The serum TSH goal appropriate for the clinical situation should also be considered.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

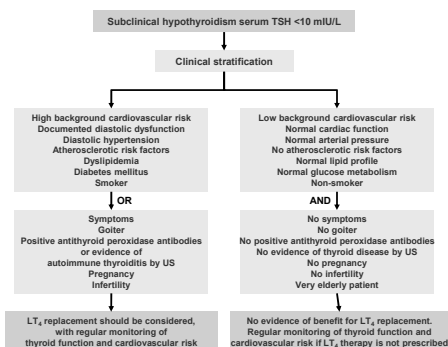
Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### Levothyroxine Formulations

% Increase		50	17	14	12	12	10	10	17	14
Dose (µg)	50	75	88	100	112	125	137	150	175	200
% Decrease	-33	-15	-12	-11	-10	-9	-9	-14	-13	

Difference of <25%

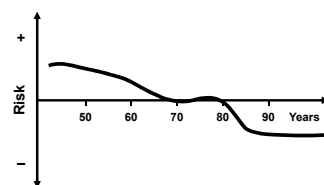
### Evaluation of Subclinical Hypothyroidism



Biondi and Cooper. Endocr Rev. 2008;29:76.

### Risk of Subclinical Hypothyroidism Primarily in Middle Age

Relationship between age and effect of subclinical hypothyroidism on manifestations of hypothyroidism (symptoms, mood, cognition) and cardiovascular risk



Biondi and Cooper. Endocr Rev. 2008;29:76.

### What biochemical goals should be employed for levothyroxine replacement in patients with secondary hypothyroidism?

- The goal should be to maintain the serum free thyroxine values in the upper half of the reference range.
- The serum free thyroxine target level may be reduced in older patients or patients with comorbidities, who may be at higher risk of complications of thyroid hormone excess.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### How should T4/T3 combination therapy be used to treat hypothyroidism?

- It is suggested to start combination therapy in an L-T4/L-T3 dose ratio between 13:1 and 20:1 by weight (L-T4 once daily, and the daily L-T3 dose in two doses). Example: If a patient is on 100 ug levothyroxine and well controlled, 95ug L-T4/5 ug L-T3, would be 19:1
- Currently available combined preparations all have an L-T4/L-T3 dose ratio of less than 13:1, and are not recommended. Close monitoring is indicated, aiming not only to normalize serum TSH and free T4 but also normal serum free T4/free T3 ratios.

Wiersinga WM, et al. ETA T4/T3 Guidelines Eur Thyroid J. 2012;1:55-71.

### How should levothyroxine administration be timed with respect to meals and beverages in order to maintain maximum, consistent absorption?

- Levothyroxine should be consistently taken either 60 minutes before breakfast or at bedtime (3 or more hours after the evening meal).

WEAK RECOMMENDATION MODERATE-QUALITY EVIDENCE

- Levothyroxine should be separated from other potentially interfering medications and supplements (e.g. calcium carbonate and ferrous sulfate). A 4-hour separation is traditional, but untested. Other medications (e.g. aluminum hydroxide and sucralfate) may have similar effects.

WEAK RECOMMENDATION WEAK-QUALITY EVIDENCE

Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### Agents and Conditions Having an Impact on L-thyroxine Therapy and Interpretation of Thyroid Tests

#### Interference with Absorption:

- Bile acid sequestrants (cholestyramine, colestipol, colesvelam)
- Sucralfate
- Cation exchange resins (Kayexelate)
- Oral bisphosphonates
- Proton pump inhibitors
- Raloxifene
- Multivitamins (containing ferrous sulfate or calcium carbonate)
- Ferrous sulfate
- Phosphate binders (sevelamer, aluminum hydroxide)
- Calcium salts (carbonate, citrate, acetate)
- Chromium picolinate
- Charcoal
- Orlistat
- Ciprofloxacin
- H2 receptor antagonists<sup>a</sup>
- Malabsorption syndromes
  - Celiac disease
  - Jejunioileal bypass surgery
  - Cirrhosis (biliary)
  - Achlorhydria
- Diet
  - Ingestion with a meal
  - Grapefruit juice<sup>a</sup>
  - Espresso coffee
  - High fiber diet
  - Soybean formula (infants)
  - Soy

ATA/AACE Guidelines for Hypothyroidism. Garber JR, et al. Thyroid. 2012;22:1200-1235.

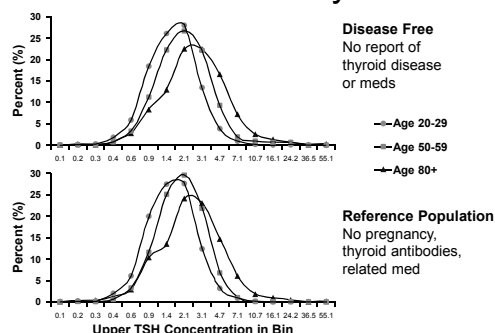
### How should levothyroxine therapy be managed in the elderly with hypothyroidism?

- Levothyroxine should be initiated with low doses, and the dose titrated slowly based on serum TSH measurements.
- Normal serum TSH ranges are higher in older populations (such as those over 65 years), and higher serum TSH targets may be appropriate for those on thyroxine replacement.

STRONG RECOMMENDATION MODERATE-QUALITY EVIDENCE

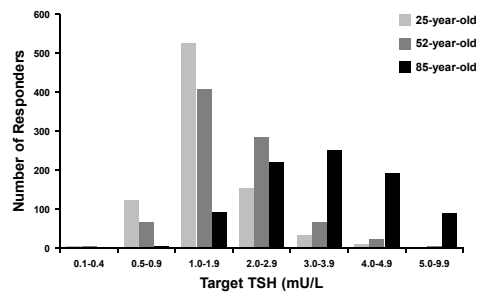
Jonklaas J, et al. Guidelines for the Treatment of Hypothyroidism Thyroid. 2014; 24:1670.

### Age Distribution of TSH from NHANES III Survey Data



Surks and Hollowell. J Clin Endocrinol Metab. 2007;92:4575.

## TSH Targets in Hypothyroidism Based on Age of Patient



Burch, et al. J Clin Endocrinol Metab. 2014;99:2077.



## Case 2 – Answers

42 year old male, hypercholesterolemia, TSH 7.45 mIU/L (nl .55-4.78), Free T4 1.2 ng/dL (0.8-1.8)

### 1. Is the patient hypothyroid?

The pattern of elevated TSH and normal range Free T4 is referred to as subclinical hypothyroidism.

### 2. Are additional tests necessary?

Most would measure a TPO antibody to confirm that it is autoimmune hypothyroidism, which is strongly suggested by the family history, but it is not required to initiate treatment.

### 3. Should he be treated with thyroxine?

The patient has symptoms of fatigue and weight gain, as well as hypercholesterolemia.

### 4. If treatment is initiated, what dose should be started?

Most would begin a low dose of 25-50 ug/day of thyroxine, although full replacement can be started. A TSH measurement should be repeated in 4-6 weeks.

### 5. What are the potential benefits of treatment?

The patient may get some improvement in symptoms. Cardiovascular risk reduction with thyroxine treatment in the setting of subclinical hypothyroidism is most significant for middle-aged patients.

## Hyperthyroidism

## Management of Hyperthyroidism

- Causes of hyperthyroidism
- Treatment choices for Graves' disease
- Antithyroid drug use in Graves' disease
- Subclinical hyperthyroidism
- Drug-induced hyperthyroidism

## Case 3

- A 38 year old woman is seen with a 6 month history of excessive sweating, tremor, and a 10# weight loss.
- No family history of thyroid disease
- Medications-none

### Physical Exam

- BP 124/74, P112, T 98.8, Weight 120#, 67#
- HEENT-bilateral lid lag, proptosis
- Neck-supple, thyroid gland 2-times normal size, diffuse, firm
- Ext-fine tremor of outstretched hands



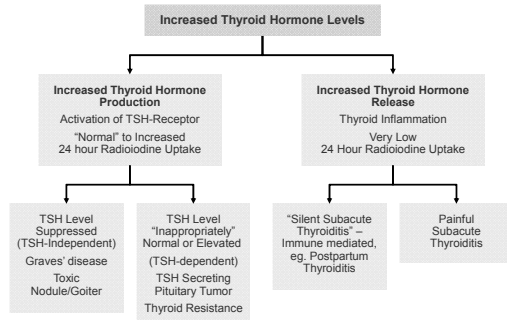
## Case 3

### Lab Results:

- TSH <0.05 (0.4-4.2 mIU/mL)
- FT4 3.2 (0.8-1.8 ng/dL)
- TT3 345 (80-200 ng/dL)

1. Should additional tests be performed?
2. What is the appropriate treatment?
3. How should the patient be monitored?
4. How long should treatment be continued?

## Etiology of Increased Thyroid Hormone Levels



## Causes of Thyrotoxicosis

**Thyrotoxicosis associated with a normal or elevated radioiodine uptake over the neck<sup>a</sup>**

- Graves' Disease, Toxic Adenoma or Toxic Multinodular Goiter, Trophoblastic disease, TSH-producing pituitary adenomas, Resistance to thyroid hormone (T3 receptor mutation)<sup>b</sup>

**Thyrotoxicosis associated with a near-absent radioiodine uptake over the neck**

- Painless (silent) thyroiditis, Amiodarone-induced thyroiditis, Subacute (granulomatous, de Quervain's) thyroiditis, Iatrogenic thyrotoxicosis, Factitious ingestion of thyroid hormone, Struma ovarii, Acute thyroiditis, Extensive metastases from follicular thyroid cancer

a. In iodine-induced or iodine-exposed hyperthyroidism (including amiodarone type 1), the uptake may be low.  
b. Patients are not uniformly clinically hyperthyroid.  
Bahn, et al. *Thyroid*. 2011;21:593.

## When should a thyroid uptake and scan be performed in a patient with thyrotoxicosis?

- A radioactive iodine uptake should be performed when the clinical presentation of thyrotoxicosis is not diagnostic of Graves' Disease
- A thyroid scan should be added in the presence of thyroid nodularity.

STRONG RECOMMENDATION

LOW-QUALITY EVIDENCE

Bahn, et al. *Thyroid*. 2011;21:593.

## Which patients with thyrotoxicosis should receive beta-adrenergic blockers?

- Beta-adrenergic blockade should be given to elderly patients with symptomatic thyrotoxicosis and to other thyrotoxic patients with resting heart rates in excess of 90 beats per minute or coexistent cardiovascular disease.

STRONG RECOMMENDATION

MODERATE-QUALITY EVIDENCE

Bahn, et al. *Thyroid*. 2011;21:593.

## Beta-Adrenergic Receptor Blockade

Drug	Dosage	Frequency	Considerations
<b>Propranolol</b>	10-40mg	TID-QID	<ul style="list-style-type: none"> <li>Nonselective beta-adrenergic receptor blockade</li> <li>Longest experience</li> <li>May block T4 to T3 conversion at high doses</li> <li>Preferred agent for nursing mothers</li> </ul>
<b>Atenolol</b>	25-100mg	QD or BID	<ul style="list-style-type: none"> <li>Relative beta1 selectivity</li> <li>Increased compliance</li> </ul>
<b>Metoprolol</b>	25-50mg	QID	<ul style="list-style-type: none"> <li>Nonselective beta-adrenergic receptor blockade, once daily</li> <li>Least experience to date</li> <li>May block T4 to T3 conversion at high doses</li> </ul>
<b>Esmolol</b>	40-160mg	QD	<ul style="list-style-type: none"> <li>In intensive care unit setting of severe thyrotoxicosis or storm</li> </ul>

Bahn, et al. *Thyroid*. 2011;21:593.

## How should overt hyperthyroidism due to Graves' disease be managed?

- Patients with overt Graves' hyperthyroidism should be treated with any of the following modalities:
- <sup>131</sup>I therapy
- Antithyroid drugs (ATD)
- Thyroidectomy

STRONG RECOMMENDATION

MODERATE-QUALITY EVIDENCE

Bahn, et al. *Thyroid*. 2011;21:593.



*Which factors favor use of one of the three treatment modalities for Graves' hyperthyroidism?*

**Radioiodine <sup>131</sup>I**

- Females planning a pregnancy in the future (in more than 4-6 months following radioiodine therapy)
- Individuals with comorbidities increasing surgical risk
- Patients with previously operated or externally irradiated necks
- Lack of access to a high-volume thyroid surgeon
- Contraindications to antithyroid drug (ATD) use

Bahn, et al. *Thyroid*. 2011;21:593.

*Which factors favor use of one of the three treatment modalities for Graves' hyperthyroidism?*

**Antithyroid Drugs (ATDs)**

- High likelihood of remission (patients, especially females, with mild disease, small goiters, and negative or low-titer TSH-Receptor Antibody, TRAb)
- Elderly or others with comorbidities increasing surgical risk or with limited life expectancy...unable to follow radiation safety regulations
- Previously operated or irradiated necks
- Lack of access to a high volume thyroid surgeon
- Moderate to severe active Graves' Ophthalmopathy

Bahn, et al. *Thyroid*. 2011;21:593.

*Which factors favor use of one of the three treatment modalities for Graves' hyperthyroidism?*

**Surgery**

- Symptomatic compression or large goiters
- Low uptake of radioactive iodine
- Thyroid malignancy is documented or suspected or large nonfunctioning nodule
- Coexisting hyperparathyroidism requiring surgery
- Females planning a pregnancy in <4-6 months
- Patients with moderate to severe active Graves' Ophthalmopathy

Bahn, et al. *Thyroid*. 2011;21:593.

*Which antithyroid drug should be used and how should treatment be initiated?*

- Obtain baseline complete blood count, including white count with differential, and a liver profile.
- Methimazole should be used except during the first trimester of pregnancy, when propylthiouracil is preferred, in the treatment of thyroid storm, and in patients with minor reactions to methimazole who refuse radioactive iodine therapy or surgery.
- Patients should be informed of side effects of antithyroid drugs and the necessity of informing the physician promptly if they should develop.

Bahn, et al. *Thyroid*. 2011;21:593.

*How long should Graves' disease patients be treated with antithyroid drugs and how should they be monitored?*

- A differential white blood cell count should be obtained during febrile illness and at the onset of pharyngitis in all patients taking antithyroid medication. Routine monitoring of white blood counts is not recommended.
- Methimazole should be continued for approximately 12-18 months, then tapered or discontinued if the TSH is normal.
- If a patient with GD becomes hyperthyroid after completing a course of methimazole, consideration should be given to treatment with radioactive iodine or thyroidectomy.

Bahn, et al. *Thyroid*. 2011;21:593.

**ATA/AACE Guidelines for Treatment of Subclinical Hyperthyroidism (suppressed TSH, normal T4/T3)**

Factor	TSH (<0.1 mU/L)	TSH (0.1-0.5 mU/L)
<b>Age &gt;65</b>	Yes	Consider treating
<b>Age &lt;65 with Comorbidities</b>		
Heart Disease	Yes	Consider treating
Osteoporosis	Yes	No
Menopausal	Consider treating	Consider treating
Hyperthyroid Symptoms	Yes	Consider treating
<b>Age &lt;65, Asymptomatic</b>	Consider treating	No

Bahn, et al. *Thyroid*. 2011;21:598.



## Case 3 – Answers

38 year old woman with 6 month history of sweating, tremor and 10# weight loss, ophthalmopathy on exam. Laboratory – TSH <0.05 (0.4-4.2 mIU/mL), FT4 3.2 (0.8-1.8 ng/dL), TT3 345 (80-200 ng/dL).

**1. Should additional tests be performed?**

History, labs and the presence of ophthalmopathy are sufficient to diagnose Graves' disease. TSH receptor antibodies could be measured and a radionuclide uptake and scan performed, but these are not necessary.

**2. What is the appropriate treatment?**

Most would treat initially with antithyroid drugs. Beta blockers may also be used. Radioiodine and surgery should be offered as alternative treatments.

**3. How should the patient be monitored?**

Baseline CBC and liver function tests should be measured. Patient should be cautioned regarding symptoms of agranulocytosis, such as fever or pharyngitis, and to stop antithyroid drug if they occur. Thyroid tests should be repeated in 1-2 months.

**4. How long should treatment be continued?**

Treatment is generally continued for 12-18 months to assess if a remission has occurred. This would be confirmed by a normal TSH off medication. Treatment, however, can be continued beyond this time if definitive treatment with radioiodine or surgery is refused or not possible.