THYROID
CASES & FAST FACTS

Ole Schmiedel
Endocrinologist & Physician

Hyperthyroidism (T-tox)

1. Autoimmune disease
    1. Graves
    2. Postpartum
    3. Hashimotos
2. Nodular disease
    1. Toxic adenoma
    2. Toxic nodular goitre

3. Drugs/other
    1. Amiodarone (Type 1 and 2)
    2. De Qervains
    3. Excess thyroid hormone
    4. TSH-oma, TH resitance

Presentation /clinic

- **Graves**
  - Ophthalmopathy
  - Female (10:1)
  - Rapid onset
  - Severe toxicosis
  - Associated AID
- **TN or TNG**
  - T3 toxicosis
  - Sub-clinical
  - Slow onset
  - Older
  - Palpable nodules

? FHx, Drug Hx, Pain over the thyroid, pregnancy

Presentation /clinic

- **Hashimotos**
  - Lymphocytic infiltration
  - AB positive (TG> TPO AB)
  - Transient toxicosis
  - Tri-phasic response
  - Hypothyroidism
  - Low uptake at Scintigram
- **Post-partum**
  - < 6/12 post partum
  - 50% Graves
  - 50% PP-thyreoditis
  - Tri-phasic response
  - Generally spontaneous recovery

Investigations

- TFT's (fT3, fT4, TSH)
- TPO AB
- TG AB
- TSH receptor AB
  (Thyroid stimulating IG)

1. **Who needs US?**
2. **Who should request US?**
3. **Who needs Scinthigram ?**

1. Autoimmune disease
   1. Graves
   2. Postpartum
   3. Hashimotos
2. Nodular disease
   1. Toxic adenoma
   2. Toxic nodular goitre
3. Drugs/other
   1. Amiodarone (Type 1 and 2)
   2. De Qervains, Riedels, ...

Investigations

- **Ultrasound**
  - thyroid nodule
  - euthyroid
  - thyroid cancer ?
- **Scinthigram**
  - Thyreotoxicosis
  - ? Thyreoditis
  - ? Toxic nodule vs. Graves

Treatment

- **Carbimazole**
- **Propylthiouracil**
- **Radioiodine**
- **Watch and wait**

Other issues

- Management post radioiodine?
- Management of thyroid cancer ?
- The suspicious thyroid nodule

TFT's:

- T3 and T4 raised, THS supressed
- Subclinical: normal T3 and T4 and low TSH
- Be aware: T3 toxicosis (nodule or Armour)

Hypothyroidism

Causes

With goitre

- Hashimotos
- Iodine deficiency
- Cold nodules

Without goitre

- Atrophic thyreoditis
- Congenial

Pituitary/hypothalamic

(low T3/4 and inappropriately normal TSH)

Iatrogenic

- Radioiodine
- Surgery
- Drugs (iodine, lithium)

Hypothyroidism and pregnancy

- Treatment adjustment
- Target TSH ?
- What to follow?

Hypothyroidism

- **Target TSH?**
  (age, context, pregnancy)
- **Subclinical hypothyroidism ?**
- **TSH vs. symptoms**
- **Thyroxine absorption**
  - Food
  - Drugs
  - Medical conditions

How much Thyroxine ?

- Age
- Gender
- Cause of hypothyroidism (remaining thyroid function)
- Difference of replacement vs THS suppression Rx for thyroid cancer
- Approximate Dose T4:
  - Male: 1.5 mcg/kg
  - Postmenopausal woman: 1.7 mcg/kg
  - Premenopausal woman: 2.2 mcg/kg

L-thyronine (T3)

- BTA (UK)
- Patient interest groups
- Evidence
- Clinical approach
- Who can get it
- How to use T3
- Safety
- When not to use T3
- Long acting T3
- Armour thyroid

Thyroid Function Tests in Pregnant Women

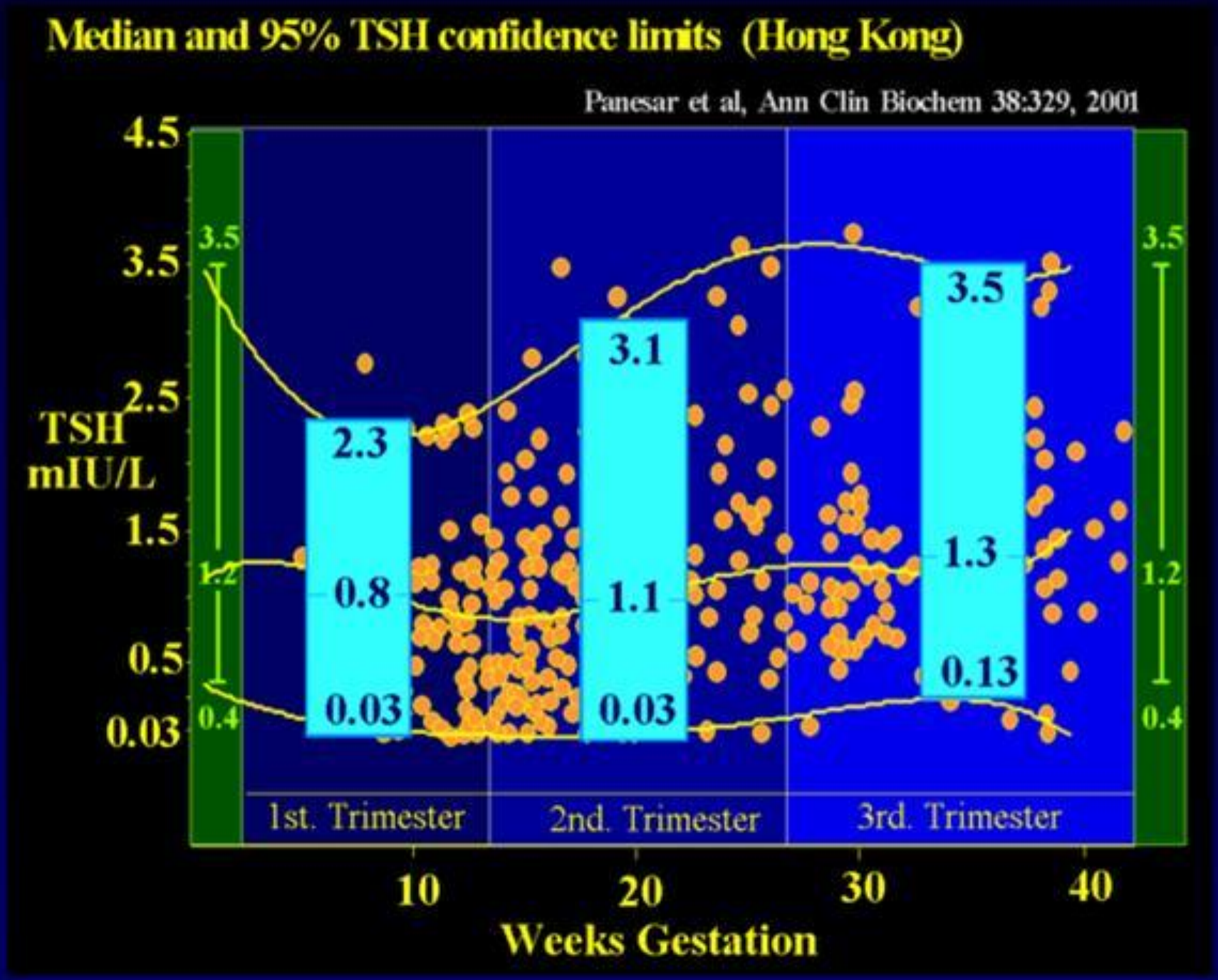
30 y/o woman

- 12 weeks gestation
- No thyroid history, negative exam
- Free T4 1.6 ng/dL (0.8-1.8)
- TSH 0.13 mIU/L (0.5-4.5)

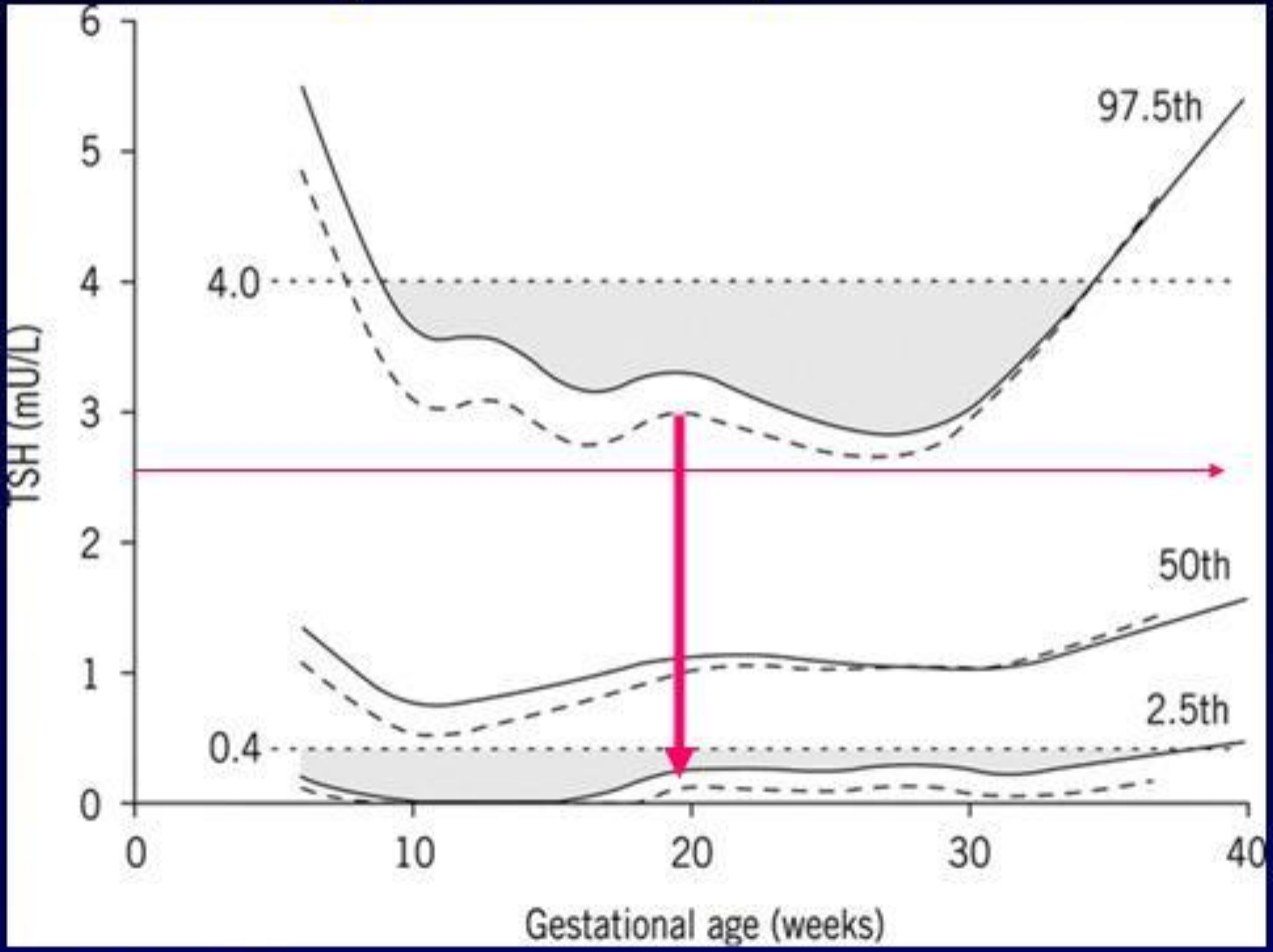
- How do you explain these test results?
- What would you do?
- (Should she have had TFT's checked?)

Changes in Thyroid Tests during Gestation

Courtesy of Dr. C. Spencer


Median and 95% TSH confidence limits (Hong Kong)
Panesar et al, Ann Clin Biochem 38:329, 2001
4.5
3.5
2.5
1.5
0.5
0.03
TSH mIU/L
3.5
1.2
0.4
2.3
0.8
0.03
3.1
1.1
0.03
3.5
1.3
0.13
1st. Trimester
2nd. Trimester
3rd. Trimester
10
20
30
40
Weeks Gestation

Median, 5th, 95th, and 97.5th %ile of TSH by week of gestation in 17,298 women



Casey et al. 2005

Case 4

48 y/o man

- fatigue and cold intolerance
- decreased libido and erectile function
- thyroid not enlarged
- TSH = 2.2 mIU/L (0.3-5.0)
- fT4 = 0.6 ng/dL (0.8-1.8)

How do you explain these test results? What would you do?

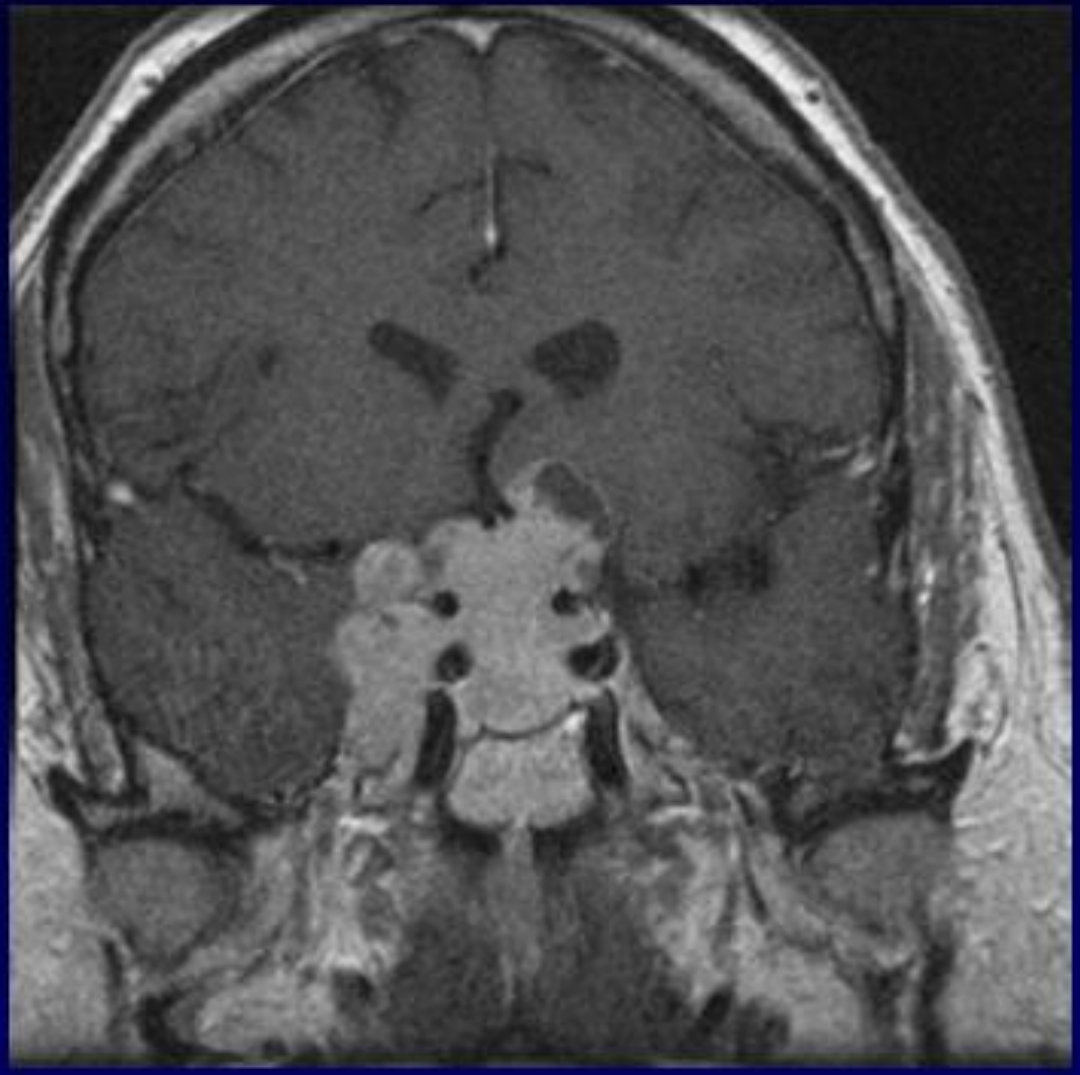
Case 4

- 48 y/o man
  - TSH = 2.2 mIU/L (0.3-5.0)
  - fT4 = 0.6 µg/dl (0.8-1.8)

  - Testosterone 10 µg/dl (250 - 900)
  - LH/FSH = normal
  - AM cortisol = 14 µg/dl (7-22)
  - Prolactin = 6800 ng/dl (< 20)

Case 4

Giant Prolactinoma



Sheehan's Syndrome

Atmaca et al. Thyroid 2007

72 patients with Sheehan's syndrome:

- 56 (85%) had normal TSH levels
- 4 (6%) had low TSH levels
- 6 (9%) had sl. Elevated TSH levels

TABLE 1. COMPARISONS OF CHARACTERISTICS OF THE GROUPS[a]

Groups	*CH0* (n = 56)	*CH1* (n = 10)	*Euthyroid* (n = 6)	*Control* (n = 10)
Age (yr)	54.3 ± 10.9 (29–75)	52.2 ± 8.4 (38–65)	50.02 ± 12.3 (31–63)	49.0 ± 9.1 (32–67)
Duration of the disease (yr)	17.2 ± 8.4 (4–36)	21.0 ± 9.4 (5–39)	18.6 ± 10.5 (6–30)	
fT_3 (N; 2.2–4.7 pg/ml)	0.96 ± 0.77 (0.03–3.05)	1.81 ± 0.81 (0.24–2.90)	2.61 ± 1.00[b] (0.86–3.30)	
fT_4 (N; 8–20 pg/ml)	3.10 ± 2.30 (0.10–7.80)	10.3 ± 3.02 (8–16)	11.6 ± 4.30[b] (8.30–19.7)	
TSH (N; 0.2–4.5 μIU/ml)	2.09 ± 1.71 (0.10–6.80)	0.96 ± 1.03 (0.01–2.90)	2.43 ± 1.81 (0.29–4.79)	1.33 ± 0.53 (0.35–2.0)

Case 4

Pearls

- If suspicion of thyroid dysfunction is more than minimal, always measure T4 (total or free) with TSH
- TSH is “normal” in hypopituitarism (much of the time)
- Also true for other pituitary hormones (LH/FSH, PRL, GH, ACTH)

Case History

A 27 yo woman, 15 weeks pregnant, presents with nausea, dyspnea and palpitations. She has Graves' disease; admitted previously for similar symptoms.

Meds: PTU 200 mg QID, Propranolol 20 mg TID

PE: BP 154/70 P 125 T 101 Ht 5'7'' Wt 135 lb.

MS: agitated CV: no rales, no S3, no edema

Thyroid: diffuse (> 100 gm); + bruit

Lab: TSH: < 0.01 mU/L (nl: 0.5-5.0)

FT4 12.9 ng/dl (nl: 0.8-1.8) T3 958 (nl: 90-180)

Does she have thyroid storm?

How would you initiate treatment?

Thyroid Storm Score

Feature	Score	Feature	Score
Fever:		**Pulse:**	
99-99.9	5	99-109	5
100-100.9	10	110-119	10
101-101.9	15	120-129	15
102-102.9	20	130-139	20
103-103.9	25	>139	25
>103.9	30	Atrial fibrillation	10
CNS:		**CHF:**	
Absent	0	Absent	0
Mild (agitation)	10	Mild (edema)	5
Moderate (delirium)	20	Moderate (rales)	10
Severe (sz, coma)	30	Severe (pulm edema)	15
GI:		**Precipitant History:**	
Absent	0	Absent	0
N, V, D, Pain	10	Present	10
Jaundice	20		

Burch and Wartofsky, Endocrinology and Metabolism Clinics of North America, 1993.

Treatment of Thyroid Storm

Although PTU is traditionally preferred because of its effects on T4 to T3 conversion, there is no evidence that PTU is more efficacious than Methimazole in Thyroid Storm.

Use Either ATD in High Dose:
Methimazole 60-120 mg daily in Divided Doses
PTU 600-1200 mg daily in Divided Doses

Methimazole and PTU Can Be Given PO, NG Tube, or Rectally
Methimazole Can Be Given IV

Cooper D. N Engl J Med 2005;352:905-917
Hodak S, Thyroid 2006;16:691-5

Thyroid Storm Treatment

- **Reduce Thyroid Hormone Synthesis**
  - Propylthiouracil (PO, NG, Rectal): 200 mg Q 4-6 hours
  - Methimazole (PO, NG, Rectal): 20 mg Q 4-6 hours
- **Reduce Thyroid Hormone Release**
  - Sodium Iodide (IV): 1 gm over 24 hours
  - Potassium Iodine (PO): 5-10 drops TID [SSKI, Lugol's]
- **Reduce Heart Rate**
  - Esmolol (IV): 500 ug over 1 min, then 50-300 ug/kg/min
  - Metoprolol (IV): 5-10 mg Q 2-4 hours
  - Diltiazem (IV): 0.25 mg/kg over 2 min, then 10 mg/min, or (PO): 60-90 mg Q 6-8 hours
- **Support Circulation and Oxygenation**
  - Stress Dose Glucocorticoids IV
  - IV Fluids
  - Oxygen