

CRITICAL THINKING EXERCISES: (Hyper-Thyroidism)

Kate Busy, a 23 year old bank employee, is hospitalized with chief complaints of tachycardia, tremors, weight loss (even with an increase in appetite) and weakness. She has been well until 6 months ago, when her co-workers started noticing her unusual irritability and nervousness and referred to her as the "jumping jitters." Her family is irritated because Kate has difficulty focusing so her "family duties" (i.e. balancing check book, dinners) have been slighted.

Assessment Findings upon Admission:

Subjective Data	Objective Data
<ul style="list-style-type: none"> • States "I wear tinted glasses most of the time." • States "I seem to sweat a lot" • States "I've been having diarrhea the last month" • States "I've lost weight without trying—I eat a lot" 	<ul style="list-style-type: none"> • V/S: T 102--P 128--R 26-- B/P 170/60 • Answers questions readily; smoking incessantly; unable to sit still; fidgety. Clothes are clean, but didn't seem to match. She wears no coat even though it is a cold winter day. • Unusually prominent, exophthalmos • Finely textured hair • Thyroid gland readily palpable; thrill felt • Flushed skin • Tremors

Impression: HYPERTHYROIDISM (Grave's Disease)

Autoimmune (unknown why)—antibodies act like TSH, which causes the glands to secrete T3 and T4

1. What are the classic assessment findings for Hyperthyroidism?

(I'm sure there are many more answers)

Because of the high levels of circulating thyroid hormone, Kate's body processes "speed-up"—knowing this will help you remember some of the assessment findings

<ul style="list-style-type: none"> • Tachycardia (due to ↑ beta adrenergic receptors) 	<ul style="list-style-type: none"> • tremors
<ul style="list-style-type: none"> • wt. loss w/ a good appetite (leading to a negative nitrogen balance/ lipid depletion—state of nutritional deficiency) 	<ul style="list-style-type: none"> • irritable/nervous

<ul style="list-style-type: none"> • hyperthermia (no infection) 	<ul style="list-style-type: none"> • jitters
<ul style="list-style-type: none"> • ↑ syst. B/P 	<ul style="list-style-type: none"> • palpable thyroid (hyperplasia/hypertrophy of the gland) and thrill felt (sign of ↑ bld. flow thru the gland)
<ul style="list-style-type: none"> • fidgety 	<ul style="list-style-type: none"> • bulging eyes (due to accumulation of fluid in the fat pads & muscles behind the eyeball)
<ul style="list-style-type: none"> • clothes don't match 	<ul style="list-style-type: none"> • photophobia
<ul style="list-style-type: none"> • flushed; sweating 	<ul style="list-style-type: none"> • diarrhea
<ul style="list-style-type: none"> • tolerates heat poorly 	

2. What are your nursing diagnoses?

- Risk for Injury (visual)
- Altered Nutrition Less than Body Requirements related to exaggerated metabolic rate and excessive appetite (inability balancing caloric intake with metabolic demands)
- Altered Body Temperature
- Ineffective coping related to irritability
- Disturbance in Self Esteem related to change in appearance
- Potential for Altered Family Coping
- Altered Role Performance
- Activity Intolerance secondary to exhaustion

BELOW are corresponding goals and interventions to the **highlighted** nursing diagnoses

Risk for Injury (visual)

Prevent Injury (eye protection) and/or Sensory-Perceptual Alterations (visual)—goal is to prevent eye ulcerations/infection

- avoid getting dust in eyes
- probably won't go away even with therapy
- elevate HOB at Noc to relieve edema
- use an eye lubricant
- dk. glasses or eye patches if photophobic & unable to shut eyes—try a sleeping mask
- steroids to reduce swelling and suture lid closed in severe cases

- diuretics may alleviate periorbital edema
- promote rest and relaxation due to anxiety/poor sleep patterns

Altered Nutrition Less than Body Requirements related to exaggerated metabolic rate and excessive appetite (inability balancing caloric intake with metabolic demands)

Improve Nutritional State

- Pre-surgery: ↑ cal. ↑ pro.; no stimulants—Post-surgery, will need to drastically reduce caloric intake
- record wt.
- calorie count to assess amount of food consumed
 - 6 small meals may be easier to eat
- foods and fluids to replace loss from perspiration
- since she has diarrhea---avoid highly seasoned foods
- avoid ETOH, stimulants

Altered Body Temperature due increased metabolic demand

Maintain Normal Body Temperature

- cool, comfortable environment
- fresh bedding, gown PRN
- cool bath
- fan
- explain this to family

Ineffective coping related to irritability

Improve Coping

- pt. re-assurance that symptoms will clear after tx.
- assess family interaction/communication
 - has the pt's. symptoms affected family dynamic?
- quiet environment and clean environment
- relaxing activities
- explain all procedures---relieve anxiety of hospitalization
- reassure that bazaar behaviors will improve with therapy
- identify activities for distraction (not putting the focus on the disease)—puzzles, molding clay, TV

Disturbance in Self Esteem related to change in appearance

Improve Self-Esteem

- explain that these symptoms are out of the control of the pt.
- remove mirrors until pt. is ready
- remind family to avoid discussing physical changes (keep a sense of normalcy)
- privacy when eating if pt. is self conscious about large meal sizes

Activity Intolerance secondary to exhaustion; Activity Intolerance R/T exhaustion secondary to accelerated metabolism

Kate will verbalize less exhaustion; Kate will exhibit increased energy

- provide a restful environment both physically and mentally
- assign them to a quiet room if hospitalized
- space out activities during the day

3. Doctor's orders include the following: Give Rationale and Nursing Implications

a) 2000 Calorie; 105 Gram (approx. 70 G in a reg. diet) Protein Diet; No Caffeine

- ↑ calorie--make -up for wt. loss
- ↑ protein--prevent muscle wasting
- no caffeine--no need for any stimulant'
- (replace fluids because of diaphoresis)

b) Bed Rest with bathroom privileges

- encourages a relaxing environment
- reduces stimulation
- reduce cardiac workload

c) Thyroid Function Tests: serum T₄ and T₃ , Thyroid scan and Thyroid ultrasound now.

- **T₄--Thyroxine**--maintains body metabolism in a steady state (norm 4.5-11.5 mcg/dl)---would be elevated in this case—hyperactive state. T₄ can convert to T₃. Free T₄ would be ordered because this is not bound to protein.
- **T₃--Triiodothyronine**--5X more potent (norm 70-220 mcg/dl)—would be elevated in this case
 - Both T₃ and T₄ ↑ metabolic rate which ↑'s metabolic consumption and heat production

Thyroid gland produces & secretes T₃ & T₄

Review your
lab &
diagnostic
book

- **Thyroid Scan**—nuclear study that helps to determine location, size, shape, and anatomical function and measurement of iodine concentration in the gland
 - ^{123}I (isotope) uptake--Radioactive Iodine Uptake commonly used-----Thyroid cannot distinguish between food w/ iodine and radioactive iodide. When ^{123}I is given, they measure the rate of iodine uptake by the thyroid; in this case, it would be high for hyperthyroidism
 - False highs due to
 - ingestion of iodine containing foods & vitamins for at least a week (assessment of the pts. intake of iodine before the scan)
 - teach not to eat foods high in iodine at least a week prior to the procedure (false readings)—i.e. seafood, iodized salt, cabbage, cough meds., enriched cereals
 - thyroid stimulating drugs
 - as a diagnostic tool not a therapeutic dose, the dose is harmless, no prep; cold nodules = cancer and hot nodules = benign
 - ^{131}I is a stronger isotope than ^{123}I or ^{125}I
 - don't have to teach radiation precautions unless dosage is high (still a good idea but don't get extreme)
 - isotope eliminated in 24 hrs mostly via urine (↑ fluids help rid the body)
 - **Thyroid Ultrasound**--determine size and if mass present (takes 30 min); no prep, remind pt that they are not radioactive w/ this test
- d) **Propranolol 10 mg QID**
- Remember the ↑ in beta adrenergic receptors in a pt in a hyperthyroid state—WELL, a beta blocker is the drug of choice--used to control sympathetic nervous system effects (controls the nervousness, tachycardia, tremors, heat intolerance)
 - used for all pts. in thyroid storm (MD may choose to use calcium channel blockers because of fewer side effects than with the beta-blockers)

- since a therapeutic (not diagnostic) use of ^{131}I (radiation therapy) takes about 3-6 mo. to reduce hyperthyroid state and change to a euthyroid state—, a pt may be put on beta blockers during that 3-6 mo period to reduce cardiac problems associated with hyperthyroid
- CAN PRODUCE CHF (BLOCKING CARDIAC FUNCTION--BE CAREFUL)---assess for c/o dyspnea, fatigue, edema, a-fib, diaphoresis, chest pain—assess tolerance to activity level
- REMEMBER that Inderal (non-selective beta blocker—both beta 1-myocardium & beta 2 effects-pulmonary/vascular) would not be used w/ pts. who have CHF or asthma but atenolol—Tenormin (selective beta blocker—specific to beta 1-myocardium) or a calcium channel blocker could be substituted---**REVIEW 2D**

e) PTU (Propylthiouracil) 100mg TID

- antithyroid agent
- blocks conversion of T_4 to T_3 outside the thyroid and prevents production of more T_4 and T_3 in the thyroid
- antithyroid meds interfere w/ hormone synthesis
- may take 2-4 wks. before noticeable change in symptoms because the the release of all the hormone from the gland into circulation takes that long
 - take as ordered
- caution pt. to NOT take iodine containing products such as cough meds., iodized salt, or shellfish
- problems w/ pt. non compliance (enc. compliance because results are slow) due to need to take med & high rate of recurrence when drugs DC'd
- report flu-like symptoms and fever---this may be drug induced (agranulocytosis and leukopenia—look @ breakdown of WBC—neutrophils, basophils, eosinophils will be low)

f) SSKI (Potassium Iodide) 125 mg TID x 10 days

- Lugol's solution used w/ antithyroid meds and beta blockers to prepare pt. for surgery (thyroidectomy)
 - Pre-surgical suppression of the gland
- Temporarily acts to prevent release of thyroid hormones from the gland into the circulation by increasing the amount of thyroid hormone stored in the gland—after so long, however, the stored thyroid hormone eventually releases back into the

circulation and again producing hyperthyroidism—
THEREFORE, iodide preparations are only used for 10-14 days before surgery

- ↓ vascularity
- ↓ size
- ↓ hormone activity
- Give after meals mix w/ juice and through a straw because it discolors the teeth; avoid OTC drugs & foods containing iodine

4. A subtotal thyroidectomy is planned 2 months later. Why was surgery delayed?

- The patient is given antithyroid drugs to produce a euthyroid state and possibly iodine and beta blockers to relieve symptoms preoperatively. Maybe not a good candidate for Radioactive Iodine Therapy.

5. What if ^{131}I is given orally for a therapeutic use not for diagnostics—precautions?

- if used as a therapeutic regime and larger doses given, it would take almost 3-6 mo. for the thyroid to reach a euthyroid state---(symptoms decrease in 3 wks.) THEREFORE, the pt is placed on antithyroid meds and beta blocker until the irradiation becomes apparent. Make sense of the possibility that the MD may not order antithyroid meds if he is worried about throwing the patient into a hypothyroid state during the radiation.
 - if patient had been on antithyroid meds, the MD would stop the drug at least 1 week before starting oral ^{131}I (radiation)
- Treatment of choice for non pregnant adults to destroy damaged tissue and thus limit thyroid hormone secretion. Worse case scenario is that the patient is thrown into a hypothyroidism and needs to take life long hormone replacement.
- TEACH when radiation precautions are needed and precautions are used because of therapeutic uses with higher radiation, stronger isotopes & longer usage of radiation
 - Increase fluids to rid the body of the isotope
 - void every 2 hrs---minimize stagnant time in bladder and flush toilet twice after each use
 - avoid prolonged physical contact (esp. w/ infants/children)
 - avoid pregnancy for at least 6 months or if post-partum, don't breastfeed for about 6 months
 - sleep alone if high doses utilized
 - have pt. wash sink/tub after use and hands after urination/defecation (good handwashing)

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- expect sore neck/dysphagia--pain controlled with a mild analgesic
- (major side effect of this radiation therapy is hypothyroidism)