

In the Name of God



# Preoperative Evaluation In Thyroid Diseases

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2021

# *Classification*

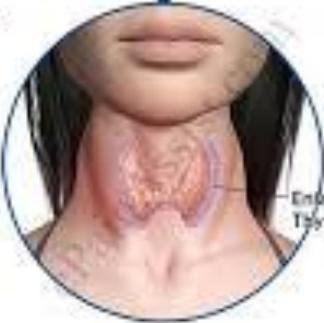
- **Hyperthyroidism / Hypothyroidism**
- **Known cases/Unknown cases(Newly diagnosed cases)**
- **Stable / Unstable patient**
- **Mild/ moderate/ severe disease**
- **Thyroid Surgery/ Non thyroid surgery**
- **Elective / urgent /emergent surgery**

# Hyperthyroidism

- weight loss, diarrhea, warm and moist skin, weakness of large muscle groups, menstrual abnormalities, osteopenia, nervousness, jitteriness, intolerance to heat, tachycardia, cardiac arrhythmias, mitral valve prolapse, and heart failure , dysphagia, dyspnea, wheezing, and orthopnea, proptosis



## Hyperthyroidism

**Diagnosis:**

**Clinical Examination** - To observe thyroid gland and find related signs like increased reflexes, tremors, skin and eye changes.

**Ultrasound Scan** - To detect the enlargement of thyroid gland and surrounding structures

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## HYPERTHYROIDISM



# Hypothyroidism

- dry skin, arthralgias, carpal tunnel syndrome, periorbital edema, intolerance to cold,
- hypotension, bradycardia, lethargy, weight gain, depressed cardiac function, pericardial effusions, and impaired ventilatory response to hypoxia or hypercarbia
- *The apathy and lethargy that often accompany hypothyroidism frequently delay its diagnosis, thus the perioperative period may be the first opportunity to spot many such hypothyroid patients*

# Hypothyroidism

- **Overt hypothyroidism :**
- depression of the ventilatory responses to hypoxia and hypercapnia,
- impaired clearance of free water with or without hyponatremia,
- slow gastric emptying, dynamic ileus, sleep apnea, bradycardia
- **In extreme cases**, cardiomegaly, heart failure, pericardial and pleural effusions
- often presenting as orthopnea, dyspnea, or general fatigue
- Hypothyroidism is often associated with amyloidosis, which may produce an enlarged tongue, cardiac conduction abnormalities, and renal disease.
- The **tongue may be enlarged** in a hypothyroid patient even in the absence of amyloidosis, and such enlargement may **hamper endotracheal intubation**.



# HYPOTHYROIDISM



## Hypothyroidism

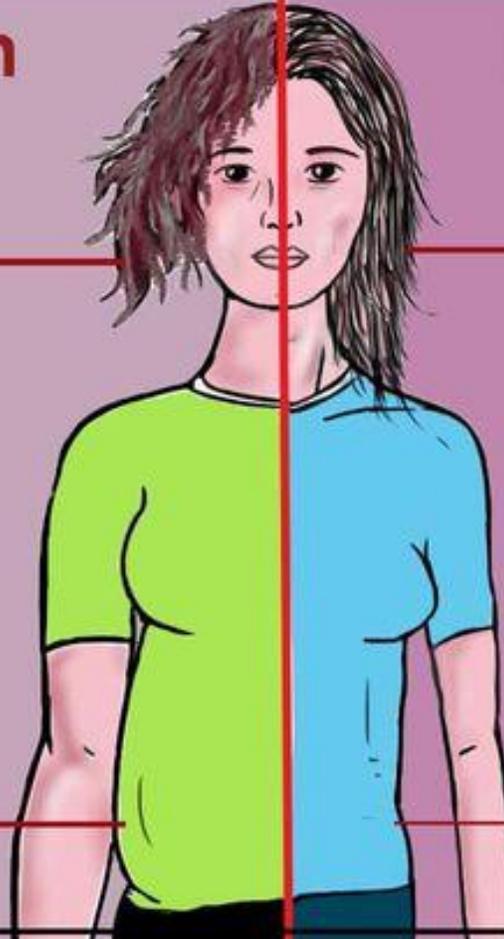
## Hyperthyroidism

Coarse,  
dry hair

Hair fall

Weight gain

Weight loss



# Decision

- . Mild to moderate thyroid dysfunction probably has minimal perioperative impact
- The major concern pertains to significant hyperthyroidism or hypothyroidism, which appears to increase perioperative risk
- Symptoms and signs of hypothyroidism and hyperthyroidism can be subtle and nonspecific, especially with milder disease in older adults.
- The preoperative evaluation should clarify the patient's current medical therapy as well as any recent changes.
- **In patients with known thyroid disease, additional preoperative thyroid function testing is not needed if the patient is on a stable medication dose and was assessed as being euthyroid within the previous 6 months.**

# Thyroid Surgery (Thyroidectomy)

- Indications : benign & malignant conditions, nodules, hyperthyroidism, obstructive or substernal goiter, thyroid cancers
- Preoperative evaluation & preparation:
- Elective surgery, with few exception it is an elective surgery. Thus any major medical issues (hyperthyroidism) should be addressed before proceeding to the operating room
- 1. Thyroid imaging: ultrasound exam, CT, MRI

# Thyroid Surgery (Thyroidectomy)

- **2. Laboratory testing:** serum TSH, free T3, free T4, Hyperthyroidism can be diagnosed by measuring levels of TSH after the administration of TRH. Although administering TRH normally increases TSH levels in blood, even a small increase in the T4 or T3 level in blood abolishes this response.
- **Thus a subnormal or absent serum TSH response to TRH is a very sensitive indicator of hyperthyroidism**
- serum Ca (concomitant parathyroid disorders),
- **in medullary thyroid cancers:** serum calcitonin, carcinoembryonic Ag (CEA), biochemical evaluation for coexisting endocrinopathies , such as hyper- parathyroidism or pheochromocytoma
- a surgical scar in the thyroid region

# Preoperative evaluation & preparation for thyroidectomy

## • 3. Laryngeal exam:

- A. direct /indirect laryngoscopy to assess vocal cord function
- B. videostroboscopy, a magnified , slow motion view of the vocal cords
- C. laryngeal ultrasound for Dx occult RLN paresis or paralysis



# Preoperative management of hyperthyroidism

- Antithyroid medications and/or Beta blockade (to avoid thyroid storm) , 4-6 weeks
- Regardless of the approach, antithyroid drugs should be administered on a long-term basis and on the morning of the surgical procedure
- inorganic iodine ,lugol's solution (saturation solution of potassium iodide, SSKI) to block iodine uptake & secretion of thyroid hormones, decrease vascularity of the thyroid gland and intraoperative bleeding, 7-10 days
- Vitamin D and calcium supplementation to reduce the risk of symptomatic hypocalcemia postoperatively (hungry bone syndrome)
- Prophylactic antiemetic (8 mg dexamethasone)

# Elective non-thyroid surgery

- elective non-thyroid surgery should also be delayed to facilitate treatment of patients with overt hyperthyroidism (i.e., suppressed TSH with elevated free T4 or T3 concentrations—with or without associated symptoms).
- Consultation with an endocrinologist is necessary if surgery is urgent in patients with thyroid dysfunction.
- If surgery is urgent, hyperthyroid patients can be treated with  $\beta$ -adrenergic blockers, antithyroid medications (e.g., methimazole, propylthiouracil, potassium iodide), and corticosteroids.

# Hyperthyroidism (non thyroid surgery)

- .1. If emergency surgery is necessary before the euthyroid state is achieved,
- 2. if subclinical hyperthyroidism progresses without adequate treatment,
- 3. or if hyperthyroidism is out of control intraoperatively:
  - Intravenous beta blocker, ipodate, glucocorticoids, PTU
  - PTU: orally via nasogastric tube or rectally
  - Glucocorticoids: dexamethasone 2mg IV Q 6hrs

## Hyperthyroidism (non thyroid surgery)

- intravenous administration of esmolol, 50 to 500  $\mu$ /kg, could be titrated to restore a normal heart rate (assuming the absence of heart failure).
- In addition, intravascular fluid volume and electrolyte balance should be restored.
- However, administering propranolol or esmolol does not always prevent “thyroid storm.”
- No specific anesthetic drug is preferred for surgical patients who have hyperthyroidism.

# a large goiter and an obstructed airway

- A patient with a large goiter and an obstructed airway can be managed in the same way as any other patient with a problematic airway. In this type of case, reviewing CT scans of the neck preoperatively may provide valuable information regarding the extent of compression.



# Hypothyroidism

- Hypothyroidism or myxedema, 0.5- 0.8% adult population
- Hypothyroidism is usually **subclinical**, **serum concentrations of thyroid hormones are in the normal range**, and only serum TSH levels are elevated. The normal range of **TSH is 0.3 to 4.5 milliunits/L**
- **TSH values of 5 to 15 milliunits/L** are characteristic of this entity
- In such cases, hypothyroidism may have ***little or no perioperative significance***
- a retrospective study: (mildly hypothyroid patients) ,more hypothyroid patients than control subjects required prolonged postoperative intubation, had significant electrolyte imbalances , and bleeding complications
- **If additional preoperative testing is clinically indicated, thyroid-stimulating hormone (TSH) assays are best to evaluate for hypothyroidism**

# *Hypothyroidism*

- In general, if a patient has moderate or worse hypothyroidism (i.e., elevated TSH and low free T4—with or without associated symptoms), elective surgery should be postponed until the individual is euthyroid.
- Other potentially useful tests include chest radiography or computed tomography scans to evaluate tracheal or mediastinal involvement by a goiter.

# Preoperative medication

- All thyroid replacement therapy should be continued on the day of surgery (administering the normal dose of levothyroxine the morning of the surgical procedure, even though these drugs have long half-lives (1.4-10 days))
- Extremely sensitive to narcotics & sedatives and even may be lethargic secondary to their disease. Therefore preoperative sedation should be undertaken with caution

# Euthyroid Sick Syndrome

- Critically ill patients with significant non thyroid illness / after surgery/ stress
- Abnormal results thyroid function tests, low level of T3 & T4, normal level of TSH
- Etiology : not understood
- No treatment for thyroid function is necessary
- Differentiation from hypothyroidism :  $TSH > 10$  = hypothyroidism ,  $TSH < 5$  = euthyroidism

# Angina + Hypothyroidism

- uncommon
- Angiographic evaluation of coronary arteries
- Coronary revascularization despite hypothyroidism
- Then thyroid hormone replacement therapy

# *Hypothyroidism*

- For patients in severe hypothyroidism or myxedema coma who require emergency surgery, liothyronine (T3 hormone) can be given intravenously (with fear of precipitating myocardial ischemia, however)
- while supportive therapy is undertaken to restore :
  - 1.normal intravascular fluid volume,(glucose-containing saline solution)
  - 2.body temperature,
  - 3.cardiac function,( phosphodiesterase inhibitors , milrinone)
  - 4.respiratory function,
  - 5. electrolyte balance
  - 6.Steroid coverage with hydrocortisone or dexamethasone

# *Hypothyroidism*

- **Addison disease** or primary adrenal insufficiency (with its relative steroid deficiency) is more common in hypothyroidism, and some endocrinologists routinely treat patients with non iatrogenic hypothyroidism with **stress doses of steroids perioperatively** because both conditions are commonly caused by autoimmune responses. The possibility that this steroid deficiency exists should be considered if the patient becomes hypotensive perioperatively.
- Body heat mechanisms are inadequate in hypothyroid patients, so temperature should be monitored and maintained, especially in patients requiring emergency surgery.
- Because of an increased incidence of myasthenia gravis in hypothyroid patients, a peripheral nerve stimulator is used to guide judicious administration of muscle relaxants.

Any Question?



*Thank you for your attention*