



ANESTHETIC MANAGEMENT OF HYPERTHYROID PATIENT POSTED FOR THYROID SURGERY

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Introduction

- *An intimate knowledge of the anatomy, physiology, pathophysiology, pharmacology, and specific issues related to anesthesia case management for thyroidectomy is essential to provide high-quality care.*
- *Airway management may be difficult despite a normal airway examination due to impingement of a thyroid mass on the laryngeal and tracheal structures.*
- *Anesthetists must be prepared to use emergency airway adjuncts in case a patient cannot be ventilated or intubated.*
- *Because sympathetic nervous system hyperactivity is associated with increased amounts of thyroid hormone, it is essential that all patients having an elective thyroidectomy pt. be in a euthyroid state before surgery*

HISTORY

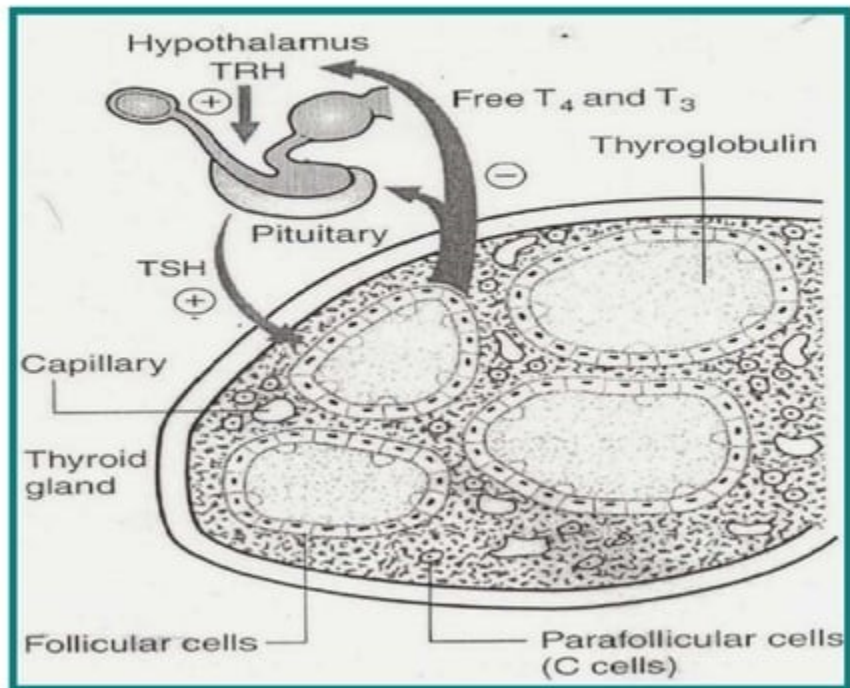
- Thyroid disease has been long recognized: goitres were first described by the Chinese in 2700 BC.
- Thyroid surgery was first described in the 12th Century, but for many years the operations were prone to complications.
- In the twelfth and thirteen centuries, the school of Salerno in Italy was cradle of thyroid surgery. At that time goitres were removed using horrific-sounding instruments such as setons, hot irons, styptics and asphodel powder.
- The American surgeon William Halsted could trace accounts of only 8 operations in which the scalpel was used between 1596 and 1800 .
- However , **the advances of anesthesia** , antiseptics and haemostasis **allowed surgeons** , such as Billroth and Kocher to perform many more thyroid operations with reduced mortality, In the 1840s. Nikolai of St. Petersburg was the first to use General anesthesia for thyroid operation.
- He used ether on a girl of 17 yr whose goitre was causing tracheal compression.

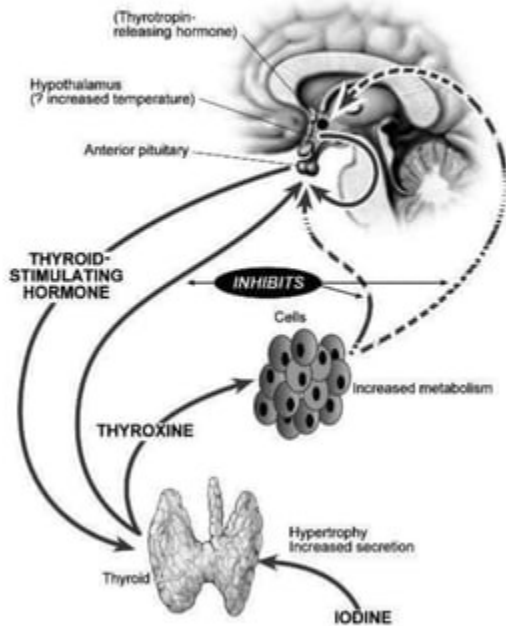
HISTORY

- Thomas Peel performed his first thyroidectomy in 1907 under local anesthetic.

BASIC OF THYROID GLAND PHYSIOLOGY

- The thyroid gland secretes two principal hormones –THYROXINE (T₄) AND TRIIODOTHYROXINE (T₃).
- These major metabolic hormone are required for homeostasis of all cell and influences cell differentiation ,growth , and metabolism.
- **Follicular cells synthesize/secrete thyroid hormones (T₄, T₃) when stimulated by *TSH, low iodide levels, iodide uptake.***
- Regulated by negative feedback loop of hypothalamus-anterior pituitary-thyroid initiated by TRH causing TSH release.





- The thyroid gland is the only source of T4. It secretes approx. 70-90 mcg of T4 / day.
- The total daily production rate of T3 is about 15-30 mcg.
- About 80% of circulating T3 comes from de-iodination of T4 in peripheral tissues. About 20 % comes from direct thyroid secretion.
- T4 is biologically inactive until converted to T3.
- Activation occurs with 5'iodination of the outer ring of T4.

Definition

- *Thyrotoxicosis* refers to the hypermetabolic clinical syndrome due to raised serum thyroid hormones levels.
- It may be because of hyperthyroidism, inflammation of thyroid gland, ingestion of exogenous thyroid hormones.
- *Hyperthyroidism* is a type/condition of thyrotoxicosis in which accelerated thyroid hormones biosynthesis and secretion by the thyroid gland causes thyrotoxicosis

HYPERTHYROIDISM

- Hyperthyroidism refers to hyperfunctioning of the thyroid gland with excessive secretion of active thyroid hormones.
- The majority of cases (i.e., 99%) of hyperthyroidism result from one of three pathologic processes:
 - Graves' disease,
 - Toxic multinodular goiter,
 - Toxic adenoma.
- Regardless of the etiology, the signs and symptoms of hyperthyroidism are those of a hypermetabolic state.
- Hyperthyroidism is the cause of Thyrotoxicosis in many patients.
- When hyperthyroidism occurs, the follicular cells of the thyroid produce 5 to 15 times the normal amount of thyroid hormone. Hyperthyroidism occurs in 1% to 2% of women and in approximately 0.1% to 0.2% of men.

HYPERTHYROIDISM

- It is of two types;-

Primary is when the pathology is within the gland .

Secondary when the thyroid gland is stimulated by excessive thyroid-stimulating hormone in the circulation.

CAUSES

Primary hyperthyroidism

Graves' disease

Toxic multinodular goiter

Toxic adenoma

Functioning thyroid carcinoma metastases

Activating mutation of the TSH receptor

Activating mutation of G_{sa} (McCune-Albright syndrome)

Struma ovarii

Drugs: iodine excess (Jod-Basedow phenomenon)

Thyrotoxicosis without hyperthyroidism

Subacute thyroiditis

Silent thyroiditis

Other causes of thyroid destruction: amiodarone, radiation, infarction of adenoma

Ingestion of excess thyroid hormone (thyrotoxicosis factitia) or thyroid tissue

Secondary hyperthyroidism

TSH-secreting pituitary adenoma

Thyroid hormone resistance syndrome: occasional patients may have features of thyrotoxicosis

Chorionic gonadotropin-secreting tumors*

Gestational thyrotoxicosis*

Differences

<u>Primary</u>	<u>Secondary</u>
<ul style="list-style-type: none">• Goitre is diffuse, vascular.	<ul style="list-style-type: none">• Nodular
<ul style="list-style-type: none">• Onset-abrupt	<ul style="list-style-type: none">• Insidious.
<ul style="list-style-type: none">• Symptoms appear 1st then thyroid swelling	<ul style="list-style-type: none">• Thyroid swelling appears 1st.
<ul style="list-style-type: none">• More severe	<ul style="list-style-type: none">• Less severe
<ul style="list-style-type: none">• CVS – rare involvement	<ul style="list-style-type: none">• Present with CCF or AF
<ul style="list-style-type: none">• CNS – commonly involved	<ul style="list-style-type: none">• Rarely involved
<ul style="list-style-type: none">• Eye signs & exophthalmos are common.	<ul style="list-style-type: none">• Eye signs rare

SIGNS AND SYMPTOMS

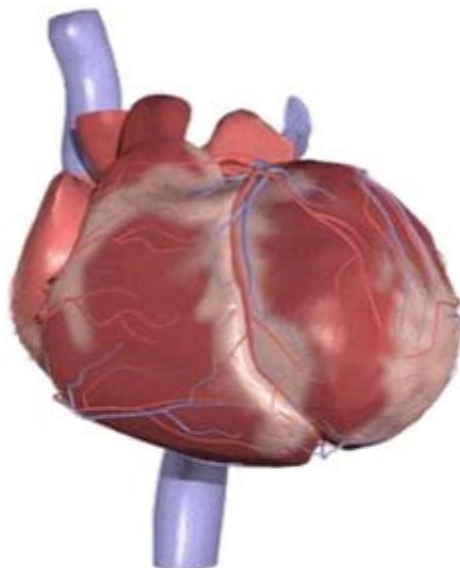
- Thyroid hormone has an essential role in metabolism; therefore, the signs and symptoms of hyperthyroidism reflects a generalized hypermetabolism.

Central nervous system manifestations

- Hyperactivity, nervousness & irritability
→ easy fatigability
- Insomnia & impaired concentration.
- Fine tremor.
- Hyperreflexia, muscle wasting & proximal myopathy without fasciculation.
- Hypokalemic periodic paralysis

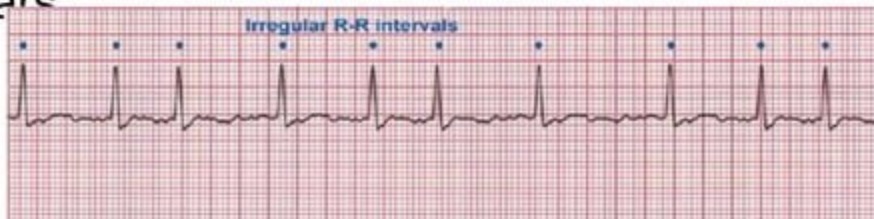


Cardiovascular Manifestation:



	Normal	Hyperthyroidism
SVR (dyn-sec-cm ⁻⁵)	1500–1700	700–1200
HR (bpm)	72–84	88–130
EF (%)	50–60	>60
CO (L/min)	4.0–6.0	>7.0
Blood volume (% of normal)	100	105.5

- Sinus tachycardia/supraventricular tachycardia → palpitations
- The high cardiac output → bounding pulse
- Systolic hypertension → widened pulse pressure.
- Aortic systolic murmur
- Worsening of angina or heart failure
- Atrial fibrillation is more common in patients >50 years



Skin & Nail Manifestations

- Warm and moist skin
- Sweating & Heat intolerance
- Palmar erythema, onycholysis, pruritus, urticaria & diffuse hyperpigmentation
- Hair texture → fine
- Diffuse alopecia occurs in



- *Thyroid dermopathy* occurs in <5%.
- Most frequent over the anterior & lateral aspects of the lower leg (hence the term *pretibial myxedema*).
- Typical lesion → noninflamed, indurated plaque with a deep pink or purple color and an "orange-skin" appearance



- **Thyroid Acropachy** → a form of clubbing found in <1% of patients with Graves' disease.



Gastrointestinal System

- Transit time is decreased → increased stool frequency → diarrhea/steatorrhea.
- Weight loss in spite of increased appetite



Reproductive system

- Frequent oligomenorrhea or amenorrhea;
- Pregnancy → low birth weight babies & pre-eclampsia.
- In men → impaired sexual function & rarely gynecomastia.

Skeletal System

- Osteopenia in long-standing cases.
- Mild hypercalcemia occurs in up to 20% of patients, but hypercalciuria is more common.
- Increase in fracture rate.



Thyroid

- Usually diffusely enlarged to $>2-3$ times its normal size.
- The consistency is firm.
- Thrill or bruit $\rightarrow$ increased vascularity of the gland and the hyperdynamic circulation.



Eye signs & symptoms

- Lid retraction → staring appearance
- Associated with specific eye signs that comprise *Graves' ophthalmopathy* or *thyroid-associated ophthalmopathy*.



- The earliest manifestations of ophthalmopathy are usually a sensation of grittiness, eye discomfort & excess tearing.
- About 1/3 pts have proptosis,

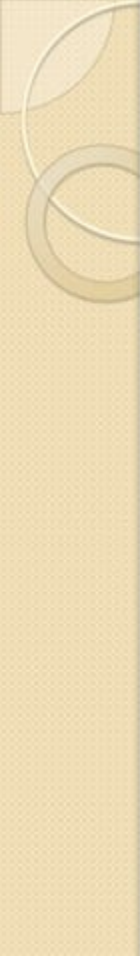


- Periorbital edema, scleral injection, & chemosis are also frequent.
- In 5–10% of patients, the muscle swelling is so severe that diplopia results.
- Most serious manifestation → compression of the optic nerve at the apex of the orbit, leading to papilledema, peripheral field defects, & if left untreated, permanent loss of vision.



The "NO SPECS" scheme is an acronym derived from the following eye changes:

- 0 = **N**o signs or symptoms
- 1 = **O**nly signs (lid retraction or lag), no symptoms
- 2 = **S**oft tissue involvement (periorbital edema)
- 3 = **P**roptosis (>22 mm)
- 4 = **E**xtraocular muscle involvement (diplopia)
- 5 = **C**orneal involvement
- 6 = **S**ight loss

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- Hematological-anemia, neutropenia, thrombocytopenia .
 - Respiratory system-increased oxygen utilization leads to inc. CO₂ production so compensatory minute ventilation and tachypnoea, increased tidal volume, dec. vital capacity, and compliance due to weak respiratory muscles.

Laboratory Evaluation

- Normal thyroid function tests

TESTS	NORMAL VALUES
TSH	>0.4-5.0 mU/L
TOTAL T4	5.0-12.0 μ g/dl
TOTAL T3	70-195 ng/dl



TSH Assay → single best test of Thyroid Hormone action at cellular level.

- Normal level → 0.4-5.0 mU/L.
- Subclinical hyperthyroidism → TSH level is 0.1-0.4mU/L with normal FT3 & FT4.
- Overt hyperthyroidism → TSH level is <0.03mU/L with increased T3 & T4.
- Thyroid Storm → TSH level is <0.01mU/L.

Free T4 (FT4) → approx 0.02% of total T4.

- Elevated in 90% of patients with hyperthyroidism.
- Decreased in 85% of patients with hypothyroidism.

T3 resin uptake test (RT3U) →

- Indirect measure of unbound fraction of T4.
- It quantitates the degree of saturation of TBG sites by T3 & T4.
- It is directly proportional to FT4 & inversely proportional to TBG sites.

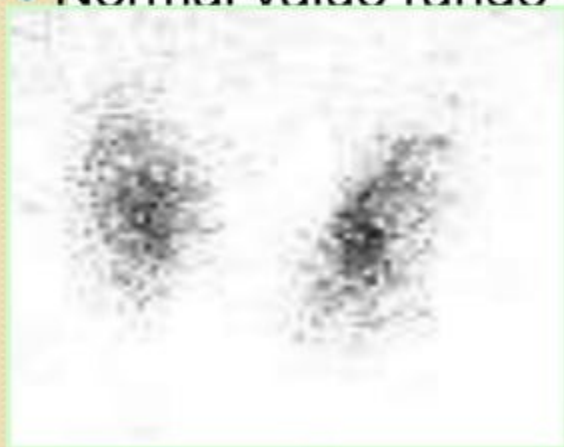
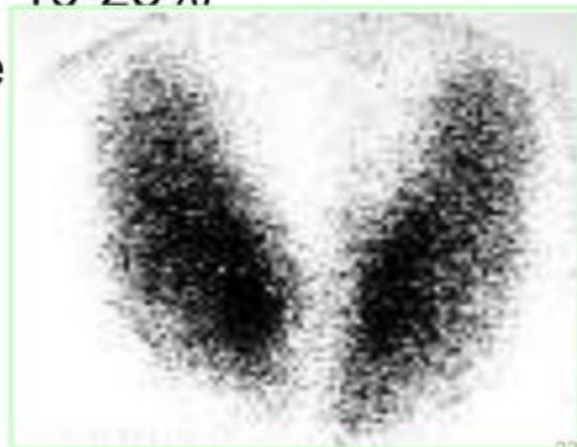
FT4 index = T4 x RT3U.

Normal value- 1.4-4.9

In 2–5% of patients, only T₃ is increased (**T₃ toxicosis**).

Radioactive iodine uptake $\rightarrow$ I^{123} , I^{131} & Tc^{99}

- Varies directly with functional state of thyroid.
- 24 hr thyroid uptake is measured.
- Normal value range – 10-25%



- TRH stimulation test → used to test pituitary function.

Other tests→

- Serum Antimicrosomal Antibodies.
- Antithyroglobulin antibodies.
- Long acting thyroid stimulators (LATS).

- **Ultrasonography** → to differentiate between cystic, mixed or solid lesion in gland.
- **Thyroid scan** using ^{123}I or Tc99 evaluate nodules as
Warm/ Normal
Hot/ Hyperfunctioning.
Cold/ Hypofunctioning.



TREATMENT OF HYPERTHYROIDISM

- Includes :

1. Antithyroid drugs
2. β -adrenergic blockers and other antihypertensive drugs
3. Radioactive iodine
4. Surgery



Antithyroid drugs

Indications :

- In children
- In young adults with mild thyrotoxicosis
- Conjugation with radioactive iodine to hasten recovery, while awaiting the effects of radiation.
- In pregnant women

- Methimazole
- Starting dose : 10 - 40 mg once or in divided doses
Maintenance: 5-15 mg once or in divided doses
- Carbimazole is a carboxyl derivative of methimazole ---they decrease the uptake and concentration of inorganic iodine by the thyroid gland.
- Propylthiouracil [PTU]
- Starting: 100 - 450 mg divided 2 or 3 times per day;
- Maintenance: 100 -150 mg divided 2 or 3 times per day
- PTU-inhibits the iodine and peroxidase their normal interaction with thyroglobulin to form T4 AND T3. also it interferes in conversion of T4 to T3
- NOTE-Continue up to the morning of surgery

Iodides

- Saturated solution of potassium iodide
1-3 drops 3 times per day
- Lugol solution (5 drops 3 times per day (dissolve in a full glass of water
- MOA –inhibit release ,dec.synthesis and block peripheral conversion of T4 to T3
- Iodide therapy added 1 wk before surgery and continued through the day

β -Blockers

- Propranolol 80 -160 mg once daily
- Atenolol 25-100 mg once or twice daily
- Metoprolol 50 - 200 mg divided 2 or 3 times per day

Surgical Treatment

Reserved for-

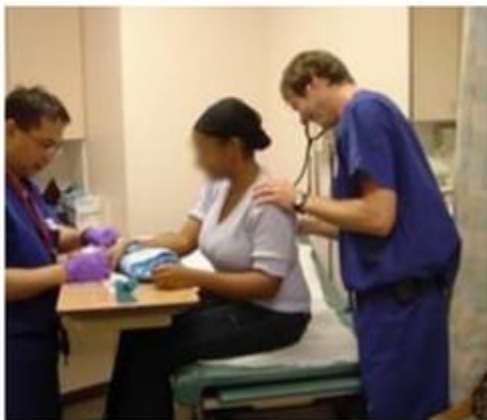
1. Severe hyperthyroidism in children
2. Pregnant women who can't tolerate ATD
3. Large goiters with severe Ophthalmopathy
4. Large MNGs with pressure symptoms
5. Who require quick normalization of thyroid function

Radioiodine Therapy

- **Indications**

1. Primary Thyrotoxicosis after 45yrs of age
2. In autonomous toxic nodule
3. In recurrent thyrotoxicosis.

Preoperative Evaluation



History

- History of onset, duration, rate of growth
- History suggestive of primary or secondary thyroid toxicity
- History of pain
- History of palpitation, precordial pain, exhaustion
- History of pressure effects- like dyspnoea, dysphagia, hoarseness of voice.
- Past history/family history.
- Personal history-diet, menstrual, mental attitude, sleep

General Physical Examination

- Built, nourishment
- Fullness of thyroid region, pallor, icterus, cyanosis, clubbing, oedema
- Temperature, Sleeping pulse rate, blood pressure
- Skin- hot and moist palm
- Tremors
- Mental status-anxiety, nervousness.
- Airway assessment

Local examination

Inspection :

- Whether diffuse/ nodular swelling
- **Pizzillo's method** : in obese and short necked patient hands are placed behind head and patient is asked to push head backwards against her clasped hand. Ask the patient to swallow, thyroid slowly moves upwards on deglutition.
- **Pemberton's sign** : Patient is asked to raise both the arm over his head until they touch the ears. This is maintained for a while, congestion of face and distress becomes evident because of obstruction of great veins at thoracic inlet.

Palpation :

- Patient should be sit on a stool and neck slightly flexed.
- **Lahey's Method**
- **Crile's method**
- **Kocher's test**
- **Berry's Sign**

- **Percussion** : Over manubrium sterni to exclude presence of a retrosternal goiter.
- **Auscultation** : A systolic bruit may be heard over goiter due to increased vascularity in primary toxic goiter.

Examination for toxic manifestation

1. *Exophthalmos* :

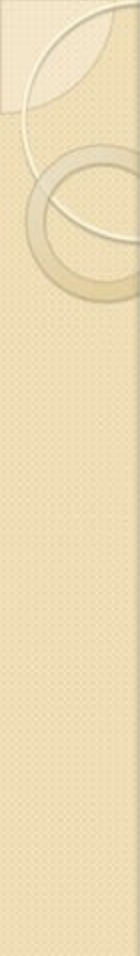
In early stages, may be unilateral but later may become bilateral.

- **Stellwag's sign** : Infrequent blinking of eyes with widening of palpebral fissure.
- **Von Graefe's sign** : Upper eye lid lags behind the eye ball as the patient is asked to look downwards.

- **Dalrymple's sign** : Upper sclera is visible due to retraction of upper eye lid.
- **Joffroy's sign** : Absence wrinkling in the forehead on looking upwards with the face inclined downwards.
- **Moebius sign** : Inability or failure to converge the eye balls
- **Gifford's sign**: Difficulty in eversion of the upper lid.

2. *Tachycardia:*

- Resting pulse rate should be recorded .
- 80-90 bpm -mild thyrotoxicosis
- 90-110 bpm-moderate thyrotoxicosis
- > 110 bpm- severe thyrotoxicosis

- 
3. ***Tremors*** : Fine tremors in stretched hands protruded tongue and fingers are seen in primary thyrotoxicosis.

Systemic examination

CVS :

- Enlarged heart
- Atrial fibrillation
- Signs of CCF.
- Systolic murmurs

CNS :

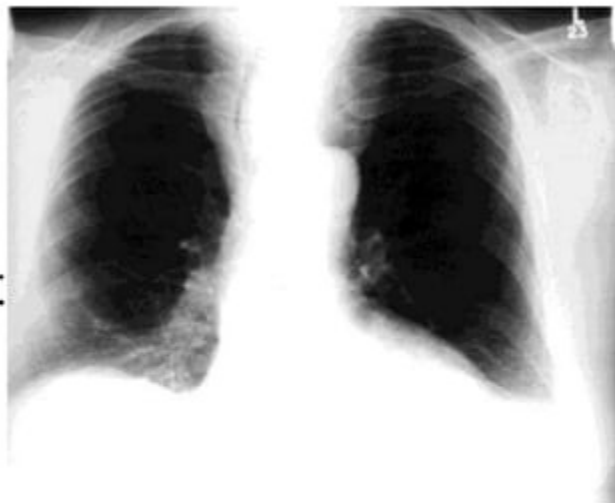
- Myopathy and tremors
- Reflexes- hyperreflexia

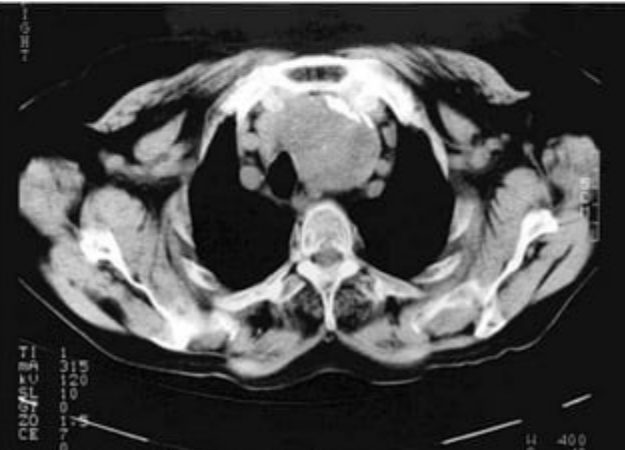
Investigation

- Complete hemogram, BT, CT to rule out anaemia, thrombocytopenia and agranulocytosis.
- Urine → Albumin, Sugar, Microscopy
- RBS, B. Urea, Serum creatinine
- Thyroid function tests.
- ECG- Sinus tachycardia, ST elevation, QT shortening, atrial fibrillation/flutter, ventricular ectopics

Chest X-ray

- PA view- position of trachea, deviation, ret sternal goiter, calcification.
- Lateral view and barium swallow- pressure effects on trachea and oesophagus





Pre operative preparation

- Admission
- Absolute bed rest.
- Sedation → Diazepam 2mg-5mg.
- B blockers, e.g propranolol 40mg 1-1-1
- Specific drugs, e.g Carbimazole 5mg 1 qid & then slowly reduced to 1 bd. Given for 4-6wks.

- Resting pulse chart.
- Thyroid function tests should be done every 4wks till EUTHYROID STATE
- Patient must be made euthyroid or near euthyroid at operation.
- Euthyroid is clinically assessed by-
 - Sleeping pulse rate < 90/min
 - Progressive weight gain

- Disappearance of toxic symptoms like tremors, nervousness, anxiety etc .
- No requirement of sedation for sleep.
- Normal pulse pressure, sinus rhythm, disappearance of cardiac murmurs
- ENT check-up for mobility of cords.
- The last dose of ATD may be given on the evening before surgery.

Plan of Anaesthesia

- General anesthesia,
- Regional – Cervical Epidural Anesthesia.
- Local blocks- Cervical plexus block (b/l)

Premedication :

- Aim is to suppress sympathetic activity.
- **Pharmacological :**
- diazepam OR Lorazepam
- Anti aspiration prophylaxis

Monitoring :

- Pulse oximetry
- NIBP
- ECG
- Temperature monitoring
- ETCO2
- Neuromuscular monitoring
- CVP line
- Urine output



General Anaesthesia

- Wide bore IV line is secured.

1. **Pre-oxygenation** : With 100% O₂ for 3-5 minutes.

2. **Induction.**

- Inj. Thiopentone sodium 5-7mg/kg i.v is the drug of choice.
- Inj. Glycopyrolate- 0.01 mg/kg i.v

- Attenuation of sympathetic response to intubation by Inj. Lignocaine 1.5-2mg/kg i.v or Opioid/Esmolol infusion can be used.

3. **Relaxation:**

- Inj Scoline 2mg/kg → if difficult airway anticipated.
- Inj Vecuronium 0.08-0.12 mg/kg iv or Inj. Rocuronium 0.5mg/kg iv → if easy airway anticipated

Difficult tracheal intubation in thyroid surgery

- The anaesthetist should expect that 6% of tracheal intubations for thyroid surgery will be difficult.
- In the study of Bouaggad with multivariate analysis, two criteria were recognised as independent for DEI.
- Study concludes that a large goitre is not associated with a more frequent DEI. But the presence of a cancerous goitre is a major factor causing DEI by tracheal invasion and tissue infiltration by the carcinoma associated with fibrosis which may reduce the mobility of laryngeal structures and make the laryngoscopic view more difficult

When airway problem is anticipated

- Awake/fibreoptic intubation can be done with local anaesthesia.
- Intubation with gentle laryngoscopy is done with cuffed armored tube/ cuffed ETT/north pole oral tracheal tube or intubating LMA with fiber optic bronchoscopy guidance.



- Patient is positioned with sand bag between the shoulder blades and the head resting on a padded horse shoe.
- Avoid hyperextension.
- Arms should be secured by the side with the ulnar nerves padded and protected.
- Due to the limited access to the face, special care should be taken to protect the eyes from injury, especially in patients with exophthalmos



4. Maintenance of Anaesthesia :

- Controlled ventilation is used with $N_2O + O_2$ + NDMR + inhalation agents + incremental doses of opioids.

NDMR :

- Inj. Vecuronium 0.05 mg/kg or
- Ini. Atracurium 0.3 - 0.4 mg/kg or
- Inj. Rocuronium 0.3 - 0.4 mg/kg.

- Already existing myopathy may prolong N-M blockade, so reduce the dose of NMB
- Isoflurane is preferred .
- **Drugs that stimulate the Sympathetic nervous system should be avoided (i.e., ketamine, pancuronium, atropine , ephedrine, epinephrine)**

Reversal and Extubation:

- With Inj. Neostigmine 0.05 mg/kg +
Inj. Glycopyrrolate 0.01 mg/kg
- A laryngoscopy can be performed to view the vocal cord to exclude any recurrent laryngeal nerve palsy.

POSTOPERATIVELY

- Removal of the thyrotoxic gland does not mean immediate resolution of thyrotoxicosis.
- The $T_{1/2}$ of T_4 is 7 to 8 days; therefore, β -blocker therapy may need to be continued in the postoperative period. Antithyroid drug therapy can be discontinued

Complications of Thyroid Surgery

1. Intraoperative:

- Carotid sinus stimulation - bradycardia + hypotension
- Tachycardia
- Thyroid crisis
- Haemorrhage
- Air embolism

- Tracheal injuries,
- Pneumothorax,
- Pneumomediastinum
- Damage to nerves.
- Atrial fibrillation

2. Post operative

<u>Immediate</u>	<u>Late</u>
Thyroid crisis	Hypoparathyroidism
Haematoma	Hypothyroidism
	hypocalcemia
Tracheomalacia	
Damage to nerves	
Laryngeal oedema	
Hypoparathyroidism	

Thyroid storm

- Is a **life threatening emergency**
- Characterized by sudden appearance of clinical signs of hyperthyroidism due to the abrupt release of T4 and T3 into circulation.
- Mortality is as high as 25% to 30%.
- Commonly associated with Grave's disease

Predisposing conditions:

- **Medical factors :**

- Infection
- Fever
- Uncontrolled toxicity
- Irregular drug intake
- Pregnancy, toxemia of pregnancy
- Radio iodine therapy
- DKA.

Surgical factors:

- Anxious and nervous patient before surgery,
- Too much handling of gland just before surgery.

This can occur both intraoperative or in the immediate post operative period, but the latter is more common between 6-18 hours post operatively.

Clinical features :

- Hyperthermia: rise of 2°C/hr over normal temperature
- Tachycardia: arrhythmias commonly atrial fibrillation
- Initially flushing and sweating later leading to dehydration

- CCF - initially high output failure, Later may go for Low output failure.
- Shock - cardiogenic/hypovolemic
- Electrolyte imbalance
- Hypo/hyperglycemia may also be present.
- Marked anxiety, agitation, psychosis.

Differential Diagnosis

- Malignant hyperthermia
- Neuroleptic Malignant Syndrome.
- Pheochromocytoma

TREATMENT

- Ensure adequate oxygenation
- Administer glucose-containing intravenous fluids
- Administer β -adrenergic blockers
- Administer sodium iodide
- Administer propylthiouracil or methimazole
- Administer glucocorticoids
- Correct electrolyte imbalances
- Correct acid-base imbalances
- Administer acetaminophen
- Apply cooling blankets

Nerve palsy

Unilateral Recurrent laryngeal nerve pa

Pt may present with

- In INCOMPLETE palsy→
 - only abductors are paralysed,
 - Vocal cord assumes median position.
 - Voice is unaffected &
 - Pt remains asymptomatic.

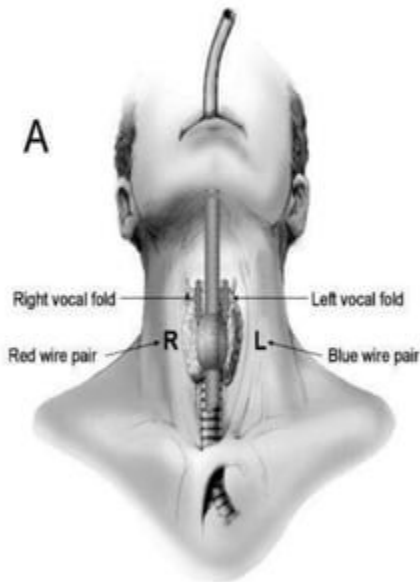
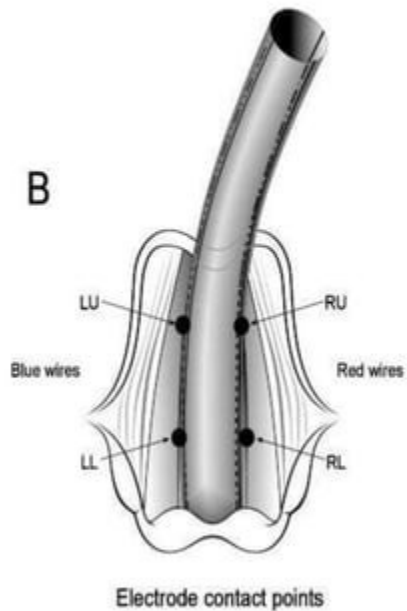
- In COMPLETE palsy →
 - both abductors & adductors are paralysed,
 - vocal cord assumes paramedian position,
 - hoarseness of voice present,

Bilateral Recurrent Laryngeal Palsy

- Both vocal cords assume median/paramedian position.
- Severe inspiratory dyspnea with stridor may result if paralysis is sudden in onset

Nerve Integrity Monitor (NIM) Endotracheal Tube

Maintain patient's NIM tube midline



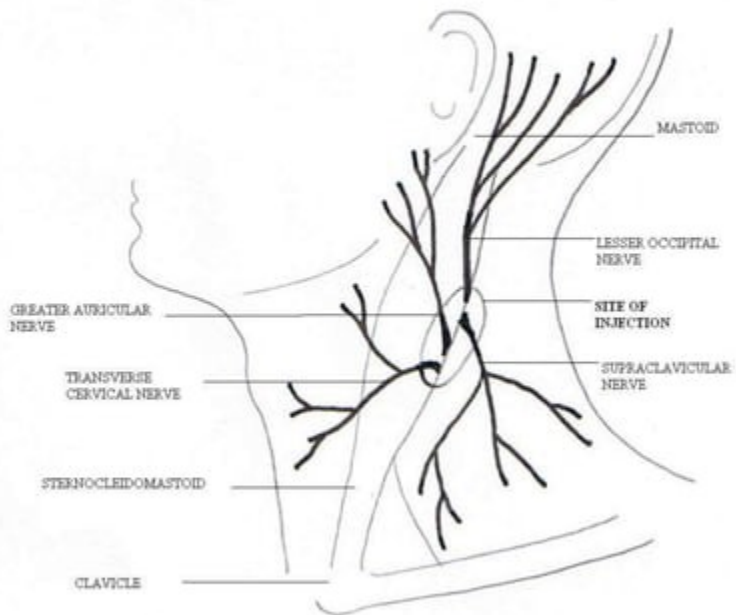
Hypoparathyroidism

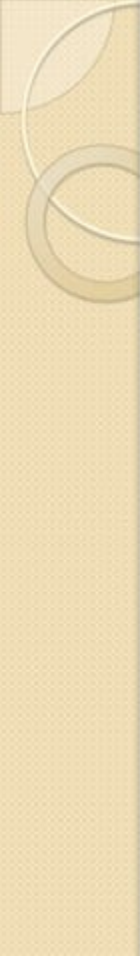
- Mainly due to vascular spasm of parathyroid glands & rarely due to accidental removal of parathyroids.
- Occurs in 2nd -5th postop day.
- Presentation →
 - Weakness.
 - Chvostek`s sign +ve.
 - Carpopedal spasm
 - Convulsions



REGIONAL ANESTHESIA

- Regional anaesthesia for thyroid surgery is used successfully as the sole anaesthetic technique particularly in areas with limited resources.
- A commonly used technique is bilateral C2-C4 superficial cervical plexus block performed under full monitoring with or without sedation.
- Bilateral deep cervical plexus blocks have a higher incidence of complications including vertebral artery and subdural injection, and bilateral phrenic nerve palsy.
- The nerves supplying the anterolateral part of the neck emerge from the posterior border of sternocleidomastoid (SCM) as the anterior rami of C2-C4, which divide into greater auricular, transverse cervical, lesser occipital and supraclavicular nerves



- 
- Regional anaesthesia avoids the risks of a general anaesthetic, allows intraoperative voice monitoring and provides excellent postoperative analgesia.
 - The technique may be suited to medically compromised patients (thyrotoxicosis), or those with obstructive symptoms secondary to large goitres to avoid the risks of a general anaesthesia.

- **SUMMARY**

- · Patients should be clinically and chemically euthyroid prior to thyroid surgery
- · Perioperative airway complications are common and the expected or unexpected difficult airway should be anticipated.
- · Postoperative complications of haematoma formation, recurrent laryngeal nerve palsy, hypocalcaemia and tracheomalacia can all cause airway compromise and must be acted upon quickly.
- Communication between the surgeon and anesthetist is vital for comprehensive and safe intraoperative management. A postoperative assessment is important to ensure that the patient's airway remains patent and hemodynamic stability is maintained.

REFERENCES

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THANK U



Marty Feldman used his bulging eyes, caused by Graves' disease, to good effect in his work as a comedian