Bazeliuc iurii

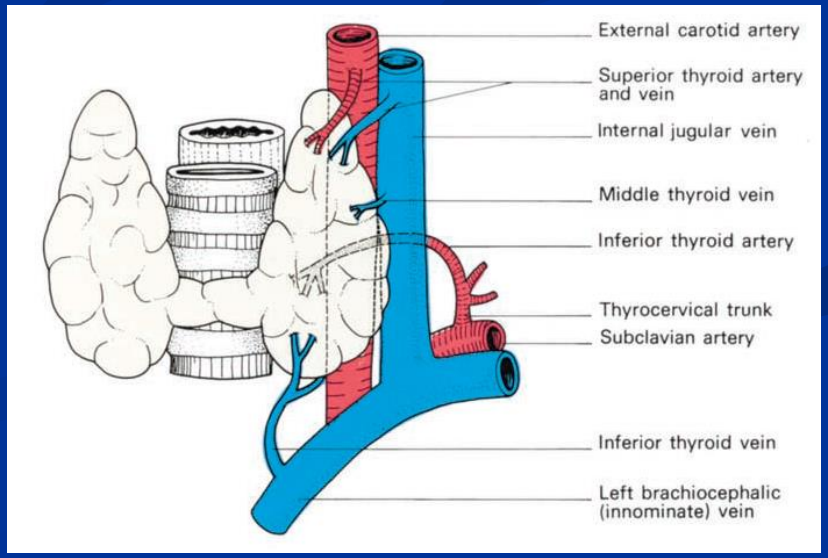
Thyroid gland

The thyroid gland is one of the largest endocrine glands.

The thyroid gland is located immediately below the larynx and anterior to the upper part of the trachea. It weighs about 15- 20g.

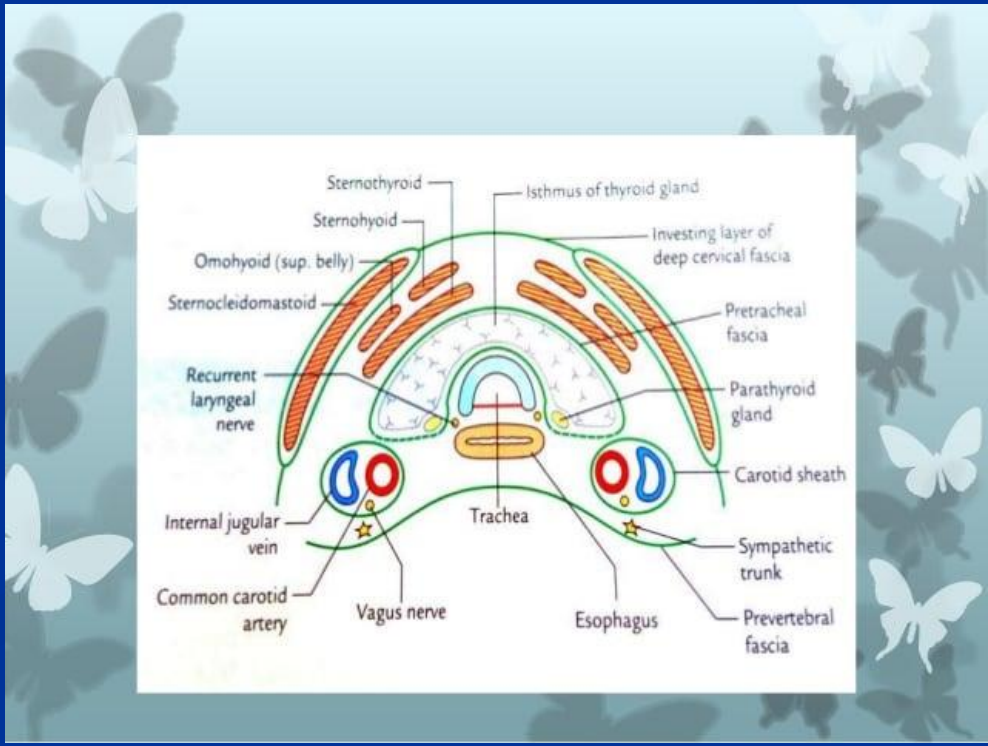
It consists of 2 lateral lobes connected by a narrow band of thyroid tissue called the isthmus.

The isthmus usually overlies the region from the 2nd to 4th tracheal cartilage.



RELATIONS

The gland is enclosed in the pretracheal fascia, covered by the strap muscles and overlapped by the sternocleidomastoids.
The anterior jugular veins course over the isthmus.
On the deep aspect of the thyroid lie the larynx and trachea, with the pharynx and oesophagus behind and the carotid sheath on either side.
Two nerves lie in close relationship to the gland; in the groove between the trachea and oesophagus lies the *recurrent laryngeal nerve* and deep to the upper pole lies the *external branch of* the superior laryngeal nerve passing to the cricothyroid muscle.



4 tiny parathyroid glands located posteriorly at each pole of thyroid gland.

Hormone secreted-

Thyroxine(T4)

Triiodothyronine (T3)

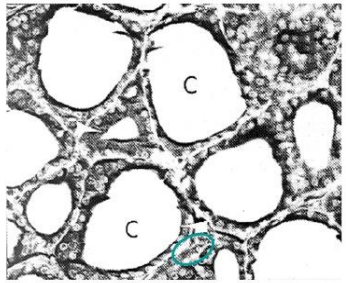
Reverse T3

Calcitonin

HISTOLOGY

The lobes of the thyroid contain many hollow, spherical structure called follicles, which are the functional units of the thyroid gland.
Between the follicles there are C cells, which secrete calcitonin.
Each follicle is filled with a thick sticky substance called colloid.

Thyroid Follicle: Functional unit of the thyroid gland



Normal thyroid gland illustrating the histologic structure, including colloid-filled (C) follicles of varying size lined by cuboidal follicular cells

Werner & Ingbar's The Thyroid, 8th Edition, page 23.

The major constituent of colloid is a large glycoprotein called thyroglobulin.
Unlike other endocrine glands, which secretes their hormones once they are produced, the thyroid gland stores considerable amount of the thyroid hormones in the colloid until they are needed by the body.

Homeostasis in the hypothalamus-pituitary-thyroid axis and mechanism of action of thyroid hormones.

TRH secreted by hypothalamus.
Stimulates TSH secreted by ant pituitary.
Stimulates the thyroid gland to synthesise T3 and T4.
T3 and T4 have negative feedback inhibition on TSH and TRH.

Evaluation of Thyroid Diseases

1. Clinical history and physical examination
2. Thyroid Function Test
   - ***TSH*** determination:
     - N = 0.5 to 5 uU/ml
     - The only test necessary in most pts w/ thyroid nodules that clinically appears to be euthyroid
     - The ***most sensitive and specific test for the diagnosis of hyper and hypothyroidism*** & for optimizing T4 replacement & suppressive therapy
   - ***Total T4*** *(55 – 150nmol/L)* and ***Free T4*** *(12 to 28pmol)* reflects the output from the thyroid gland.

     Total T3 *(1.5 to 3.5 nmol/L)* ***Free T3*** *(3-9pmol)* – confirming the diagnosis of early hyperhtyroidism

THYROID SCINTIGRAPHY

Provide information about thyroid activity , the size and extent of the gland.
Helpful in showing retrosternal extension.
Material used is Tc 99m, I123,I131.
Cold nodule: 80% benign,20% malignant.
Hot nodule: 5-9% malignant.
Warm nodule: take up the same radioactivity as rest of the gland.
The principal benefits of isotope scanning are in confirming the presence of a ‘hot/toxic' nodule in the thyroid gland in a thyrotoxic patient, and in identifying metastases or residual local disease after total thyroidectomy for carcinoma.

THYROID SCINTIGRAPHY

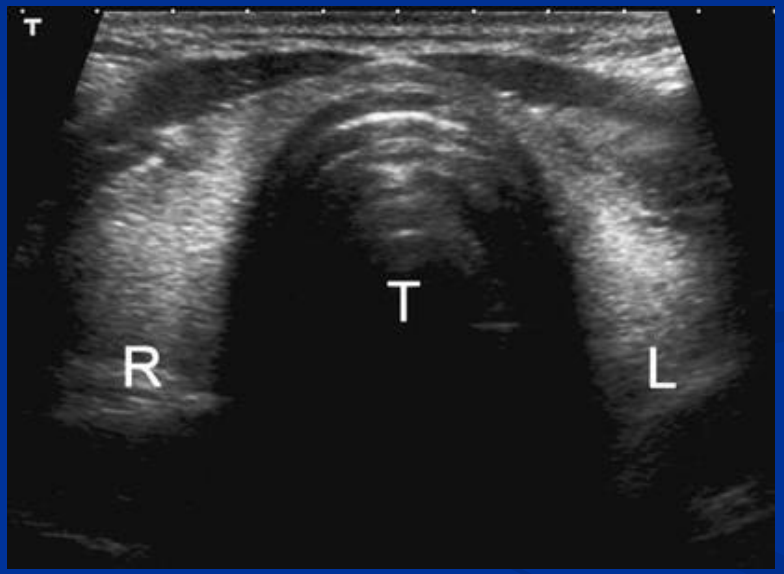
A hot nodule is one that takes up isotope while the surrounding thyroid tissue does not.
Here, the surrounding thyroid tissue is inactive because the nodule is producing such high levels of thyroid hormones that TSH secretion is suppressed.
A warm nodule takes up isotope, as does the normal thyroid tissue around it.
A cold nodule does not take up isotope

Evaluation of Thyroid Diseases

1. **Thyroid Imaging:**
   a. ***Radioactive Imaging:***
   I 123 & I 131
   - Mass and it's activity: **COLD** (15 – 20% malignant), HOT and WARM (<5% malignant) nodules
   - ***F-fluorodeoxyglucose positron emission*** tomography – use to screen for metastases in thyroid CA if radioactive Iodine is negative.

USG

Helps in determining the nature of swelling.
USG guided FNAC.
Helps in detecting Metastatic LNs.
Followup.



CT scan

- To know the extent of malignancy and reterosternal extension.

Evaluation of Thyroid Diseases

1. **Fine Needle Aspiration Biopsy:**
   - Single most important test after clinical history & PE in the evaluation of thyroid masses.
   - w/ or w/o ultrasound guidance

GOITER

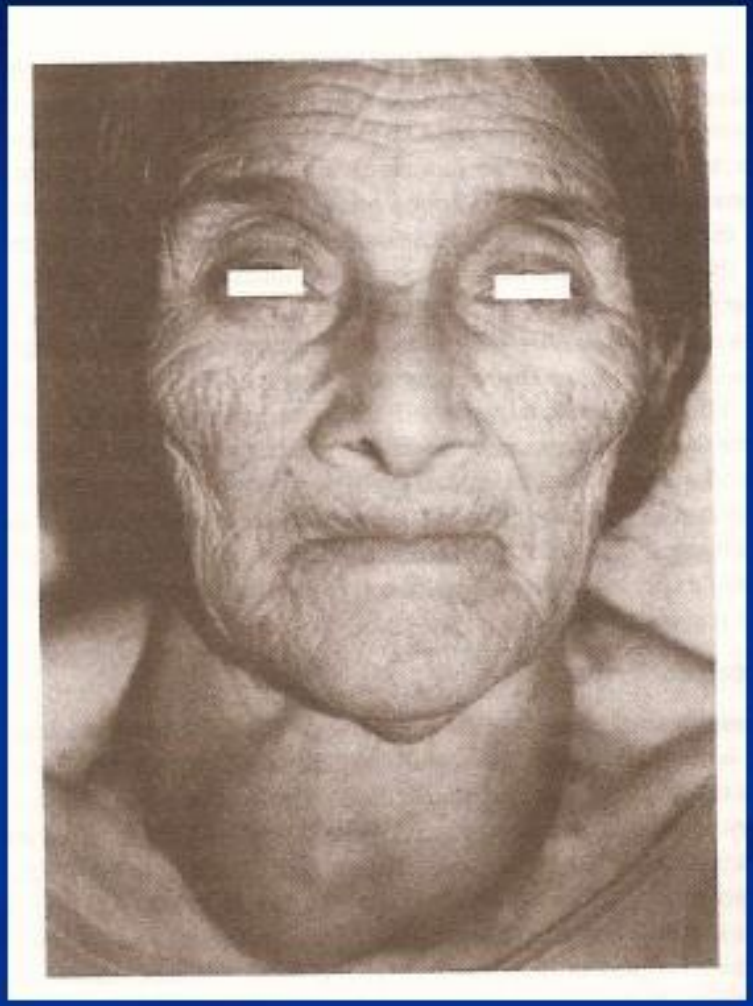
- Enlargement of the thyroid gland in a euthyroid pt ***not associated*** with neoplasm or inflammation:

1. **Familial:**
   - Inherited enzymatic defect (dyshormonogenesis)
   - Autosomal recessive
   - Hypothyroidism / euthyroid
2. **Endemic:**
   - Iodine deficiency
3. **Sporadic:**
   - No definite cause, excludes goiter caused by thyroiditis and neoplasm as well as endemic goiter

GOITER

Pathology:

- May be diffusely enlarged and smooth, or enlarged markedly nodular
- ***Nodules are filled w/ gelatinous, colloid rich material*** and scattered between areas of normal thyroid tissues
- With areas of degeneration, hemorrhage and calcification.

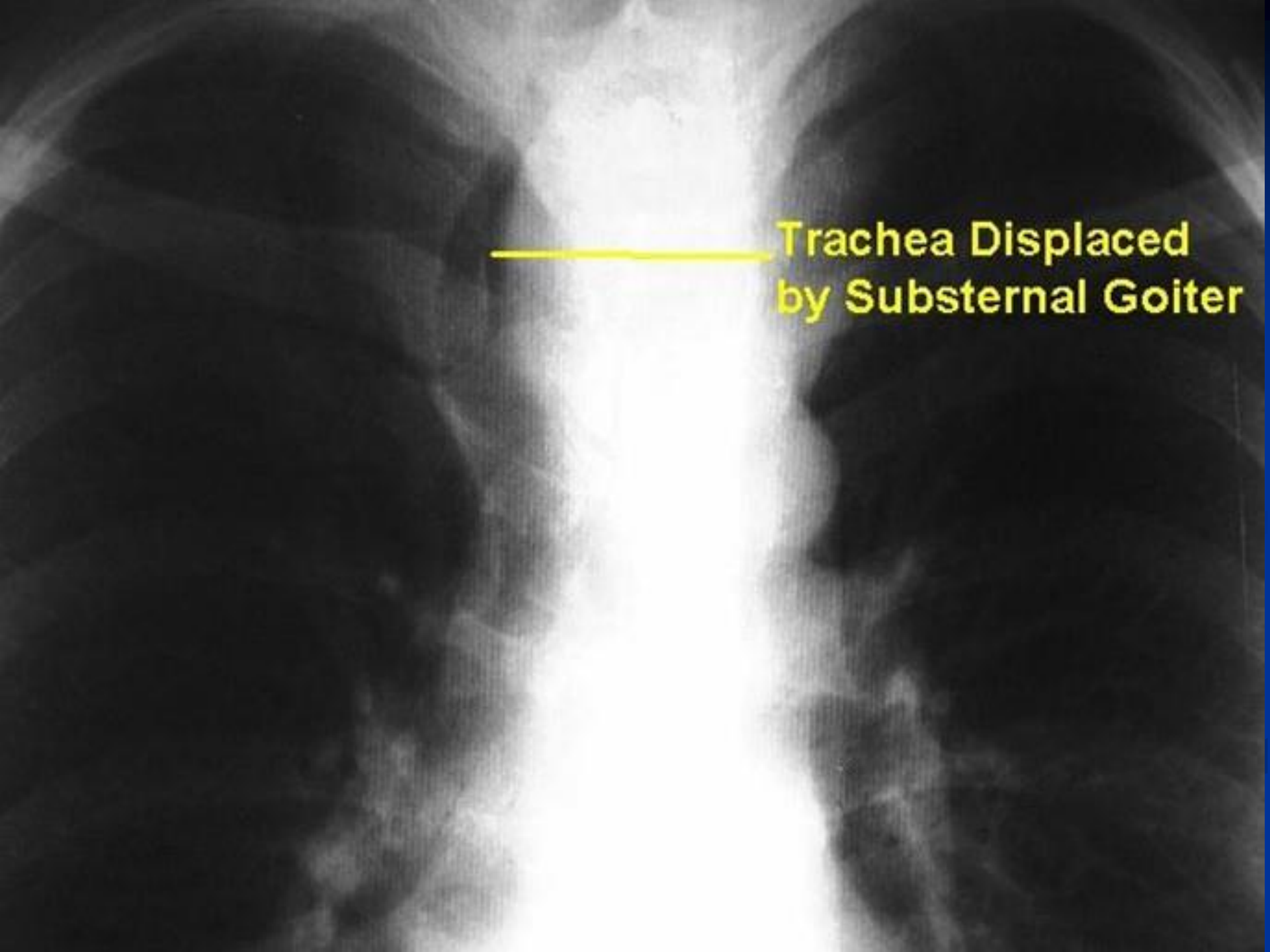


The primary symptom of a goiter is noticeable swelling in the neck. The nodules may range in size from very small to very large. The presence of nodules may increase the appearance of swelling. Other symptoms include the following:

- difficulty swallowing or breathing
- coughing
- hoarseness of voice
- dizziness when you raise your arm above your head

Goiter

- Enlarged thyroid gland.


Trachea Displaced
by Substernal Goiter

THYROIDITIS

A. Acute Suppurative Thyroiditis

- Uncommon
- Associated with URTI
- Staphylococcus, Streptococcus and Pneumococci
  E. Coli
- Sx: - acute thyroid pain
  - dysphagia
  - fever
- Dx: - FNA ----> smear and CS
- Tx: - IV antibiotics / drain (abscess)

Hashimoto’s thyroiditis

Hashimoto thyroiditis (or chronic lymphocytic thyroiditis) is the most common cause of hypothyroidism in areas of the world in 45 and 65 years of ageA female predominance of 10:1 to 20:1 Epidemiologic studies have demonstrated a significant genetic component to Hashimoto thyroiditis

Pathogenesis Hashimoto thyroiditis is an autoimmune disease.

The overriding feature of Hashimoto thyroiditis is progressive depletion of thyroid epithelial cells (thyrocytes)-gradually replaced by mononuclear cell infiltration and fibrosis.Multiple immunologic mechanisms may contribute to the death of thyrocytes

CD8+ cytotoxic T cell-mediated cell death

Cytokine-mediated cell death Binding of *antithyroid antibodies* (anti-TSH receptor antibodies, antithyroglobulin, and antithyroid peroxidase antibodies) followed by antibody-dependent cell-mediated cytotoxicity

Morphology The thyroid is often diffusely enlarged

The capsule is intact, and the gland is well demarcated from adjacent structures. The cut surface is pale, yellow-tan, firm, and somewhat nodular.
Mic:*extensive infiltration of the parenchyma by a mononuclear inflammatory infiltrate containing small lymphocytes, plasma cells, and well-developed germinal centers*The thyroid follicles are atrophic - lined in many areas by epithelial cells distinguished by the presence of abundant eosinophilic, granular cytoplasm, termed Hurthle cells- metaplastic cells.

Riedel thyroiditis

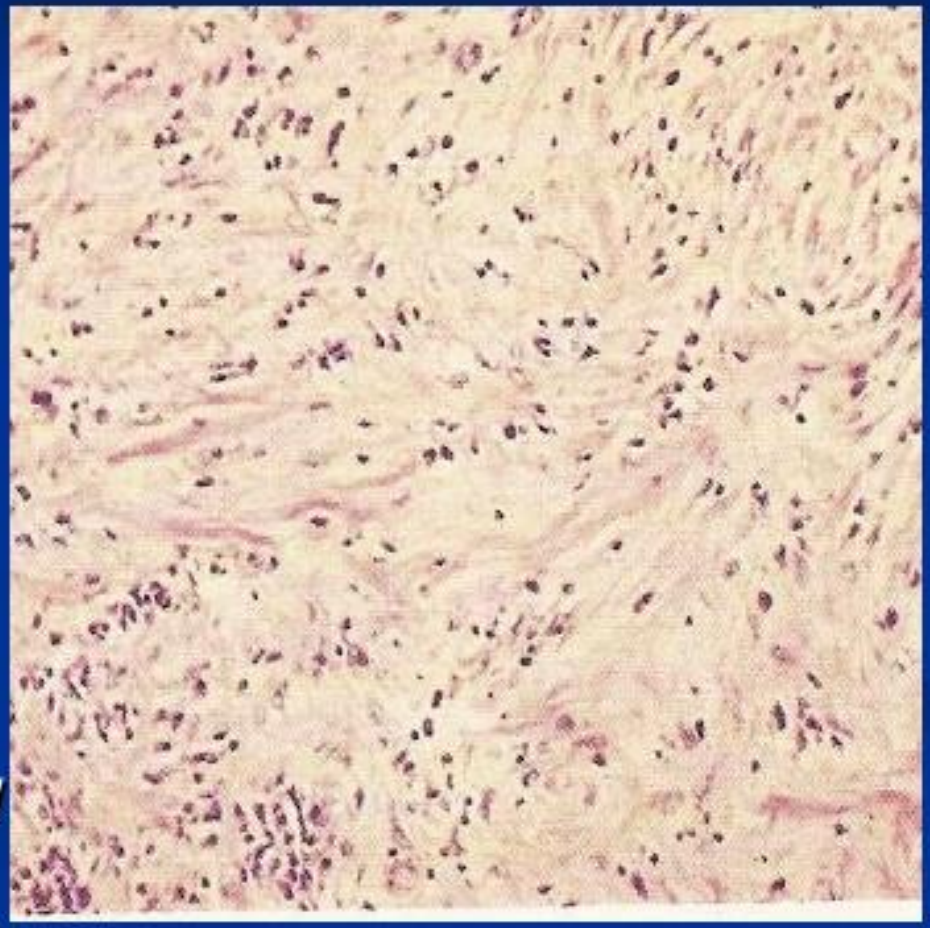
A rare disorder of ***unknown etiology*** characterized by **extensive fibrosis involving the thyroid and contiguous neck structures.**The presence of a hard and fixed thyroid mass clinically simulates a thyroid carcinoma.
Grossly: asymmetric-stony hard
Mic:Fibrous tissue involves glandInflammatory fibrosclerosis-idiopathic disorders

THYROIDITIS

A. **Nonsuppurative Thyroiditis:**

2. **Riedels' Thyroiditis:**

- *Marked dense invasive fibrosis* that may involve surrounding structures
- Can cause hypoparathyroidism
- Unknown cause ***(maybe part of fibrosclerosis – retroperitoneum, mediastinum, lacrimal gland and bile duct – sclerosing cholahgitis)***



Riedel's thyroiditis (RT)

History

Nonpainful, rapidly growing thyroid mass.

Hard, fixed, painless goiter- stony or woody.

Most patients are euthyroid. Hypothyroidism is noted in approximately 30% of cases.

Local compressive symptoms.

Hypoparathyroidism.

Clinical features closely resemble those of anaplastic carcinoma of the thyroid.

One distinguishing feature of RT is the absence of associated cervical adenopathy.

Riedel's thyroiditis (RT)

Approximately one third of patients with RT have an associated extracervical manifestation of multifocal fibrosclerosis (eg, retroperitoneal fibrosis, mediastinal fibrosis, orbital pseudotumor, pulmonary fibrosis, sclerosing cholangitis, lacrimal gland fibrosis, fibrosing parotitis).

THYROIDITIS

A. Nonsuppurative Thyroiditis:

1. Riedels' Thyroiditis:

- S/Sx: - painless woody hard anterior neck mass w/c progresses causing compression symptoms
  - Hoarseness - dyspnea
  - stridor - dysphagia
- Dx: - open thyroid biopsy – frozen section
  - FNA biopsy is inadequate
- Tx: - Isthmectomy – to relieve compression symptom
  - Thyroxine replacement
  - Tamoxifen
  - Steroid

Diffuse toxic goitre

Graves' disease, occurs in younger women .
Associated with eye signs.
50% of patients have a family history of autoimmune endocrine diseases.
The whole of the functioning thyroid tissue is involved.
Hypertrophy and hyperplasia are due to abnormal **thyroid-stimulating antibodies** (TSH-RAbs)

HYPERTHYROIDISM

GRAVE'S Disease (Diffuse Thyroid Goiter)

- Most common form of thyrotoxicosis
- Autoimmune
- Female > male; most prevalent 20-40 y/o
- ***Thyroid stimulating antibody*** (immunoglobulin)

  directed at the TSH receptor or the thyroid follicular cells.
  - LATS (long acting thyroid stimulating antibody)
  - TRAb (thyroid receptor antibody)

THYROTOXICOSIS-Clinical features

The symptoms are:

- tiredness;
- emotional lability;
- **heat intolerance;**
- **weight loss;**
- **excessive appetite;**
- **palpitations.**

The signs are:

- **tachycardia;**
- hot, moist palms;
- exophthalmos;
- lid lag/retraction;
- **agitation;**
- **thyroid goitre and bruit.**

HYPERTHYROIDISM

GRAVE'S Disease (Diffuse Thyroid Goiter)

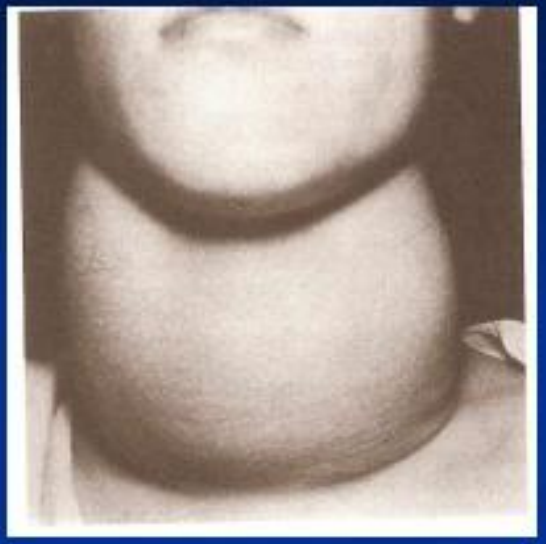
Manifestations:

- ***Signs/symptoms of thyrotoxicosis***: **Inc. Body Metabolism**
  - ***heat intolerance***
  - ***sweating***
  - ***weight loss, muscle wasting***
  - ***tachycardia/atrial fibrillation***
  - ***fine tremors***
  - easy fatigability
  - hypoactive tendon reflexes
  - amenorrhea
  - decrease fertility
  - easy fatigability, agitation and excitability
  - diarrhea

HYPERTHYROIDISM

GRAVE'S Disease (Diffuse Thyroid Goiter)

- Triad:
  - diffuse goiter
  - thyrotoxicosis
  - exopthalmos
- Other:
  - hair loss
  - pretibial myxedema
  - gynecomastia
  - splenomegally



(Glycosaminoglycans)

GRAVE'S OPHTHALMOPATHY

2 clinical phases:
The **inflammatory** stage and the **fibrotic** stage
The inflammatory stage is marked by edema and deposition of glycosaminoglycan in the extraocular muscles. There is orbital swelling, stare, diplopia, periorbital edema, and at times, pain.
The fibrotic stage is a convalescent phase and may result in further diplopia and lid retraction. It improves spontaneously in 64% of patients

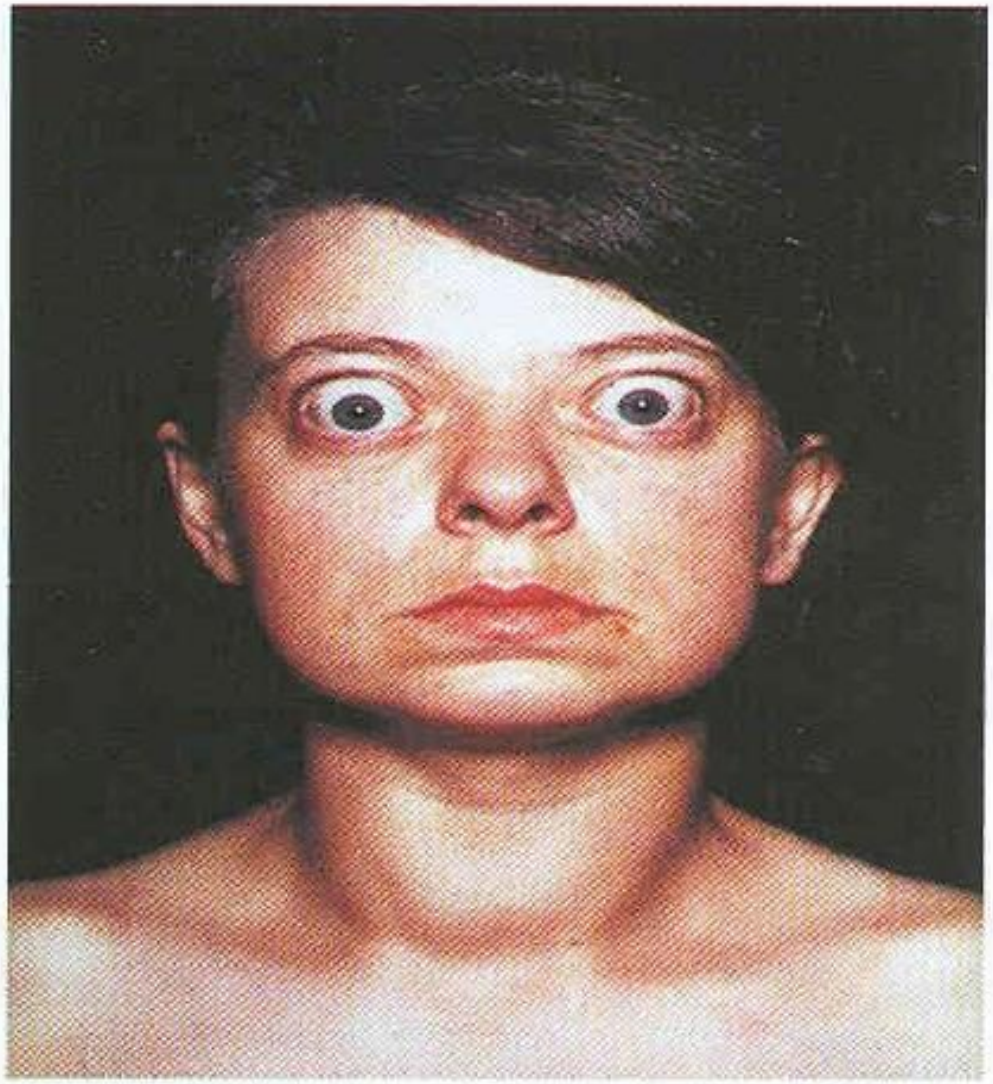
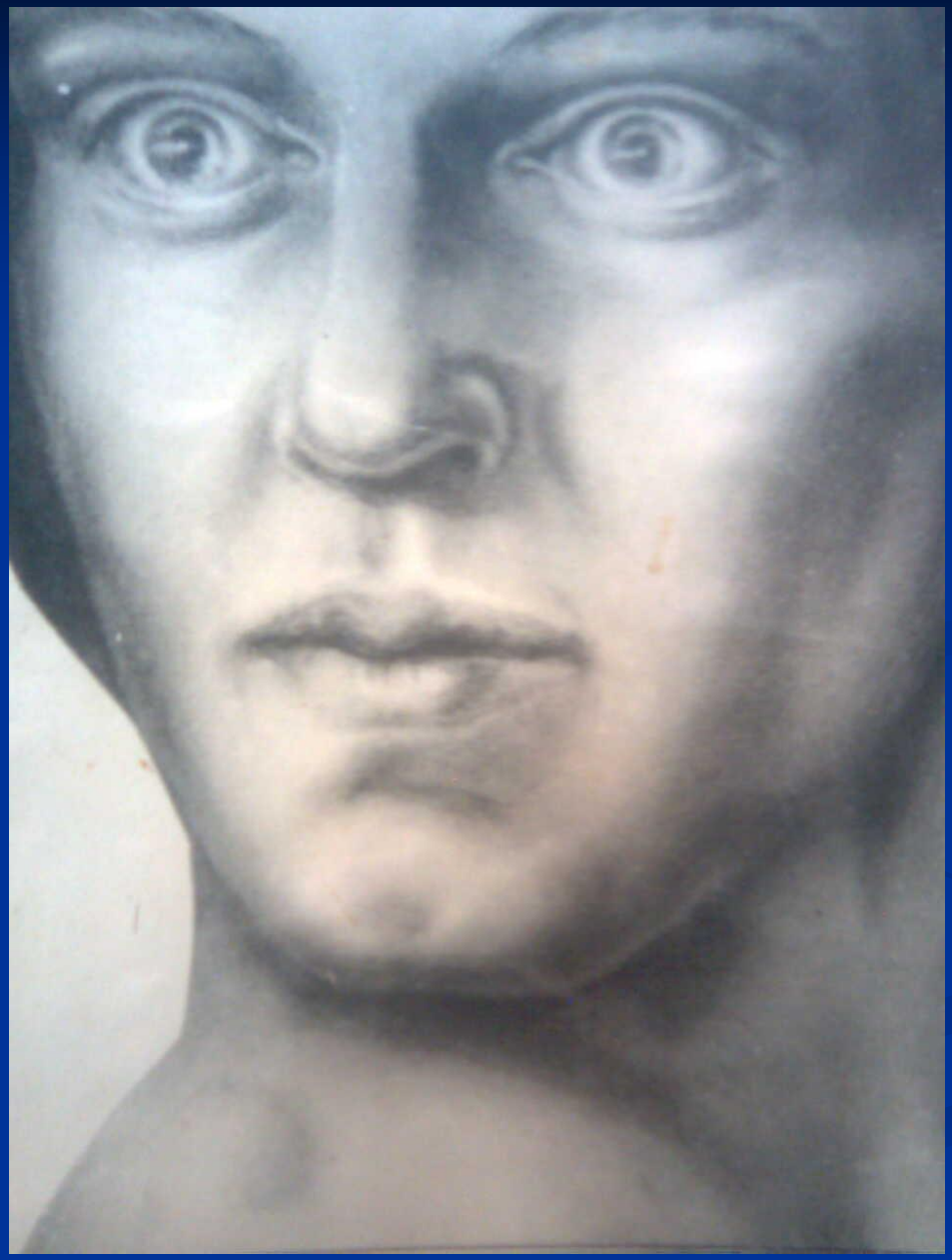
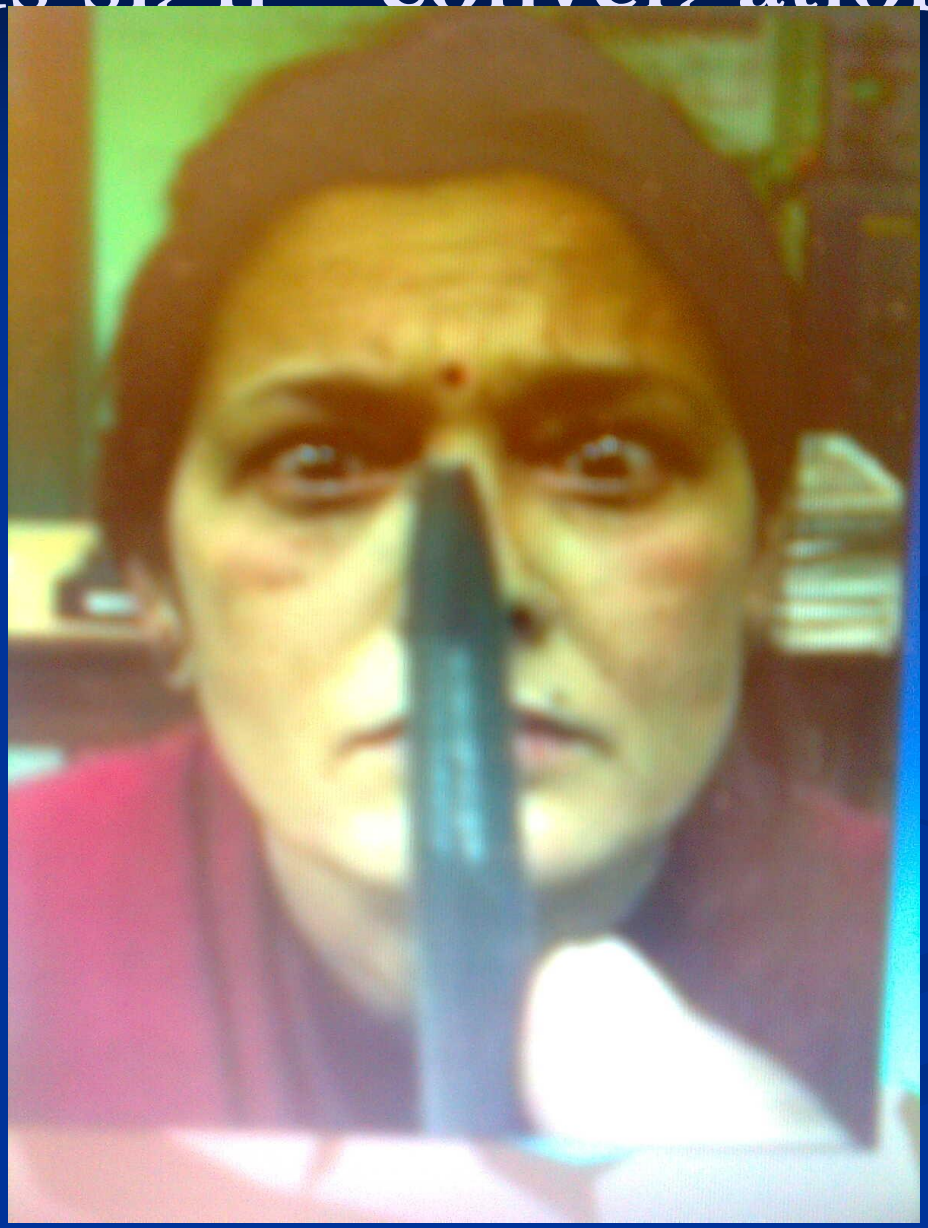


FIGURE 21-13
Graves disease. A young woman with hyperthyroidism displays a mass in the neck and exophthalmos.

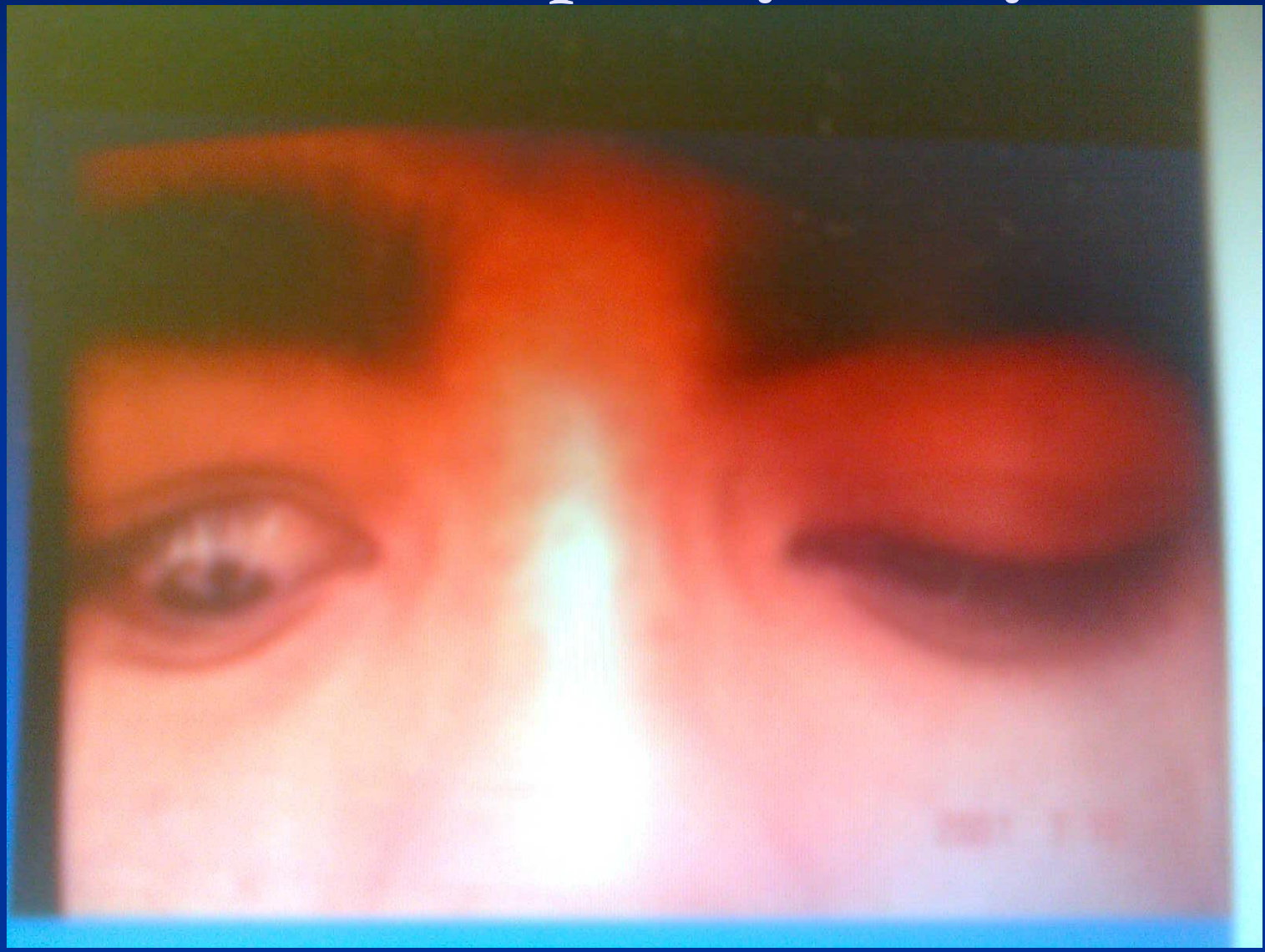
Stelvage sign – rare *blink, or wolf look*



Moebius sign – convergation destroy



Graeffe sign – the superior eyelid don,t cover completely the eye.



HYPERTHYROIDISM

- **Diagnosis:**
  - Autonomous thyroid function
    - Low TSH
    - Elevated T3 / T4
    - Thyroid scan ---> diffuse elevated iodine uptake
    - Thyroid ultrasound

- **Treatment:**

Choices:

- Antithyroid drugs
- Radioactive iodine therapy
- Surgery

Choice depends on:

- Age
- Severity of the disease
- Size of the gland
- Coexistent pathology (Ophthalmoplegia)
- Other factors:
  - Patient's preference
  - Pregnancy

HYPERTHYROIDISM

Antithyroid Drugs:

- **Propyl thiouracil (PTU)** = 100-300mg TID
- **Methimazole (Tapazole)** = 10-20 TID then OD
- **Carbimazole** = 40mg OD

- Inhibits the organic binding of iodine and coupling of iodotyrosine
- **PTU** can also lower conversion of T4 to T3; ***it can also decrease thyroid autoantibody levels***

HYPERTHYROIDISM

- Beta blockers (propranolol) – to alleviate peripheral adrenergic effects

Advised medical management

1. Small diffusely enlarge gland
2. larger glands that decreases in size due to antithyroid drugs

Thyroidectomy / Radioactive Iodine Ablation

1. Toxic nodule goiters
2. Large diffuse glands
3. Hyperthyroidism recurs when drug was discontinued

HYPERTHYROIDISM

Radioactive Iodine Therapy:

Advantages:

1. Avoidance of surgery (no injury to nerve / parathyroid gland)
2. Reduce cost & ease of treatment

Disadvantages:

1. Lifelong thyroxin replacement therapy
2. Slower correction of hyperthyroidism
3. Higher relapse rate
4. Adverse effect of ophthalmopathy

HYPERTHYROIDISM

Radioactive Iodine Therapy:

Suitable treatment:

1. Small or moderate size goiter
2. Relapse after medical and surgical therapy
3. Antithyroid drug and surgery are contraindicated

Contraindicated:

1. Pregnant / breast feeding
2. Ophthalmopathy (progression of eye signs)
3. Isolated nodular goiter or toxic nodular goiter
4. Young age (children/adolescence) ----> Infertility / carcinoma

HYPERTHYROIDISM

Thyroid Surgery:

Indicated to:

1. Young patient
2. With Grave ophthalmopathy
3. Pregnant
4. With suspicious thyroid nodule in Grave's gland
5. Large nodular toxic goiter w/ low level of radioactive iodine uptake.

Placed patient to euthyroid state prior to thyroid surgery:

1. Antithyroid drugs
2. Lugol's iodine solution (3 drops BID): SSKI supersaturated KI
   - Decrease vascularity of the gland / inhibit release of thyroid hormone hence reduce the risk of thyroid storm
3. Propranolol

HYPERTHYROIDISM

Thyroid Surgery:

Thyroidectomy:

1. Bilateral subtotal thyroidectomy
2. Total lobectomy & subtotal lobectomy contra-lateral (Hartley-Dunhill)
3. Total thyroidectomy

Advantages over RAI:

1. Immediate cure of the disease
2. Low incidence of hypothyroidism
3. Potential removal of coexisting thyroid carcinoma

Disadvantages:

1. Complication ---> nerve injury (1%) and hypoparathyroidism (13% transient/ 1% permanent).
2. Hematoma
3. Hypertrophic scar formation

Thyroid storm:

- Life threatening
- Precipitated by:
  1. Infection (pharyngitis / pneumonitis)
  2. Iodine 131 treatment
  3. Thyroid surgery

- Prophylactic treatment: --- Surgery in euthyroid state

Thyroid storm:

Treatment:

1. Fluid replacement
2. Antithyroid drug
3. Beta blocker
4. Lugol's iodine solution
5. Hydrocortisone
6. Cooling blanket
7. Sedation
8. Extreme cases ----> peritoneal dialysis or hemofiltration to lower T4&T3

Avoid ASPIRIN ---> increases free thyroid hormone levels

THYROID NEOPLASMS

A.BENIGN
a.Follicular adenoma.
b.Hurthle cell adenoma.
c.Colloid adenoma.
d.Papillary adenoma.

B.MALIGNANT(Dunhill classification)
a.Differentiated
1.Papillary CA(60%)
2.Follicular CA(17%)
3.Papillofollicular CA
4.Hurthle cell CA
b.Undifferentiated
1.Anaplastic CA(13%)
C.Medullary CA(6%)
D.Malignant lymphoma(4%)
E.Secondaries.

THYROID NEOPLASMS ETIOLOGY

Radiation exposure.
MNG.
Genetic.
Hashimoto’s thyroiditis

PAPILLARY CA

Most common cancer of thyroid.
Common in females and young age group.
Woolner classification includes
i)occult primary
ii)intrathyroidal.
iii)extrathyroidal

PAPILLARY CA

PATHOLOGY
Grossly it can be soft,firm,solid or cystic.
Microscopically it contains cystic spaces with papillary projections with psammoma bodies,malignant cells with orphan annie eye nuclei.

PAPILLARY CA

SPREAD

Slowly progressive tumor.

Multicentric.

Spread is via lymphatics.

PAPILLARY CA

Treatment-----

Total thyroidectomy.

Suppressive dose of L-thyroxine.

Neck dissection if LNs are positive.

PROGNOSIS is good.

FOLLICULAR CA

Can occur **de novo or in a multinodular goitre.**
More aggressive tumor.
Spreads mainly by blood.
Bone secondaries are typically vascular,warm and pulsatile.
FNAC is inconclusive.
Ttreatment- Is total thyroidectomy.

ANAPLASTIC CA

Occurs in elderly.
Very aggressive tumor of short duration.
Stridor and hoarseness of voice.
Dysphagia.
Fixity to skin.
FNAC is diagnostic.
Tracheostomy and isthmectomy to relieve obstruction.
Radiotherapy is tt.
Very poor prognosis.

MEDULLARY CA

Arises from parafollicular c cells which are derived from ultimobranchial body.
Contains characterstic amyloid stroma.
Calcitonin is a useful tumor marker.
Tumor also secretes 5 HT,PGs,ACTH,and VIP
Spreads mainly via lymphatics.
Can be sporadic,associated withMENII syndrome or familial.
Ttreatment. Is total thyroidectomy.

MALIGNANT THYROID

90 – 95% are differentiated tumor w/ follicular origin

1. Papillary thyroid adenocarcinoma
2. Follicular adenocarcinoma
3. Hurtle cell carcinoma

- **6% arise from parafollicular cells:**
  1. Medullary carcinoma of thyroid

- **1% poorly differentiated**
  1. Anaplastic thyroid carcinoma

MALIGNANT THYROID

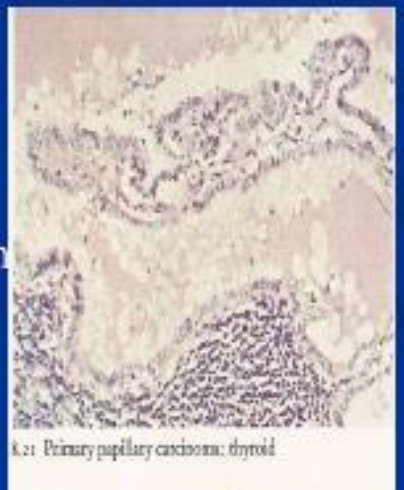
Oncogene associated w/ Thyroid carcinoma:

1. **RET oncogene:**
   - Seen in **papillary and medullary thyroid CA**
   - Located in ***chromosome 10***
2. **TRK – A:**
   - ***Chromosome 1***
3. **Mutated ras oncogenes:**
   - **Follicular thyroid carcinoma**, thyroid adenoma and multinodular goiter
4. **Mutated p53 gene:**
   - **Anaplastic thyroid carcinoma**

MALIGNANT THYROID

Papillary Thyroid Carcinoma:

- Most common (80%)
- Predominant thyroid CA in children (75%)
- Usually due to radiation exposure of the neck (85-90%)
- Multi-focal (30-88%); has LN spread (para-tracheal & cervical LN).
- Can invade trachea, esophagus and recurrent laryngeal nerve; late hematogenous spread.
- **Mixed tumor (papillary & follicular):** variant of papillary CA, but classified as papillary for it biologically acts as papillary CA.
- ***Orphan Annie Nuclei:***
  - Characteristic cellular feature
  - Abundant cytoplasm, crowded nuclei and intra-nuclear cytoplasmic inclusion



k.21 Primary papillary carcinoma: thyroid

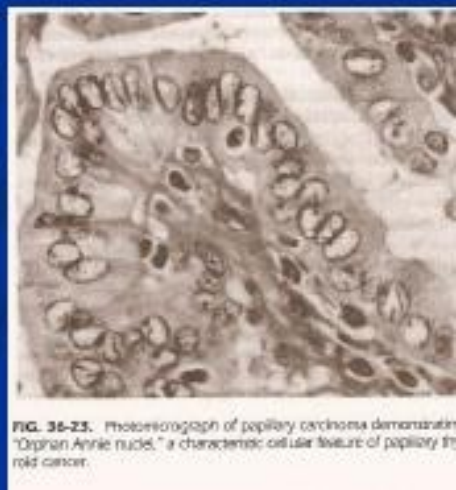


FIG. 36-23. Photomicrograph of papillary carcinoma demonstrating "Orphan Annie nuclei," a characteristic cellular feature of papillary thyroid cancer.

Papillary Thyroid Carcinoma:

3 forms of papillary CA (based on size and extent):

2. ***Minimal or occult / micro carcinoma***
   - ***1 cm or less, no capsular invasion***
   - Non-palpable and usually an incidental finding intra-op or autopsy
   - Recurrence rate ----> 7%
   - Mortality ----------> 0.5%
3. ***Intra-thyroidal Tumors:***
   - > 1cm and confined to the thyroid gland
   - (-) extra thyroidal invasion
4. ***Extra-thyroidal Tumors:***
   - Locally advanced with invasion through the thyroid capsule into adjacent structures.

- ***All types can be associated w/ LN metastases and intra-thyroidal blood vessel invasion or occasionally metastases***

Papillary Thyroid Carcinoma:

S/Sx:

- Euthyroid, slow growing painless mass
- Signs of local invasions:
  - Dysphagia
  - Dyspnea
  - Hoarseness of voice
- Palpable cervical LN more apparent than primary lesion **(lateral aberrant thyroid)**
- Uncommon distant metastases (lung metastases in *children*)

Diagnosis:

- FNAC (specific and sensitive for papillary, medullary and anaplastic)
- CT/MRI in pts w/ extensive local or sub-sternal extension

Papillary Thyroid Carcinoma:

Prognostic indicators: (85% 10yrs survival)

3. AGES scale:

   A- age G- grade E- extent S- size

5. MACIS scale:

   M- metastases A- age C- completeness of resection

   I- extra thyroidal invasion S- size

8. AMES
9. TNM

Distant metastases (bone): most significant prognostic indicator overall

TNM Classification of Thyroid Tumors

Primary tumor: (T)

TX – primary tumor not assessed

T0 – no evidence of primary tumor

T1 – tumor </= 2cm in diameter, limited to thyroid

T2 – tumor > 2cm but < 4cm, limited to thyroid

T3 – tumor >4cm, limited to thyroid, or any tumor w/ minimal extra-thyroidal invasion

T4a – any size that extend beyond capsule invading subcutaneous soft tissue, larynx, trachea, esophagus, recurrent laryngeal nerve or ***intrathyroidal anaplastic cancer***

T4b – tumor invading prevertebral fascia or encasing carotid artery or mediastinal vessels or ***extrathyroidal anaplastic cancer***

TNM Classification of Thyroid Tumors

Regional LN (N) – include central, lateral, cervical and mediastinal LN

NX – regional LN cannot be assessed

N0 – no regional LN metastasis

N1 – regional LN metastasis

- **N1a** – metastases to level VI (pretracheal, paratracheal and prelaryngeal/Delphian LN)
- **N1b** – metastases to unilateral, bilateral or contralateral cervical or superior mediastinal LN

TNM Classification of Thyroid Tumors

Distant Metastasis (M)

MX – distant metastases cannot be assessed

M0 – no distant metastases

M1 – w/ distant metastases

TNM Classification of Thyroid Tumors

Papillary or Follicular Tumors:

STAGE	TNM
Younger than age 45 y/o	
I	any T, any N, M0
II	any T, any N, M1
Age 45 w/o and older	
I	T1, N0, M0
II	T2, N0, M0
III	T3, N0, M0; T1-3, N1a, M0
IVA	T4a, N0-1a, M0;T1-4a, N1b, M0
IVB	T4b, any N, M0
IVC	any T, any N, M1

Thyroid Operations

Isthmectomy

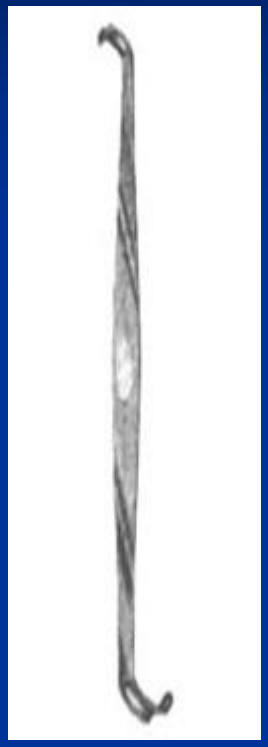
Lobectomy

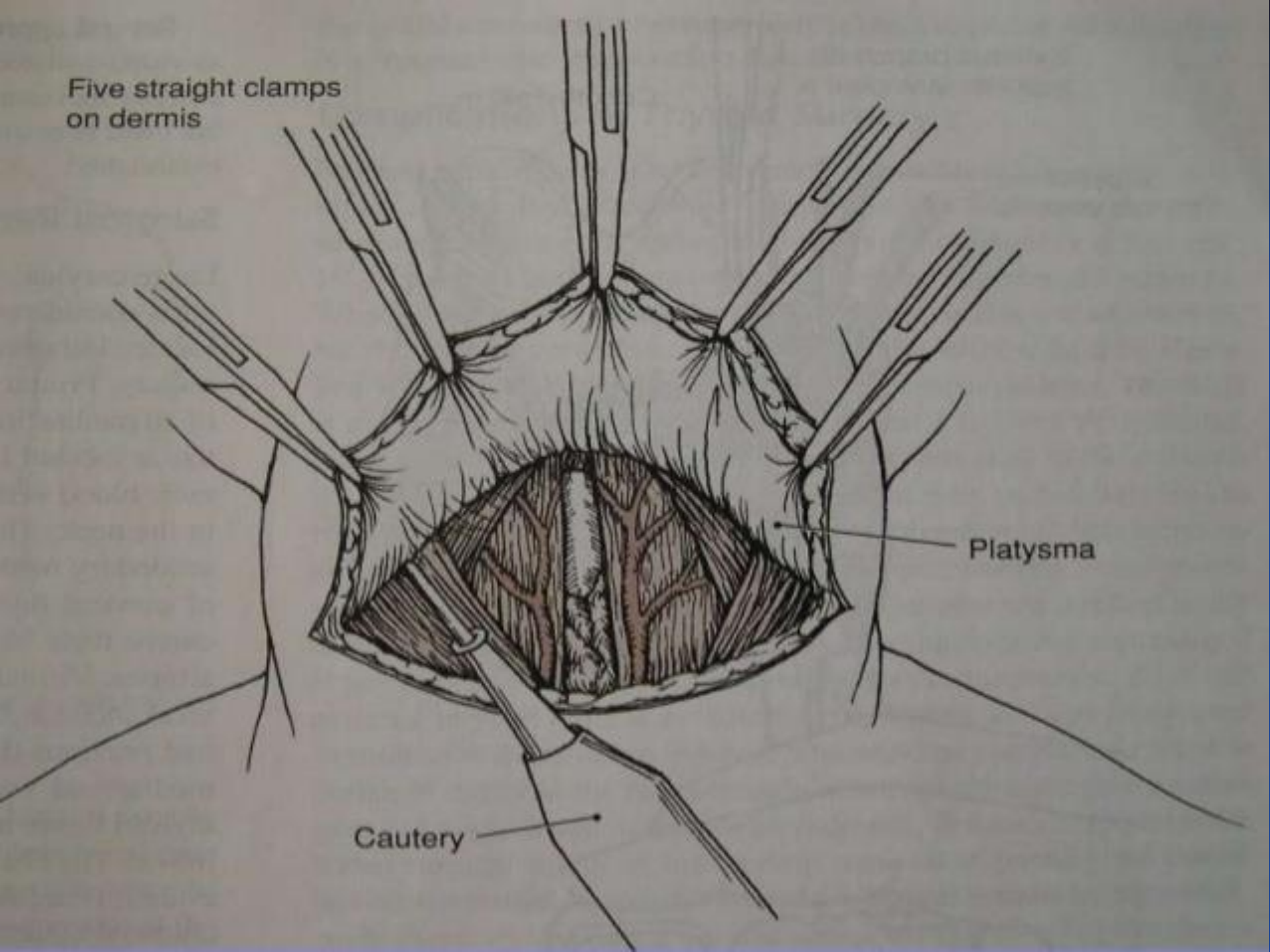
Hemi-thyroidectomy

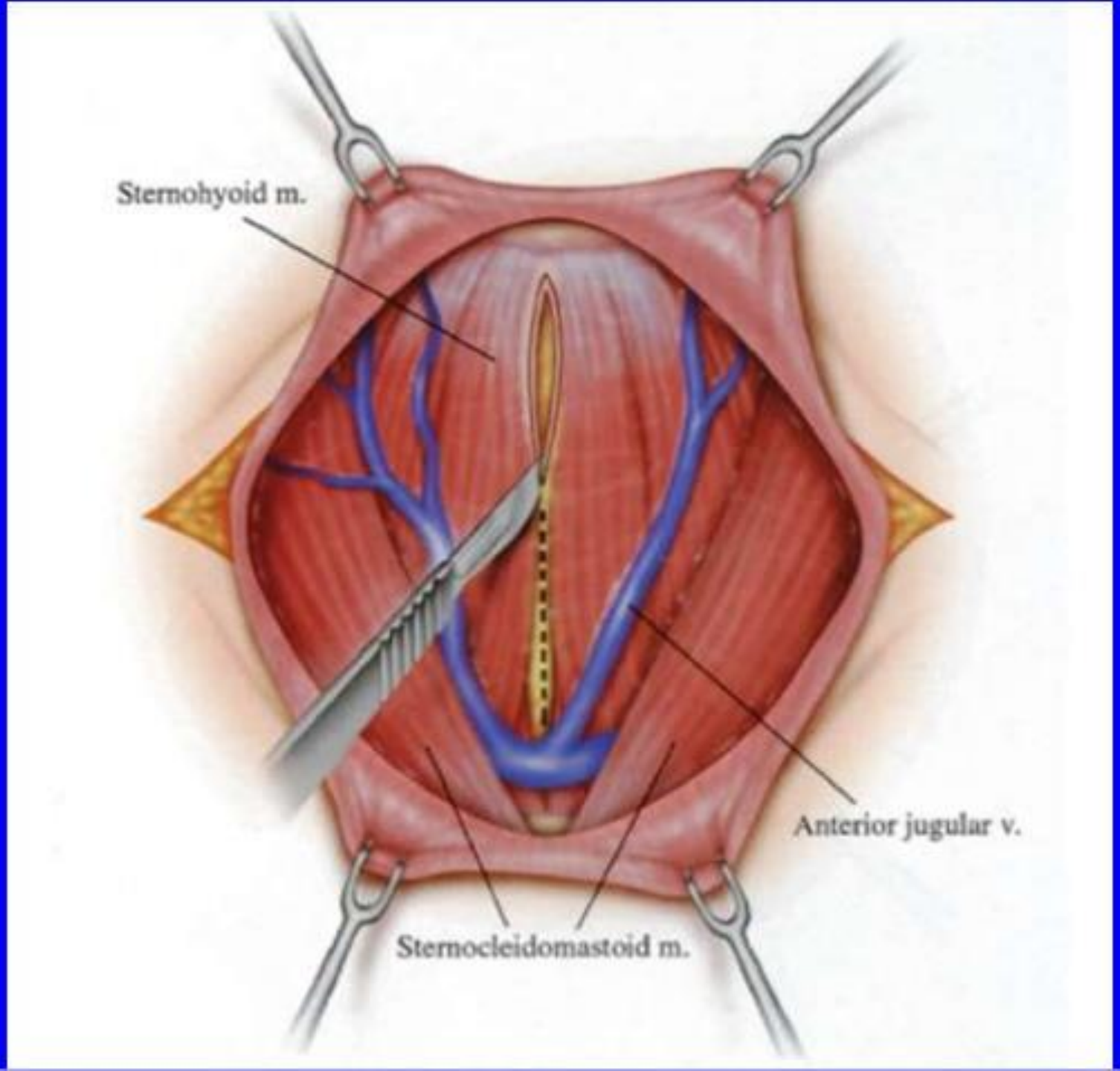
Subtotal thyroidectomy

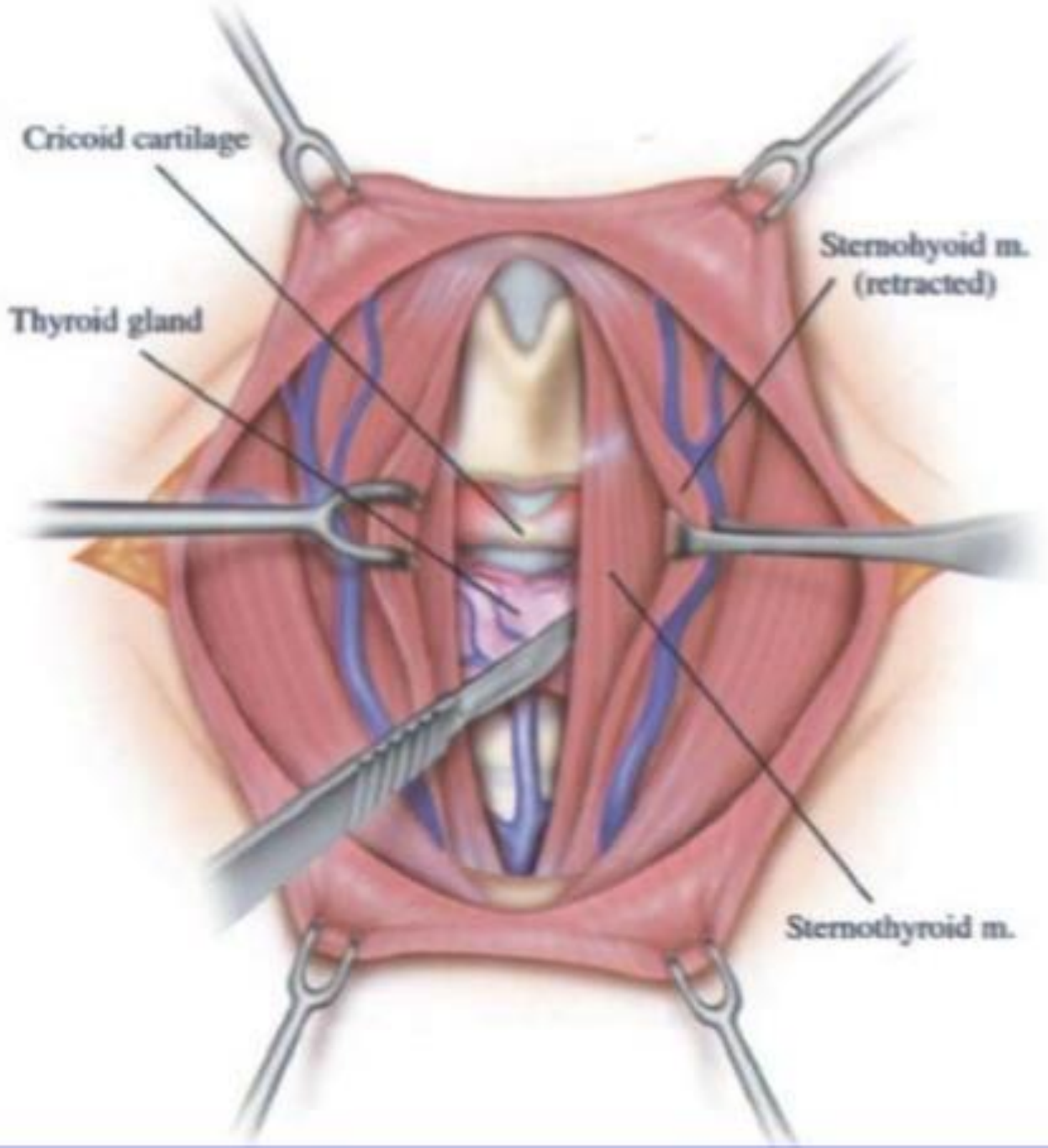
Near-Total Thyroidectomy

Total Thyroidectomy




Five straight clamps
on dermis
Platysma
Cautery


Sternohyoid m.
Anterior jugular v.
Sternocleidomastoid m.


Cricoid cartilage
Thyroid gland
Sternohyoid m.
(retracted)
Sternothyroid m.

Exposure of thyroid gland

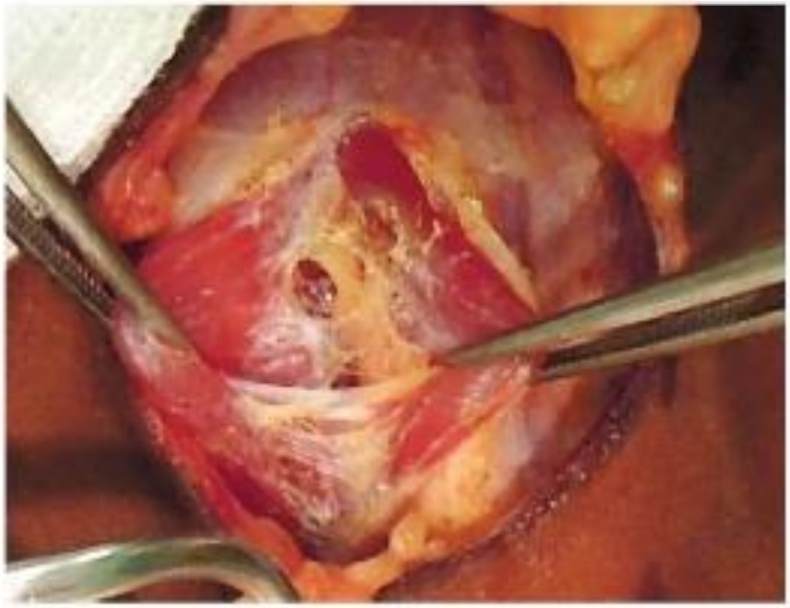


Figure 20: Fascia between sternohyoid and sternothyroid muscles divided to expose thyroid gland

Identification of RLN

Figure 21: Medial rotation of (R) thyroid lobe exposes the middle thyroid vein

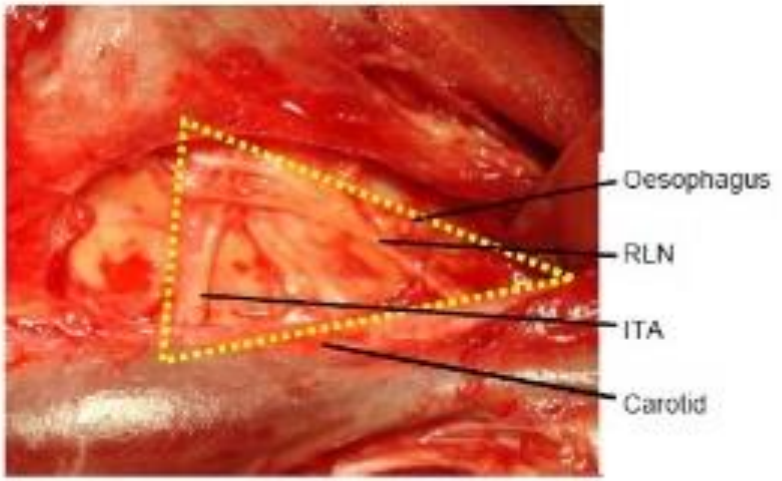


Figure 11: RLN crossing Simon's triangle formed by oesophagus, inferior thyroid artery (ITA) and common carotid artery (right neck, thyroid reflected medially)

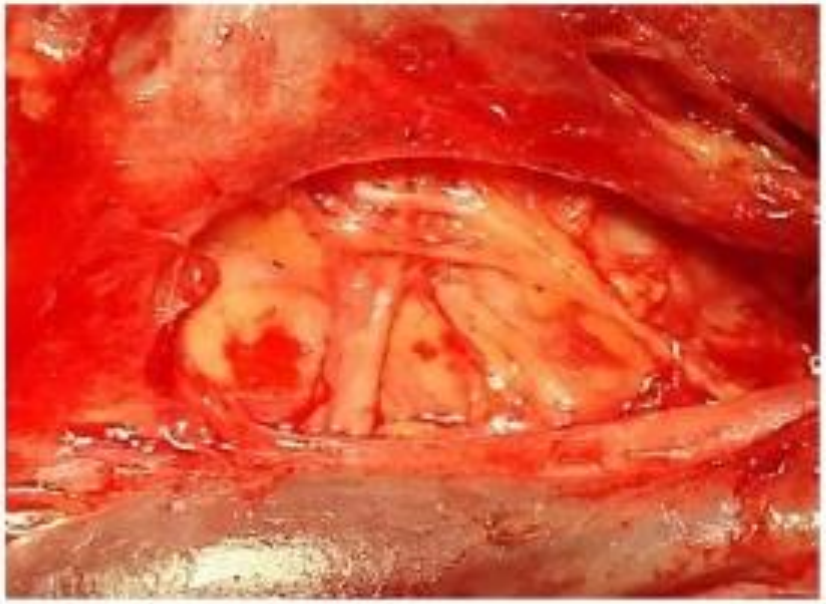


Figure 10: RLN passing over the inferior thyroid artery (right neck, thyroid reflected medially)

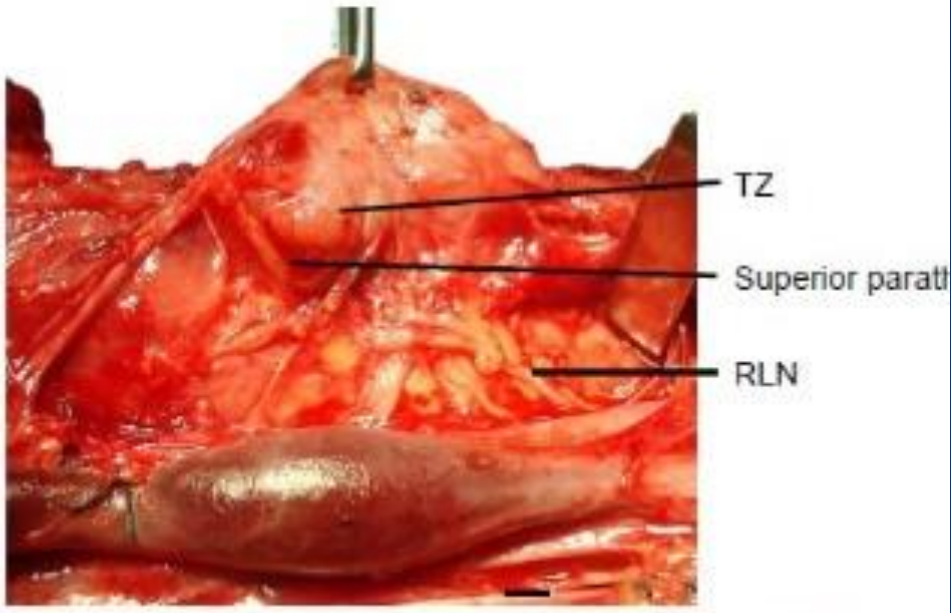


Figure 6: Tubercle of Zuckerkandl (TZ) and its relationship to the superior parathyroid gland and RLN

Identification of parathyroid glands

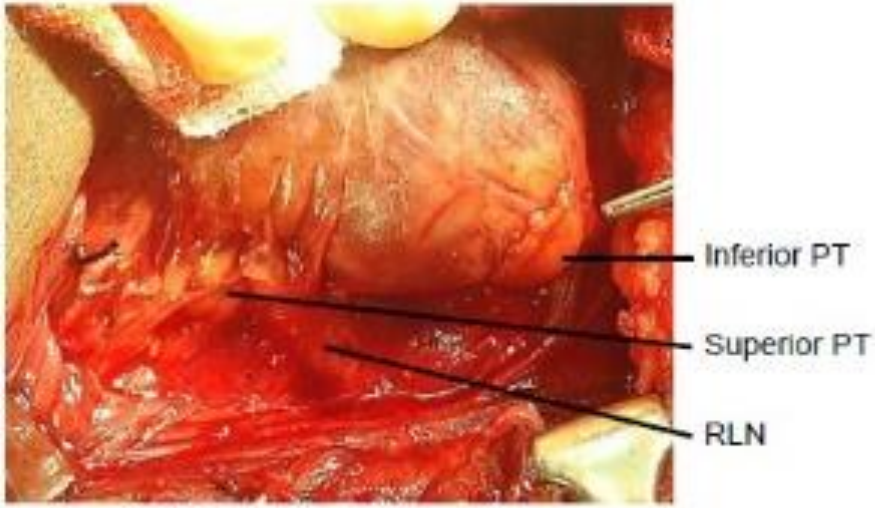


Figure 14b: The superior parathyroid gland lies deep (dorsal) and the inferior parathyroid superficial (ventral) to a coronal plane along the course of the RLN

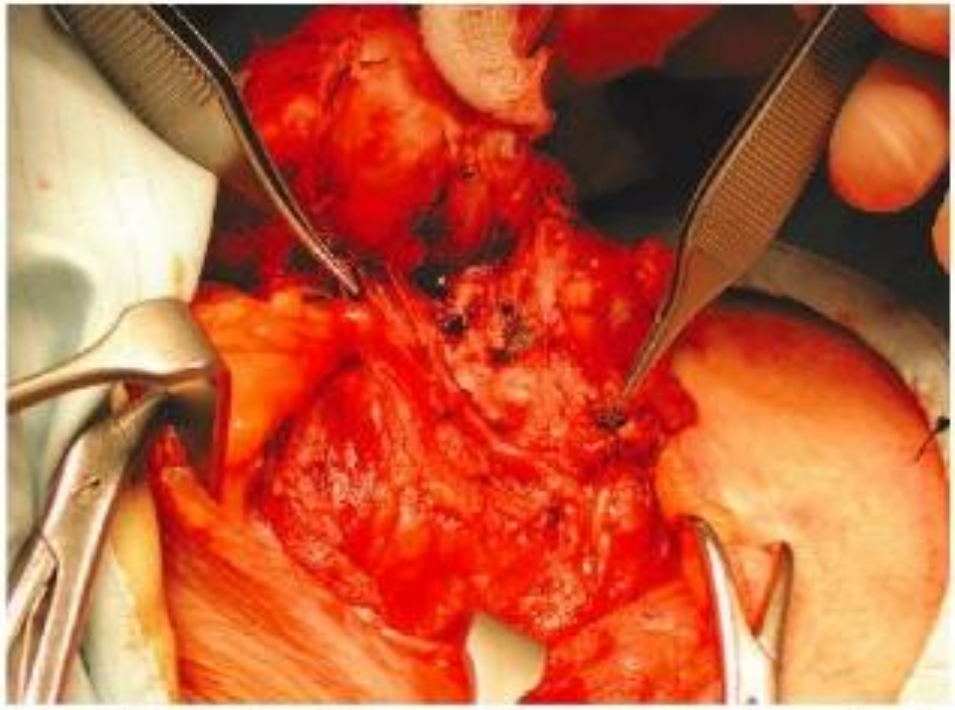
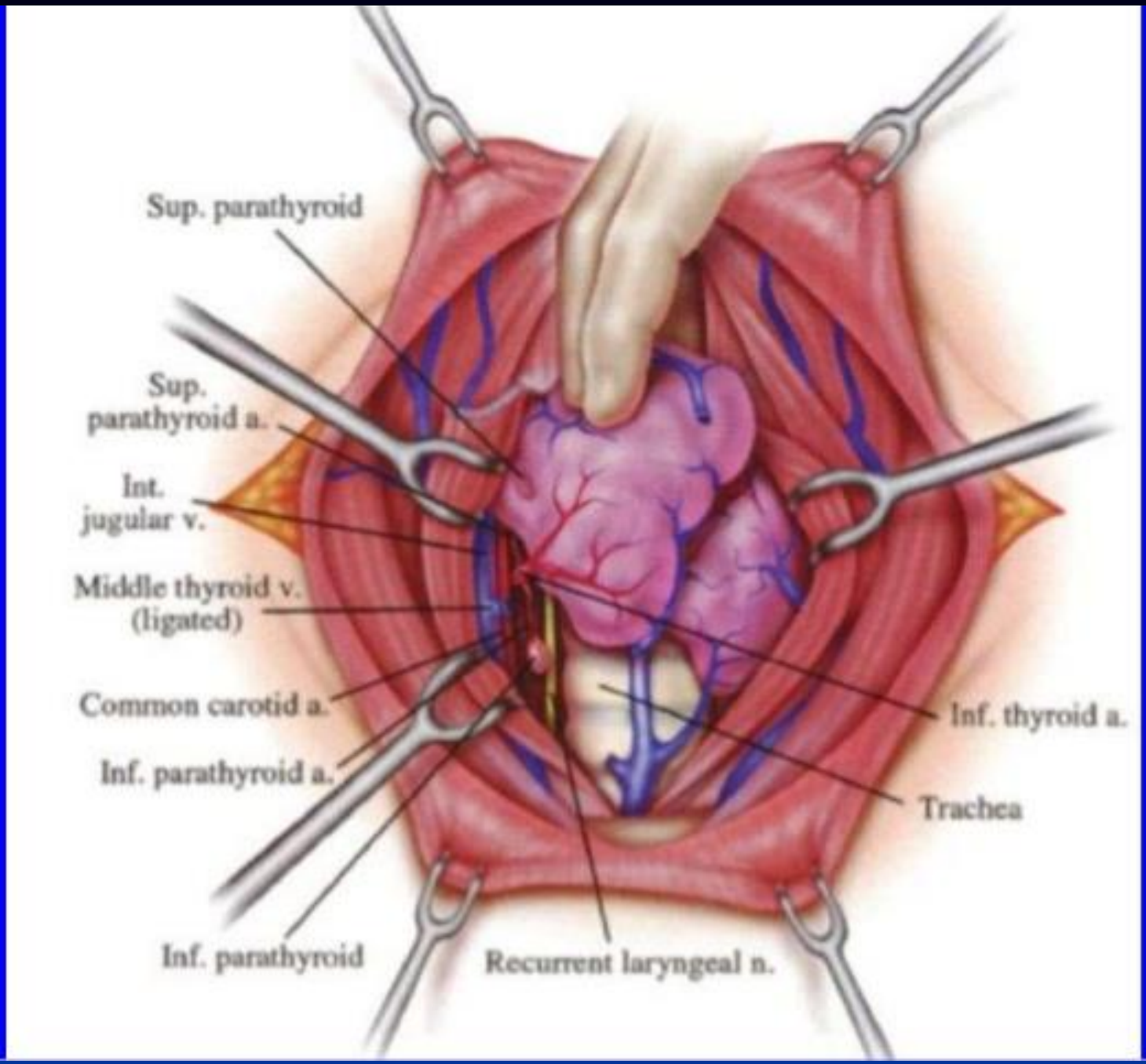
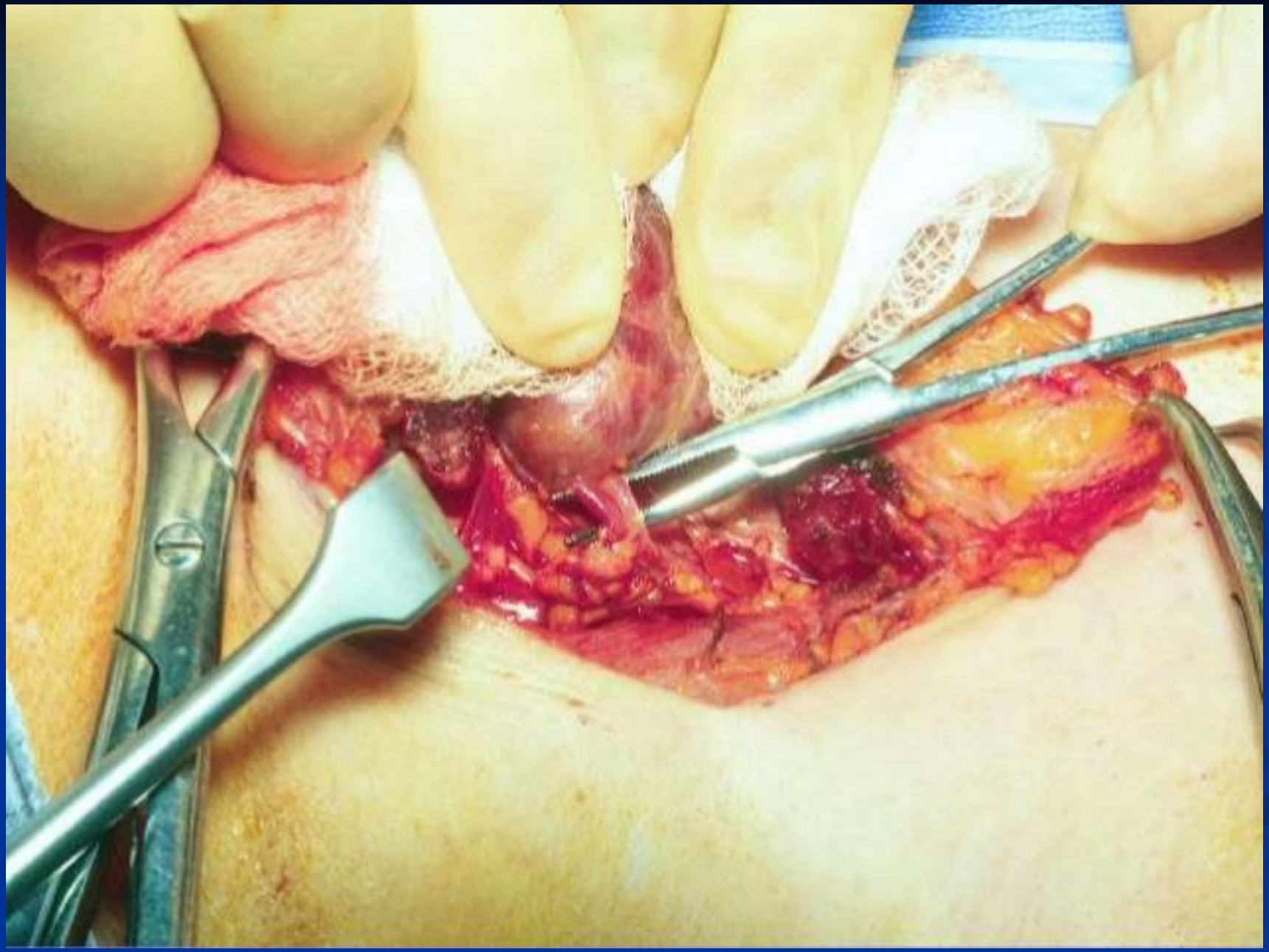
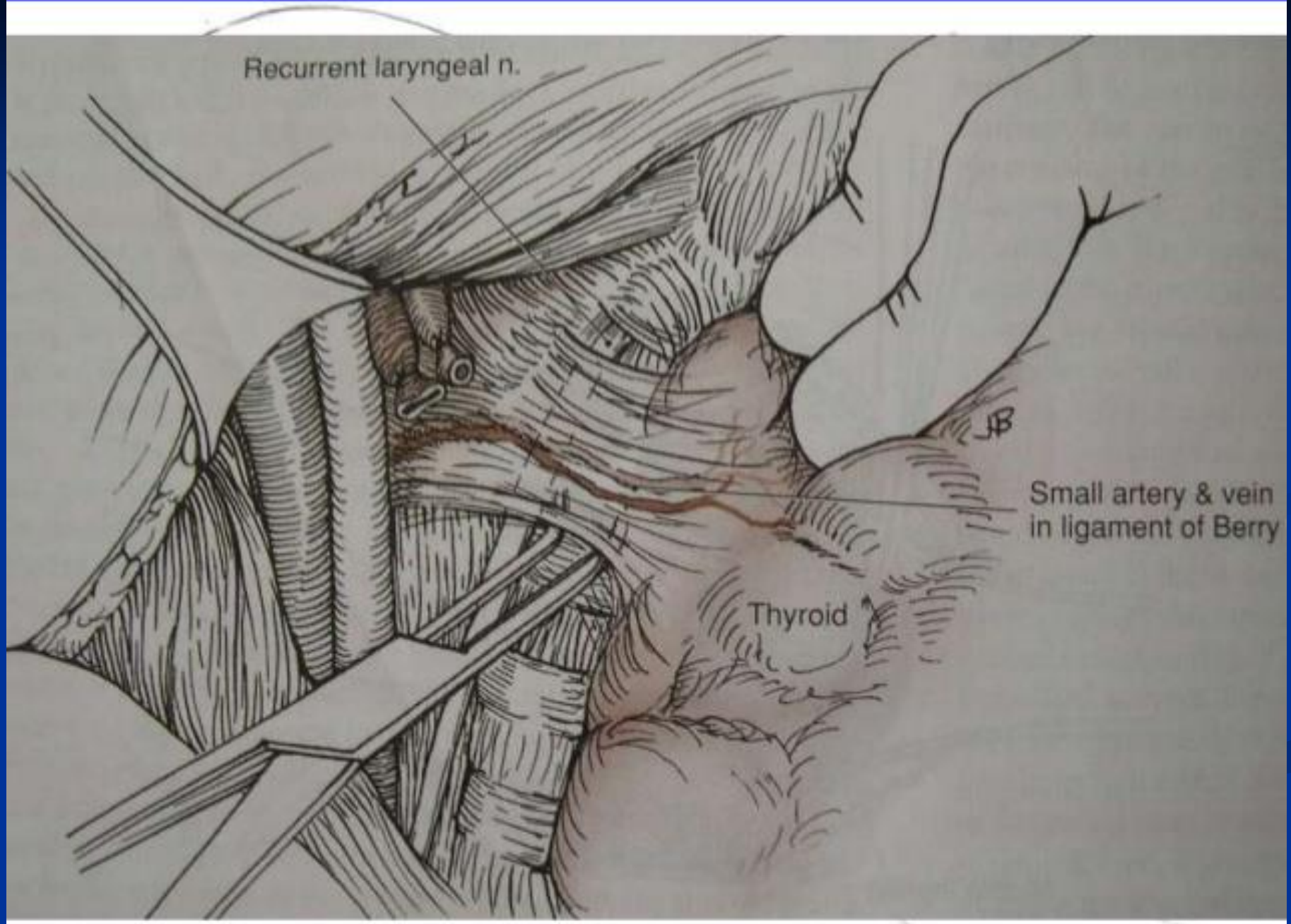
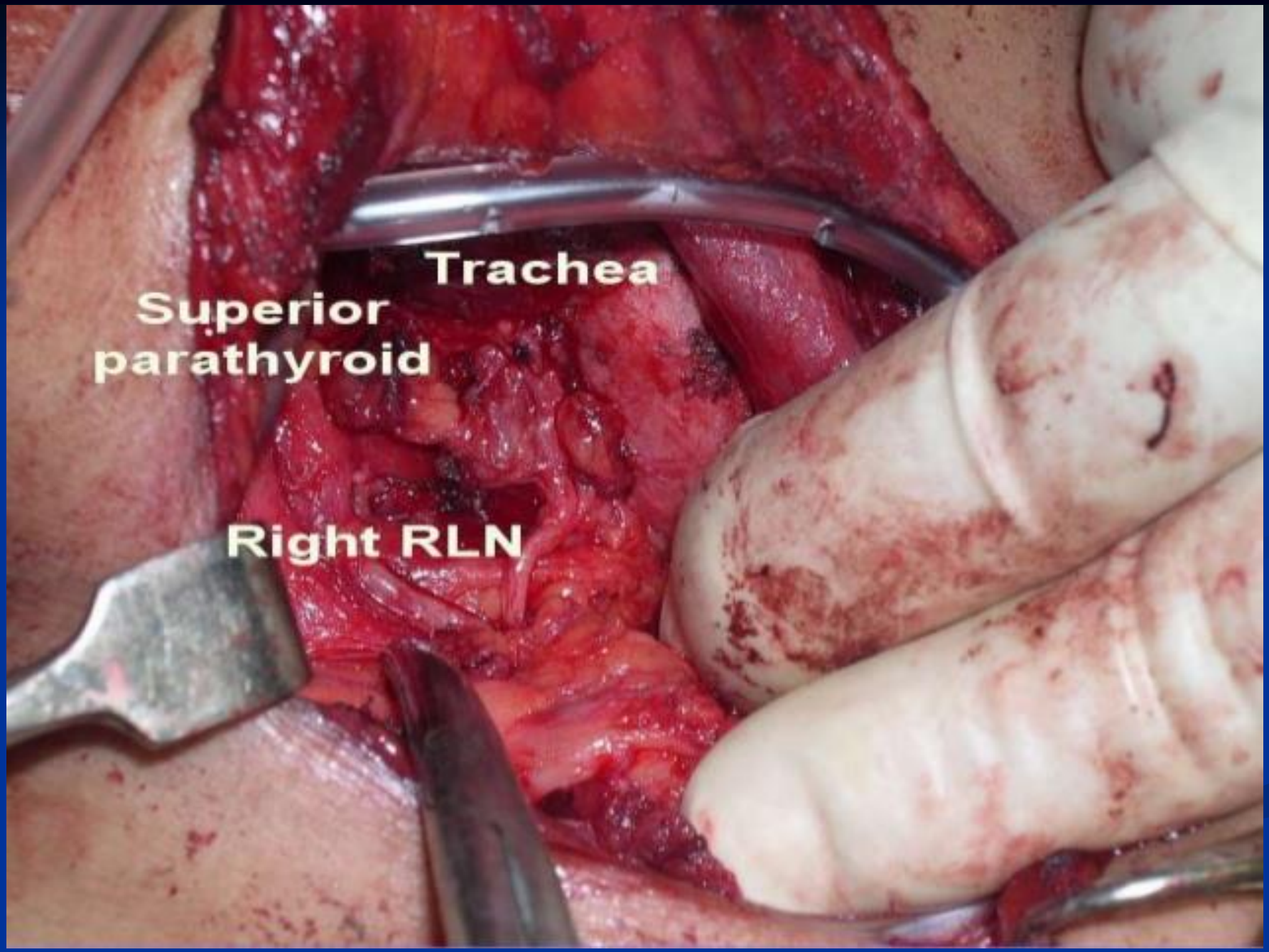


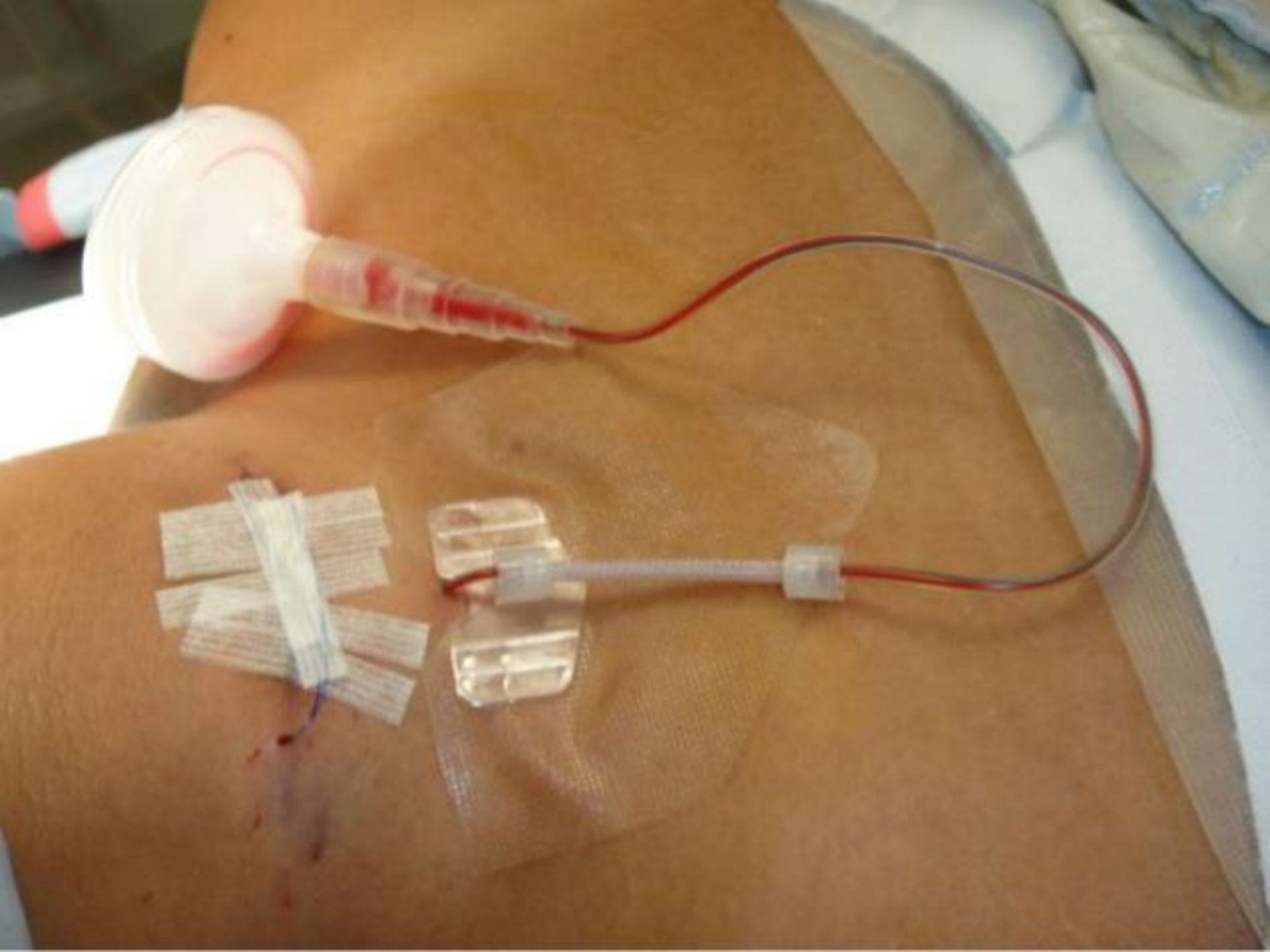
Figure 7 Identification of the recurrent laryngeal nerve and parathyroid glands.


Sup. parathyroid
Sup. parathyroid a.
Int. jugular v.
Middle thyroid v. (ligated)
Common carotid a.
Inf. parathyroid a.
Inf. parathyroid
Recurrent laryngeal n.
Trachea
Inf. thyroid a.




Recurrent laryngeal n.
Small artery & vein
in ligament of Berry
Thyroid


Trachea
Superior
parathyroid
Right RLN



Postoperative complications

Haemorrhage
Respiratory obstruction
Recurrent laryngeal nerve paralysis and voice change
Thyroid insufficiency
Parathyroid insufficiency
Thyrotoxic crisis
Wound infection
Hypertrophic or keloid scar
Stitch granuloma

A. Local Complications

1. Hemorrhage (1ry – 2ry – reactionary)
2. Liquifying hematoma
3. Wound infection
4. Unightly scar
5. Respiratory complications (trachiitis)
6. Pneumothorax
7. Mediastinal emphysema
8. Air embolism

Complications of Thyroidectomy

B. Specific Complications

1. **Respiratory obstruction (stridor)**

- Laryngeal edema (glossitis)
- Tracheal collapse (tracheomalacia)
- Hematoma – blood clot
- FB
- RLN affection

2. Nerve Injuries

RLN Injury (unilateral – bilateral)

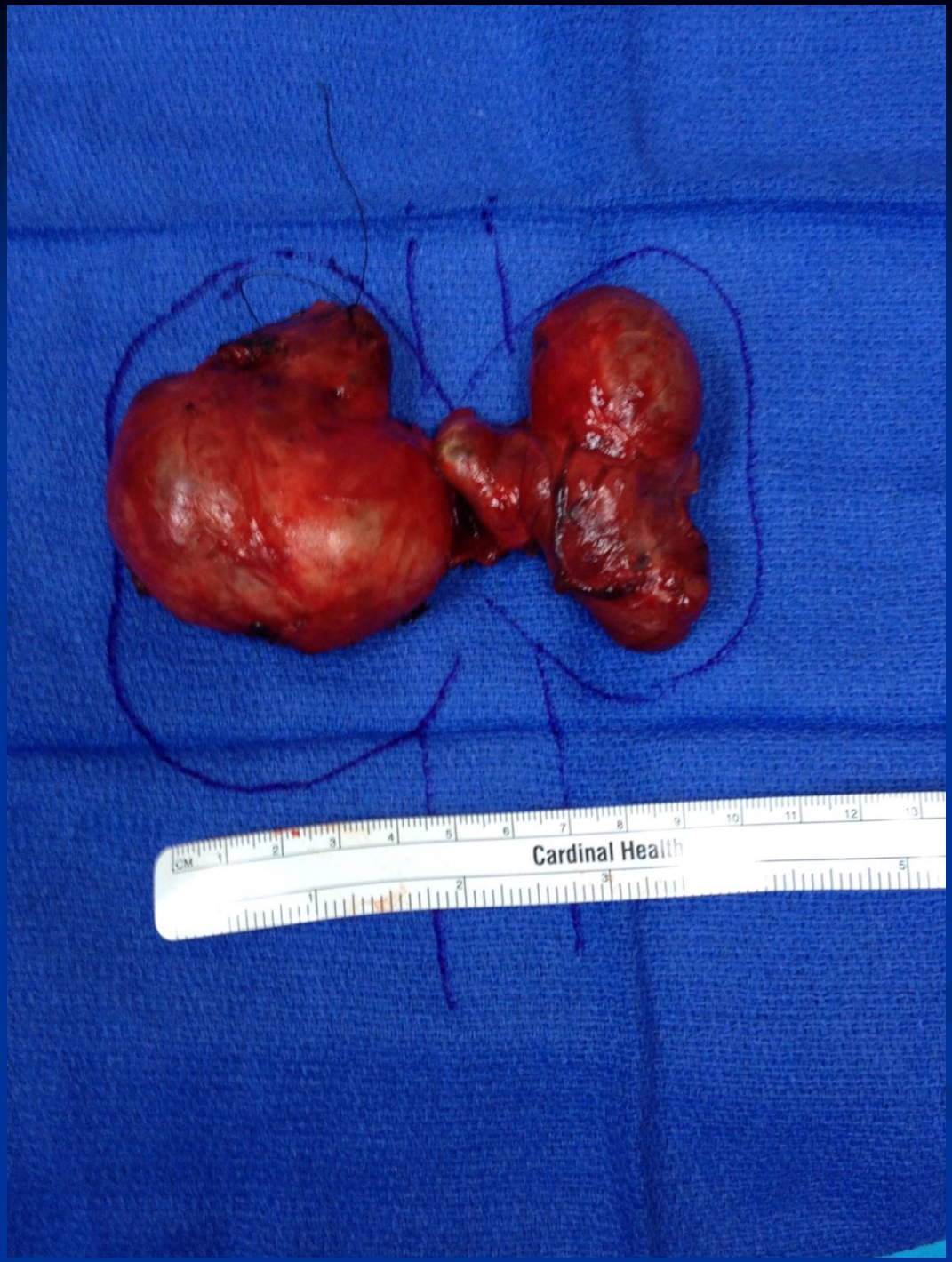
- Division (partial – complete)
- Stretching
- Ligation
- Compression (edema – hematoma)
- Concussion
- Diathermy

ELN Injury

Cervical sympathetic nerve

3. Endocrinal Abnormalities

- Hypoparathyroidism
- Hypothyroidism
- Recurrent thyrotoxicosis
- Thyrotoxic crisis
- Progressive exophthalmos


Cardinal Heal