

## Thyroid Surgery

**Thyroid gland** : is endocrine gland situated in mid line of neck against vertebra C 5-6-7 T1.

Weight about 20-25g.

Shape : butter fly formed of 2 lateral lobes connected by an isthmus.



### **Anatomy :**

Each thyroid lobe is pear shaped with its apex reaching oblique line of thyroid cartilage . The isthmus crosses the 2<sup>nd</sup> ,3<sup>rd</sup> ,4<sup>th</sup> tracheal ring and may project upwards forming the pyramidal lobe which is connected to hyoid bone by fibrous band.

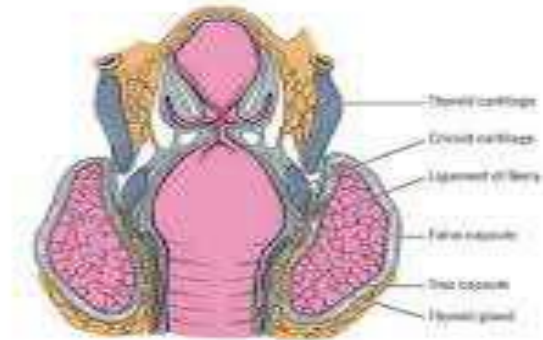
### **Capsules:**

- 1- true fibrous capsule: enveloping the gland.
- 2- false fascial capsule :derived from pretracheal fascia which is attached above thyroid cartilage & hyoid bone so it allows the gland to move up during deglutition.
- 3- The fascia is thickened posteriorly forming the ligament of Berry which fixes the back of the gland to cricoid cartilage.

## Capsules of the thyroid gland

It has 2 Capsules:

- True Fibrous capsule enclosing the gland.
- False fascial capsule derived from the pretracheal fascia. (Thickens laterally forming the lat. Ligament of Berry which fixes the gland to the cricoid cartilage)



- Medially :each lobe moulded over larynx and trachea.
- Superiorly: the gland over lies cricothyroid muscle .

External branch of superior laryngeal nerve pass deep to upper pole of the gland on it is way to supply muscle.

- Posterolaterally: contact with carotid sheath and parathyroid.
- Posteriomediaally :related to tracheoesophageal groove in which run recurrent laryngeal nerve.

### Blood supply:

Arterial supply :

- 1)sup.thyroid artery :branch of external carotid a ,closely related to external laryngeal nerve but separate it close to the apex of the gland.
- 2)inf thyroid artery :branch of thyrocervical trunk of subclavian artery ,it is terminal branches related to R.laryngeal nerve close to the gland.
- 3)thyroid ima artery :(may be absent)arise from arch of aorta or innominate a .&ascend in front of trachea to reach the isthmus.

Venous drainage:

- 1) sup. thyroid v. from apex to I.j.v
- 2) middle thyroid v from base to i.j.v
- 3) inf thyroid vein from isthmus to innominate vein.

## **Thyroidectomy**

Definition: it is a removal of all or part of thyroid gland

Indications :

- A) as therapy for patient with thyrotoxicosis.
- B) to treat benign or malignant thyroid tumor.
- C) to treat pressure symptoms such as respiratory distress or dyspnea or dysphagia.
- D) cosmetic purpose.
- E) To establish definitive treatment of thyroid mass specially when cytological results is indeterminate.

## **Models of Thyroidectomy**

- Hemithyroidectomy
- Subtotal thyroidectomy
- Near total thyroidectomy
- Total thyroidectomy

## **Hemithyroidectomy**

It involve removal of one lobe plus entire isthmus is removed. It is performed in benign disease involving one lobe.

1. Also done in follicular carcinoma involving one lobe.
2. Other indication:
  - A) solitary toxic or non toxic nodule .
  - B) thyroid cyst.

### **Subtotal thyroidectomy**

Here about 8 gm ,or tissue size of pulp of finger is retained on lower pole of thyroid on both sides ,and rest of gland is removed.

Indications:

- 1- Toxic thyroid (primary or secondary)
- 2- Non toxic multinodular goitre.

### **Near total thyroidectomy**

Here both lobes except less than 2gm of thyroid tissue on the lower pole, near to the recurrent laryngeal nerve and parathyroid ,are removed to retain blood supply to parathyroid gland .

Indication : mostly done in papillary thyroid carcinoma .

### **Total thyroidectomy**

Here entire gland is removed.

Indication:

- 1- Follicular thyroid cancer
- 2- Papillary thyroid cancer

### **Pre-operation**

Blood group and cross matching keep required blood ready.

- 1- Indirect laryngoscope:check for abduction of vocal cord.
- 2- Serum calcium estimation because hyperparathyroidism may coexist.
  - a- T3 ,T4, TSH.
  - b- Thyroid antibodies.
  - c- ECG & cardiac fitness specially in cases of toxic goitre.
  - d- Lugol,s iodine is given 10days prior to surgery to make the gland firm and less vascular.

**Indication:**

1. Scar
2. Airway obstruction
3. Voice change
4. Hypothyroidism
5. Hypoparathyroidism

**Procedure :**

Position: under general anesthesia patient is put on upine position, with neck hyperextended with sandbag under shoulder, table tilt 15 degree head to reduce venous congestion. (rose position).



skin is prepped from chin to the upper

1. thorax.
2. surgeon and assistant scrub and gown the stand the opposite site. usually start the larger gland first.

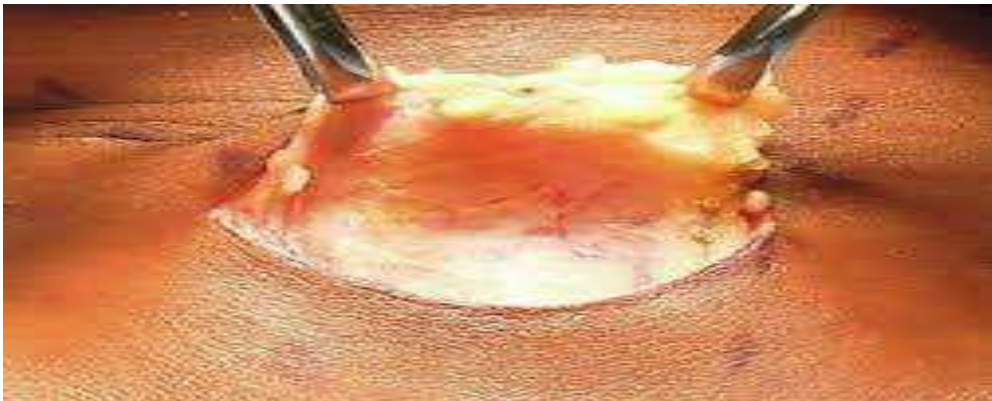
**Incision :**

- Site of incision is identified with suture.
- Transverse skin crease incision is placed 2-3 cm above the sternal notch about 8cm long extending to lateral border of sternocleidomastoid muscle.
- The scapel with size 15 blade is slanted to divide skin and platysma.
- Hemostasis controlled with electrocuttary.

1- Sub platysmal plane flap

Subcutaneous tissue and platysma are incised in platysmal plane ,remaining superficial to anterior jugular vein.

- Upper flap rised up to thyroid cartilage.
- Lower flap up to sternoclavicular joint.
- deep fascia is opened vertically in mid line.



2- separating strap muscle and exposing the anterior surface of thyroid gland

The fascia between strap muscles (sternohyoid, sternothyroid, and omohyoid) is divided, along midline and muscle retracted laterally.

In case of larger goitre or any neoplasm strap muscle divided in upper part .



3- pre tracheal fascia

4- identify the middle thyroid vein

a-The thyroid gland is rotated medially using surgeon finger .

b- The middle thyroid vein identified which is then legated.

c-This permit further mobilization of the gland.



5- superior pole of thyroid

a- Superior pole is dissected

b- Identify the superior thyroid artery, close to superior pole of the thyroid paranchyma and ligate it.

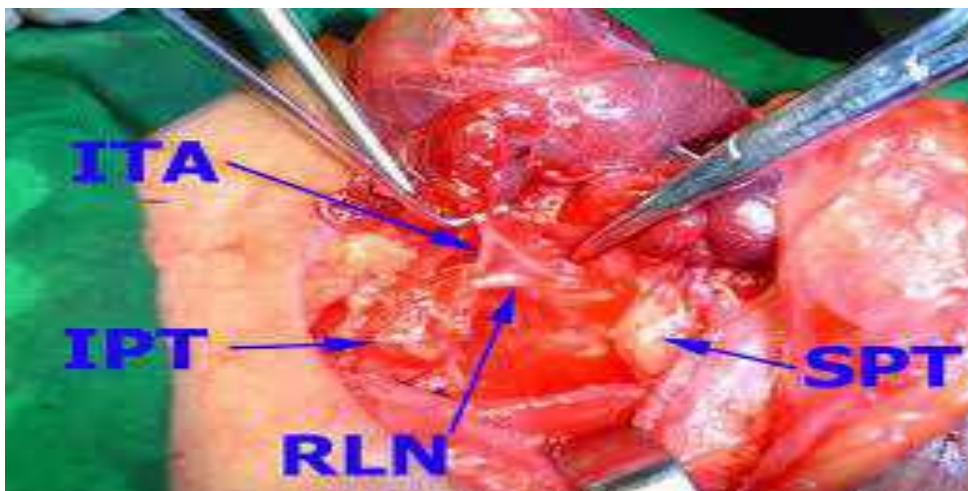
c- Dissection is done in avascular plane between upper pole of the gland and cricothyroid muscle to avoid trauma of external branch of superior laryngeal nerve entering cricothyroid.



6- Identify superior of parathyroid gland

**Location:** in the posterior position at the level of upper 2/3 of the thyroid and approximately 1cm above and behind the crossing point of recurrent laryngeal nerve and inferior thyroid artery.

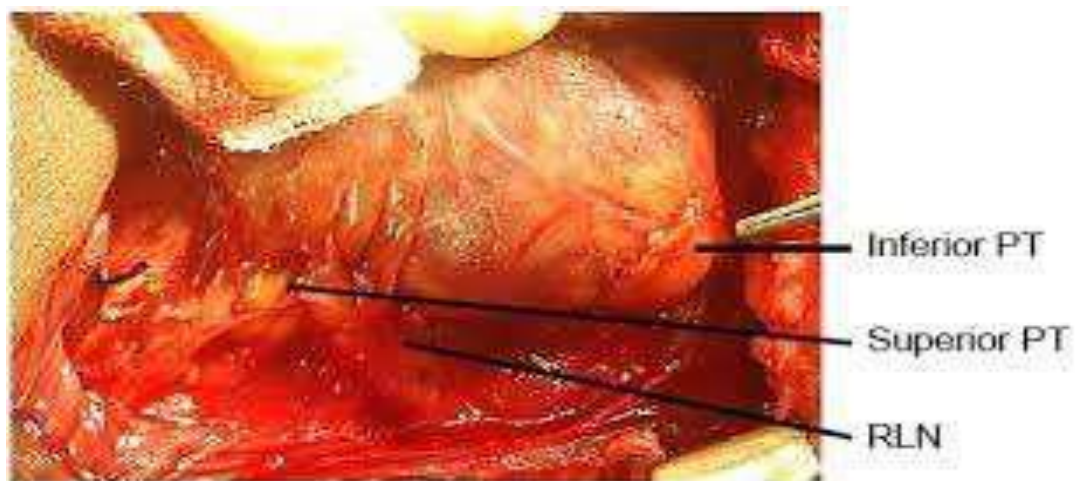
- a- It is orange yellow in color.
- b- The gland must remain in situ with blood supply intact.



7- Identify posterior of parathyroid gland

**Location :** between lower pole of thyroid and isthmus, below and in front of crossing .

Care must be give to preserve it in situ to avoid damage it is inferior thyroid artery supplying both glands.





8- Capsular ligation of inferior artery

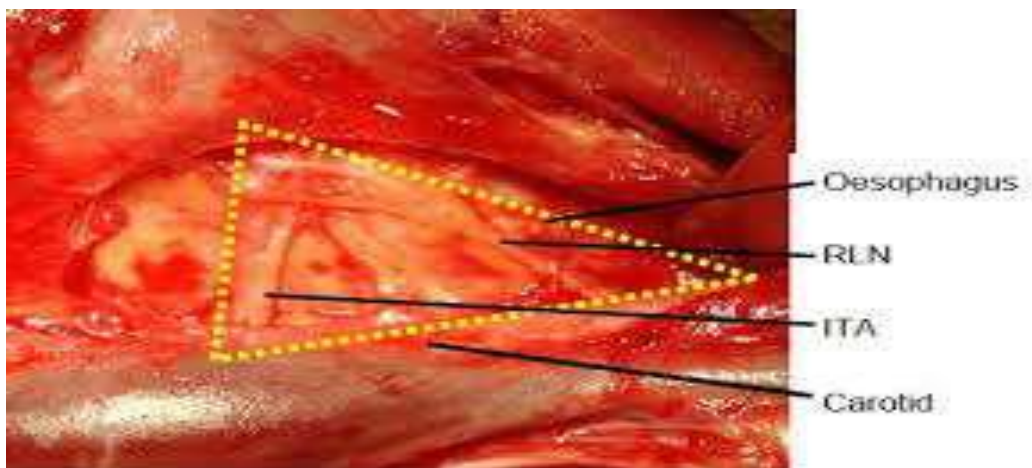
- a- It is a branch of thyrocervical trunk .
- b- Ligation done at capsular level, at the lower pole of thyroid gland.
- c- It retain *blood supply of parathyroid very important.*

9- Identify recurrent laryngeal nerve

Should be identified with dissection of entire course .

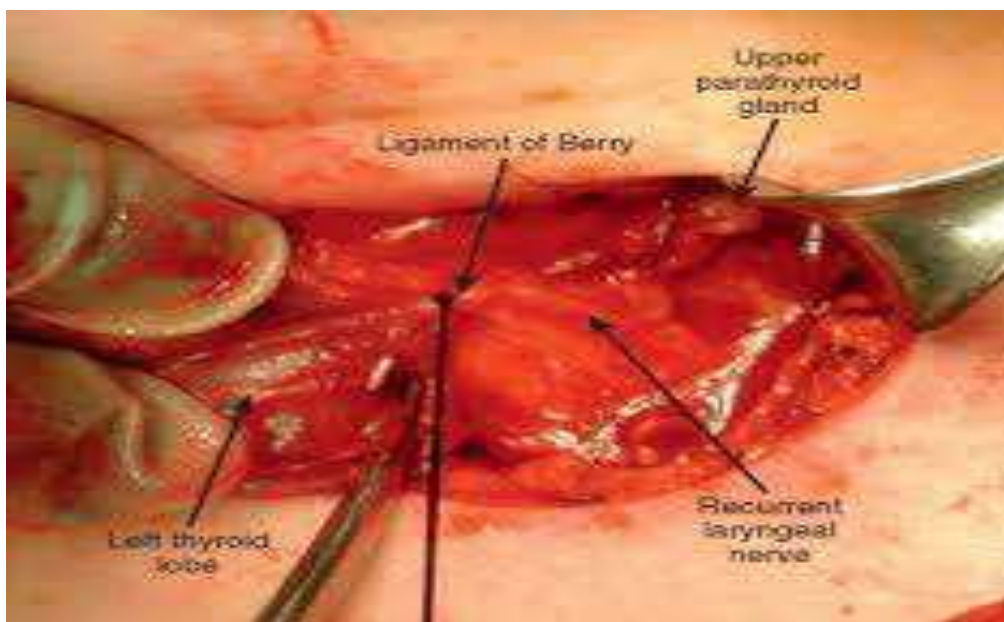
Recurrent laryngeal nerve is located in Riddles triangle

- a- Superior-inferior thyroid artery
- b- Med trachea
- c- Lateral: common carotid artery



## 10- Dissection of Thyroid

- Berrys ligament :define the posteriolateral attachment of thyroid gland .
- Plunt dissection can be used to further expose this fascia ,then with scalpel transect the ligament.
- Often minimal amount of thyroid tissue left near the entrance of recurrent laryngeal nerve into the larynx to reduce risk of injury.



## 11- Closure

Absolute hemostasis, Suction drain to thyroid bed (beneath strap muscle)  
Close loosely in layer with absorbable, sutures. Close skin with suture or clips. Check vocal cord on extubation by direct laryngoscope.

12- Post Operation Management

- 1- close follow up till fully conscious
- 2- at bed side clip remover in case of respiratory distress.
- 3- calcium gluconate in case of acute hypocalcemia.
- 4- remove : Drain :when dry 24-48hours post operatively Sutures 3-5days post operatively.

13- Complication

- a- Haemorrhage
- b- Respiratory obstruction
- c- Recurrent laryngeal nerve paralysis
- d- Hypoparathyroidism
- e- Hypothyroidism
- f- Recurrent thyrotoxicosis