**TOTAL LARYNGECTOMY**

**Indication:**
- Surgical treatment of advanced laryngeal tumors
- Recurrence laryngeal tumors

**Definition:**
Total Laryngectomy includes removal of all laryngeal and associated structures including strap muscles, from the hyoid bone and epiglottis superiorly to the tracheal rings inferiorly, with varying amounts of the hypopharynx and thyroid gland. The main disadvantage of total Laryngectomy is the permanent tracheotomy and loss of the laryngeal voice.

**Contraindications:**
- Lesions too extensive to permit complete resection of local disease
- Medical risks
- Patient refusal

**Preoperative Assessment:**
- General blood check up
- consent
- CT scan
- Antibiotics (intra-op)
- Tracheostomy
- Discuss voice rehabilitation options
- Endoscopic examination and documentation

**Steps**

1. **Preparation**
   - Trachy change to longer tube (Montandon type tube)
   - sand bag, extend the neck
   - clean lower half of face up to nipple area + trachy tube
   - can stitch the tube to skin

2. **Skin Incision**
   - mark the area, *Gluck-Sorenson U*-shaped flap (apron flap)
   The incision begins approximately 3–4 cm below the mastoid, descends to the posterior third of the sternocleidomastoid muscle, and curves to the mid line approximately 3 cm above the
internal third of the clavicle to pass parallel 2 cm above the sternal pitchfork. It is continued symmetrically toward the other side.

- Side arm extension for neck dissection
- Other incision H incision

- Give local (marcain + adrenaline)
3. Flap elevation
- cut; raise the flap sub-platysma, superiorly above hyoid bone, inferiorly supra-sternal notch, laterally mid SCM

- Stitch out of way, with silk stay suture.
  If a neck dissection is necessary, it is performed before the total Laryngectomy.

4. Mobilization of the larynx

Para-carotid tunnel
- start with medial border of SCM
- Identify IJV, carotid artery – retract laterally (take care of vagus nerve)
- divide omohyiod muscle (usually through the tendon)
- ligate the thyroid vessels
- clear down to clavicle and up to the hyoid
- ligate anterior jugular vein
  Superior thyroid pedicle ligation
- Take care of hypoglossal nerve – very close to greater horn of hyoid (if damage there will reduces swallowing performance) lies close to common facial vein where it joins the IJV.

Cut the strap muscles
- Divided inferiorly immediately above the sternum
- And superiorly just above the hyoid bone
Continue dissection through fat lateral to trachea until trachea is exposed; remove level 4 and 6 lymph node, then expose recurrent laryngeal N.
Mobilize the thyroid gland, ligate the vessels, Cut the trachea at stoma anterioly, and stitch it to skin.

**Removal of larynx**

Three different ways: from above-downward (Gluck-Soerensen’s), from below-upward (Tapia), or via a lateral approach.

Larynx is removed from above downwards (inside the larynx can be seen and there is no damage of cutting into the tumour)

Body of hyoid is grasped with heavy artery or kochers forceps and pulled forwards (retracted antero-inferiorly)

Detaching the mylohyoid muscle, geniohyoid muscle, digastric sling, and hyoglossus muscle in sequence in a medial to lateral direction.

In addition, the stylohyoidal ligament is detached from the lesser cornu
With diathermy cut through the base of tongue and enter the pharynx (care taken not to open into the pre-epiglottic space, is avoided by high pharyngeal entry) Inspect the tumour. [Palpating this area, the surgeon can note the tip of the epiglottis between his or her fingers]

When detaching the hyoglossus muscle, one must be careful to avoid injuring the hypoglossus nerve and the lingual artery

Rotate thyroid cartilage anteriorly , then Using scalpel or electrocautery, the inferior constrictor is incised 5 mm anterior to the posterior edge of the thyroid ala and cricoids cartilage

Tip of epiglottis is grasp with Allis forceps and pulled anteriorly and inferiorly.

Cut pharyngeal mucosa with scissors laterally towards the superior cornu of thyroid cartilage. [Removal of the larynx is continued along the external part of both aryepiglottic folds]

When both sides are cut, arriving at the posterior arytenoid area, the two cuts are joined below the cricoarytenoid joint, where there is a good plane of cleavage on the postcricoid area.
Stand at head of table, divide the constrictor muscle along the superior cornu of thyroid (identify that first) (can use preosteal elevator to retract it)
- Aim downward towards the arytenoid cartilage, doesn’t cut into pyriform fossa. Go to post cricoids, then dissect larynx downwards and separate it from oesophagus.

**Transection and Division of the Trachea**

- The trachea is usually transacted between the second and third ring
- Once the trachea is open, and after looking into the Subglottic space to make sure there is a sufficient inferior surgical margin, the trachea is intubated with a new, cuffed endotracheal tube that is inserted into the distal trachea for control of the airway.

**5. Repair of the pharynx**

After the larynx is removed, gloves and instruments are changed.

- Insert NG tube
- Wash the wound
- Hemostasis
- Can close in a straight-line in 3 layers [mucosal, fascial, muscular]
Damage mucosa must not be used in closure (if less mucosa can use myocutaneous flap, pec major or latissimus dorsi)

- Use vicryl 3.0
  T-shape closure (inverting sutures) the inferior part of the pharyngeal defect is closed vertically, forming a T.

With the T-closure, a combination of horizontal and vertical straight lines are used to obtain a nontensioned wound.

**Connell suture pattern**

[The suture goes through the wall from the serosa to the mucosa, then back from the mucosa to the serosa on the same side. The stitch then crosses the incision to the serosa on the other side and then repeats]

**Tracheostoma**

For tracheostoma and closure, the entire cartilaginous portion of the trachea is sutured to the inferior skin flap (with a U-incision) with interrupted sutures of 0 or 2-0 silk to widen the diameter of the tracheostoma. [without cartilage exposure]

This is best achieved by a modified vertical mattress suture that traverses (1) skin (peripherally), (2) cartilaginous tracheal wall, and (3) skin (centrally)

**6. Closure**

  Two suction tube inserted (Drain)
  Skin close in two layers
  Dressings

The specimen should be inspected to confirm the location of the tumor and to evaluate the safety margins.
Post operation care

- Antibiotic for at least 48 hours
- Pain killer
- Start L-thyroxin 100 microG, Calcium lactate 11/11 Tds (if thyroid has been removed)
- Nil my mouth for 7 days
- NG feeding – start with 50 mls water, gradually increase 100mls/h, then.....
- Oral intake is usually started on the seventh to tenth postoperative day (in non-irradiated patients) if there is no sign of wound breakdown, tenderness, or flap elevation. In previously irradiated necks is advisable to wait until the 12th–14th day post-operatively to allow a longer healing time after the pharyngeal repair.
- Ambulation
- The drains are removed when output is less than 25 ml/day for two consecutive days.
- Voice rehab
- STO day 14 for stoma and day 7 for neck.
- Remove NG, barium swallow
- Remove trachy tube – stoma button
- Trace HPE
- Refer oncology if margins not clear, lymph node involvement.
- F/U at monthly intervals during the first year, then to 2-month intervals the second year, 3-month intervals the third year, and 6-month intervals the fourth and fifth years and then yearly.
Local complications:

- Early hematoma
- Drain failure
- Infection
- Pharyngocutaneous fistula
- Bleeding
- Wound dehiscence
- Stomal stenosis.
- Pharyngoesophageal stenosis/stricture
- Hypothyroidism
- Hypocalcaemia
- others