LARYNGEAL CARCINOMA

Surgical Anatomy and patterns of spread:

- Common in old age 50–60yrs, M > F
- Third most common cancer in males.
- Anatomically 3 regions: Supraglottis, glottis and Subglottis
- Hot Potato voice, Inspiratory dyspnoea ➔ Supraglottic cancer
- Dysphagia ➔ Epiglottic cancer
- Odynophagia ➔ Cricopharyngeal sphincter
- Each region is anatomically and embryologically distinct with separate Lymphatic Channels

**SUPRAGLOTTIS:**
- Includes – arytenoids, epiglottis (laryngeal surface), aryepiglottic folds, false vocal cords and ventricles
- High lymphatics and so high propensity of Cervical Nodal metastasis. Lymph. Exit via the Thyrohyoid membrane alongside superior laryngeal vessels into JDLN

**GLOTTIS:**
- Both true vocal cords till 5mm below them
- VC is membranous anterior 3/5th (Vocalis Muscle) and cartilagenous posterior 2/5th (vocal process of arytenoid)
- Anterior Commisure lies midway between thyroid notch and lower border of thyroid cartilage in males and a little up in females
- Sparse lymphatics of true vocal cords
- Lymph from GLOTTIS AND SUBGLOTTIS pass via the cricothyroid membrane into Delphian (Prelaryngeal). Pretracheal and deep cervical nodes alongside inferior thyroid artery

**SUBGLOTTIS:**
- Mobile part – 5 mm below VC to upper border of Cricoid
- Fixed part – upper to lower border of cricoid

Pattern of Spread:
- Due to its unique embryological development and lymphatics usually tumours arising remain localised to particular sites of origin. Membranes and ligaments acting as natural barriers
- Pressman identified pattern of spread
- Spread preferentially occurs along lines of least resistance especially when connective tissue barriers are traversed by blood vessels and nerves
- **Radiotherapy is not good if there is vocal cord fixity. If VC fixed then surgery (VPL) treatment of choice always**
POTENTIAL TISSUE SPACES:

- **Reinke’s space** – Submucosal space between mucosa of glottis and underlying Vocalis muscle. Acts as a bursa for sliding of mucosa over the muscle and provides fluency of speech.
- Early glottis cancers remain superficial and thus stripping of mucosa suffices.

- **Preepiglottic Space of BOYER:**
  - Bounded by:
    - Anteriorly – Thyrohyoid membrane
    - Superiorly – Hyoepiglottic ligament
    - Inferiorly – Thyroepiglottic ligament
    - Posteriorly – Epiglottis
  - Rich in lymphatics and Resistant to radiotherapy as sparse blood supply.
  - Involvement directly puts staging to T3.
  - Space continuous on either side with paraglottic space.

- **Paraglottic Space:** Paired
  - Bounded by:
    - Laterally – Thyroid Ala
    - Medially – Conus elasticus
    - Superiorly – Ventricle and quadrangular membrane
    - Posteriorly – pyriform sinus
  - Contains **Thyroarytenoid** muscle. Infiltration of this space causes fixity of vocal cords.
  - Inferolaterally gap between cricoid and thyroid and so **propensity for extralaryngeal spread**.

SUPRAGLOTTIC TUMOURS:

- Preferential spread upwards to base of tongue and rarely involve below false cord.

EPIGLOTTIC TUMOURS:

  - SUPRAHYOID EPIGLOTTIS
  - INFRAHYOID EPIGLOTTIS

- Suprahyoid – Exophytic lesions and bulky proliferative masses with minimal underlying invasion. Tend to be overstaged.
- Infrahyoid – Infiltrative, may grow circumferentially to involve false cords, aryepiglottic folds, medial wall of pyriform sinus and pharyngoepiglottic folds (lateral Glossoepiglottic fold).
- Preepiglottic space involvement is common (**Radioresistant**).
- Epiglottic tumours rarely invade thyroid cartilage, implies transglottic spread and an absolute contraindication for Supraglottic laryngectomy.

TUMOURS OF FALSE CORD –

- Anterior commissure acts as barrier for tumour spread (Vocal ligament, Thyroepiglottic ligament, conus elasticus and inner perichondrium of thyroid ala).
- Can involve above i.e. epiglottis, posteriorly aryepiglottic folds n arytenoids and anteriorly the anterior commisure.
TUMOURS OF VENTRICLE –

Paraglottic, Radioresistant, submucosal spread to medial wall of pyriform fossa. Most are transglottic at presentation

TUMOURS OF ARYTENOIDS AND ARYEPIGLOTTIC FOLDS:

- These tumours behave like pyriform fossa malignancies and are called MARGINAL ZONE CANCERS
- Post cricoid spread is common.

GLOTTIC CANCERS:

- Most arise from anterior 2/3rd (membranous part of VC)
- Barriers – Reinke’s space and anterior commissure
- Initial spread occurs horizontally and vertical spread occurs late.
- Inferior spread is limited by conus elasticus which is barrier btw glottis and Subglottis.
- Vertical spread directly upstages tumour to T2 and usually subglottic
- Deep lateral invasion occurs in paraglottic space.
- Cartilagenous portion rarely involved but involved in metastatic tumours from other sites.
- Degree of vertical spread imp to plan conservative hemilaryngectomy and critical cut off is limited to cricoid cartilage which lies 10mm anteriorly and 5mm posteriorly
- Primary posterior lesions of glottis are rare but may be involved in secondaries from other sites.

ANTERIOR COMMISURE LESIONS:

- Uncommon
- The anterior commissure is directly attached to the thyroid cartilage without intervening tissues by the Broyle’s ligament. So early cartilage involvement occurs via this
- Tumour spreads superiorly involving base of epiglottis whereas inferiorly tumour exits the cricothyroid membrane.
- If tumour extends from the vocal cords onto the lower portion of the epiglottis at the anterior commissure, the risk of thyroid cartilage invasion is extremely great

SUBGLOTTIC TUMOURS:

- < 1 % of all laryngeal tumours
- Spread along entire circumference of Subglottis
- Cricoid cartilage involvement early as no intervening muscle layer.
- Presenting feature in subglottis also is fixity of vocal cords
- Total Laryngectomy is Rx of choice

TRANSGLOTTIC MALIGNANCY:

- Tumours that involve both supraglottis and glottis across the ventricle with cord fixity are called transglottic malignancy. Can be supra to glottis or glottic spreading to supra.
- Advanced at presentation
- Cartilage involvement early, VC fixity and near total or total laryngectomy
- Tumours of supraglottis can occasionally become traneglottic by ant commisure involvement, invade cartilage early via broyle ligament.
Posterior extension tumours become transglottic by cricoarytenoid joint affection or Interaarytenoid area. Extralaryngeal spread via cricothyroid membrane or thyrohyoid membrane.

**PYRIFORM SINUS** (Smugglers fossa)

- Bounded by:
  - Laterally – Mucosa covering lamina of thyroid cartilage
  - Medially – Arytenoids and aryepiglottic folds above and cricoid cartilage below
  - Superiorly – *Lateral glossoepiglottic folds* (pharyngeoepiglottic folds)
  - Inferiorly – Oesophagus

  No anatomical compartments and so tumour spreads aggressively

  Sub mucous spread and so can’t be seen superficially much and hence resection margins mapped out in **cm and not mm**

  Apex situated at level of cricoid and close to paraglottic space

  Spread:
  - Anteriorly – Paraepiglottic space, Preepiglottic space
  - Posteriorly – Postcricoid region, cricothyroid joint, extralaryngeal involvement
  - Medially – Arytenoid, cricoarytenoid and subglottis

**Diagnosis and imaging**

**SUPRAGLOTTIC MALIGNANCY**:

- Present late, Usually a metastatic LN
- Suprahyoid – overstaged and early diagnosed, non infiltrative
- Pain (epiglottic), difficulty in swallowing (Cricopharyngeal sphincter involvement), FB sensation, stridor, hoarseness, change of voice (hot potato voice), and aspiration (epiglottic Ca causing failure of laryngeal closure or **Ca pyriform fossa involving superior laryngeal nerve causing sensory loss**)  
- Lymphadenopathy common.

**GLOTTIC**:

- Early presentation
- Voice change mainly, Lymphadenopathy rare, stridor, hoarseness

**SUBGLOTTIC**:

- Very uncommon and advanced presentation.
- Can involve entire circumference of trachea and result in stridor
- 90% of laryngeal cancers are SCC that involve mucosa and so visible on surface
- **Mobility of VC is the single most important factor to decide choice of treatment**
- Direct Laryngoscopy is gold standard for diagnosis.
**IMAGING TECH.**

- **Barium Swallow** of hypopharynx and upper oesophagus delineates lesions of pyriform sinus, post pharyngeal wall and post cricoid area.
- Imaging techniques are very helpful for evaluating the depth of tumour.
- **CT** –
  - Axial plane so accurate in judging vertical and lateral spread of tumour
  - Particularly lesions of the anterior commissure and Subglottic region
  - Paraglottic space is better visualised with CT
- **MRI** –
  - Preepiglottic space and base of tongue
  - Superior than CT for Cartilage

**STAGING**

TNM

**SUPRAGLOTTIS:**

- T1 ➔ 1 subsite with normal VC mobility
- T2 ➔ Multiple with normal VC
- T3 ➔ Tumour limited to Larynx with VC fixation OR involvement of Preepiglottic space, post cricoid region, medial wall of pyriform sinus
- T4 ➔ Extralaryngeal extension, destruction of thyroid cartilage, involvement of oropharynx or soft tissues of neck.

**GLOTTIS:**

- T1 ➔
  - T1a – one VC
  - T1b – both VC but no fixation yet
- T2 ➔
  - T2a – Supra or subglottic spread
  - T2b – impaired cord mobility
- T3 ➔ Tumour limited to Larynx with VC fixation
- T4 ➔ Extralaryngeal extension, destruction of thyroid cartilage, involvement of oropharynx or soft tissues of neck

**SUBGLOTTIS:**

- T1 ➔ limited to subglottis
- T2 ➔ extending to VC with normal or impaired mobility
- T3 ➔ Tumour limited to Larynx with VC fixation
- T4 ➔ Extralaryngeal extension, destruction of thyroid cartilage, involvement of oropharynx or soft tissues of neck
N common of all
N1 – < 3 cm Single Ipsilateral
N2 –
  - N2a – Ipsi single 3 – 6 cm
  - N2b – Ipsi Multiple 3 – 6 cm
  - N2c – Contralateral or bilateral 3 – 6 cm involvement
N3 – > 6 cm
M1 – Distant metastasis

**STAGING ::**
Stage 0 – TisNoMo
Stage 1 – T1MoNo
Stage 2 – T2NoMo
Stage 3 –
  - T3NoMo
  - T1N1Mo
  - T2N1Mo
  - T3N1Mo
Stage 4 – T4NoN1Mo
  - Any T N2N3 M0
  - Any T any N M1

So if N1 then directly 3 or 4 and if N2 directly goes to stage 4

**Treatment decisions**

As a general rule if no VC fixity Radiotherapy gives best results (except pre and para epiglottic space lesions)
RT alone not to be given in Pre para involvement, VC fixity, Cartilage invasion, paralaryngeal soft tissue invasion, young indivisual, CIS of glottic cancer, Purely anterior commisure lesions (surgery preferred)
Supragottic cancers N stage more important for treatment whereas glottis T stage more important
Also influenced by general health and pulmonary reserve
Age – don’t use radio on young
Voice Quality – Best Radiotherapy > CO2 laser > Laryngofissure surgery

**Glottic Cancers**
Radiation avoided for CIS. CO2 laser OR Microlaryngoscopic stripping used.
Surgery RxOC in young, verrucous lesions, advanced lesions, patients refusing radiation or unavailability
T1 – Mid cord lesions – Cure rates >90%
  - Radiotherapy
  - Endoscopic transoral CO2 laser coredectomy
  - Laryngofissure surgery and Cordectomy with temporary tracheostomy
Site specific treatment options in T1 glottic cancer

Cord lesions
- Cord lesion extending to anterior commissure
- Anterior commissure lesion

1. Radiotherapy
2. Endoscopic CO2 laser cordectomy
3. Laryngolhsure & cordectomy

(VPL – Vertical Partial Laryngectomy)

- Cord lesions Involving anterior commissure –
  - Radiotherapy – (wedging technique & uniform isodose curves)
  - VPL (frontolateral)
  - Endoscopic CO2 laser excision (only under expert hands)

- Anterior Commissure lesions –
  - VPL (Frontal)
  - Radiotherapy (cartilage invaded early so not a good option as early cartilage invasion is difficult to diagnose also and thus only radiation may lead to recurrence)

T2 lesions –
- T2a – Radiotherapy with regular follow up
- T2b – VPL / Supracricoid laryngectomy with CHEP (Crico-hyoidoepiglottopexy)
- RRSS (Radical radiotherapy and salvage surgery)

T3 and T4 –
- Total Laryngectomy / near total laryngectomy / extended partial laryngectomy
- RRSS

Treatment Options in T1 Glottic Cancer:

- T1a (Cord freely mobile)
  - Radiotherapy
  - VPL

- T1b (Impaired cord mobility)
  - VPL / Supracricoid laryngectomy with CHEP
  - RRSS

VPI = Vertical Partial Laryngectomy
CHEP = Crico-hyoidoepiglottopexy
RRSS = Radical Radiotherapy & Salvage Surgery for Radiotherapy failures
SUPRAGLOTTIC LESIONS:

- MOBILE CORDS AND NO CARTILAGE INVASION
- T1, T2 and those T3 where though Preepiglottic space involved but no cord fixity, Rx depend on nodal mets, age, pulmonary reserve, general health and subsite.
**Partial Laryngectomy**

**Transoral endoscopic resections**
- Once anterior commissure involved or deeper laryngeal spaces namely paraglottic space or Preepiglottic space invaded, Transoral endoscopic excision is oncologically unsafe.

**Open partial laryngectomies**
- Faesable because of embryological compartmentalization of larynx and ability of larynx to function physiologically after such resections.
- Cricoid is the rostrum on which the entire larynx rests and resection of even a part of this leads to complete collapse of larynx.
- Arytenoid is essential as a basic functioning unit of larynx, phonation, aspiration prevention all depend on it.
- Hence partial laryngectomy (voice and nasal respiration) → intact cricoid ring and atleast one mobile vibrating arytenoid utmost important.
- Thus only subglottic extension > 10mm anteriorly and 5 mm posteriorly is CI for conservative procedures.
- Interarytenoid or retroarytenoid involvement also necessitates resection of both arytenoids.
- For Sphincteric action → innervation necessary so Subglottis → save RLN and for supraglottis atleast one SLN
- Aim of reconstruction is to maintain AP diameter to prevent stenosis & posterior glottic bulk normally provided by arytenoids maintained to avoid aspiration and good quality of voice.
CONTRAINDICATIONS FOR VOICE CONSERVATION INCLUDE:

- Subglottic extension (> 5mm posteriorly and > 10mm anteriorly)
- Interarytenoid involvement
- Retroarytenoid involvement
- Lesion too close to cricoid cartilage
- Arytenoid joint inv bilaterally
- Arytenoid involved bilaterally
- Loss of nerve supply bilaterally

GLOTTIC CANCER CONSERVATIVE SURGERIES

- Report early so usually localised disease and thus mostly conservative approach used
- LARYNGOFISSURE WITH CORDECTOMY:
  - Involved cord + ipsilateral soft tissue resected, thyroid cartilage divided for approach but not resected.
- VPL i.e. VERTICAL PARTIAL LARYNGECTOMY:
  - Vertical segment of thyroid cartilage + Cord lesion + intervening paraglottic space.
  - Procedure can be extended in anterior commissure and/or arytenoids.
- SUPRACRICOID LARYNGECTOMY WITH CHEP:
  - Entire thyroid cartilage + involved portion of glottis + paraglottic tissues

LARYNGOFISSURE WITH CORDECTOMY:

- Now replaced by CO2 laser cordectomy
- INDICATIONS:
  - Mid cord lesions
  - T1 lesions
  - No impairment of vocal cord mobility
  - No anterior commissure involvement
- PROCEDURE:
  - GA through tracheostomy ➔ Midline thyrotomy (incision from thyroid notch to inferior border of thyroid cartilage) ➔ Incision through cricothyroid membrane and larynx entered ➔ Anterior cut placed 2 to 3 mm posterior to anterior commissure and posterior cut anterior to arytenoid cartilage ➔ Superior resection line above false vocal cords and inferiorly lower border of thyroid cartilage.
  - The resultant mucosal defect is left to heal by granulations. In weeks dense fibrous pseudocord forms making it difficult to differentiate from true cord.
  - Tracheostomy usually closed in a week.
  - Procedure well tolerated as doesnt cause aspiration.
  - Neither disturbs nerve supply nor pharyngeal musculature.
  - Cure rates 84-98%

VPL (Vertical Partial Laryngectomy aka Vertical Hemilaryngectomy)

- Described by Billroth
- INDICATIONS:
  - Impaired cord mobility glottic cancers
  - Anterior commissure involved
Extension to the anterior surface of arytenoid can be resected with VPL.

**Resection depends on part of glottis involved:**
- **HEMILARYNGECTOMY** ➔ cord lesion without anterior commissure or arytenoid involvement.
- **FRONTAL** ➔ Anterior commissure lesion
- **FRONTOLATERAL** ➔ Cord + anterior commissure
- **EXTENDED HEMILARYNGECTOMY** ➔ Cord lesion involving arytenoid
- **SUBTOTAL BIFRONTAL HEMILARYNGECTOMY** ➔ Horse shoe lesion involving both VC but sparing arytenoids.

**ELIGIBILITY CRITERIA FOR VPL**

1. One VC + Anterior commissure + Not more than 1/3rd of opposite cord involved
2. Only extension till vocal process of arytenoid.
3. Subglottic Extension with not more than 10mm anteriorly and 5mm posteriorly
4. If paraglottic extension then should not cross ventricle above and has minimal subglottic extension which will allow a clear margin of resection above the cricoid cartilage.
5. Cancer of true vocal cord with no involvement of the thyroid cartilage.
6. RT failure in early lesion i.e. RT lesion as well as residual lesion both satisfy eligibility criteria for VPL.

**PROCEDURE**

- Full thickness en block resection of involved portion of glottis along with overlying segment of thyroid cartilage and intervening paraglottic tissues.
- Upper margin of resection includes segment of false cord and lower margin above cricoid cartilage
- GA via tracheostomy ➔ Horizontal incision over thyroid from one SCM to other ➔ strap muscles separated exposing larynx ➔ reflect perichondrium on both sides of thyroid cartilage ➔ 2 vertical thyroid cartilage cuts depending on lesion ➔ **entry via cricothyroid membrane** ➔ first cut across glottis on less involved site ➔ Epiglottis and both superior laryngeal nerves preserved.

**RECONSTRUCTION**

- **Reattachment of remnant vocal cords** ➔ the C/L true cord should be anchored to thyroid or soft tissue to keep it taught.
- **Mucosal defect** ➔ need not be reconstructed in most cases except in FRONTAL or FRONTOLATERAL laryngectomies as we have to prevent anterior fusion of two sides with resultant stenosis.
  - Done using sialistic keel. Removed after 2 to 3 weeks
  - For Subtotal bifrontal laryngectomy epiglottis used for reconstruction as mucosa lining of epiglottis is consistent with mucosa of remaining larynx. Epiglottis sutured to defect using tensionless interrupted vicry sutures
  - Epiglottic recon. ➔ distressing aspiration

- **Reconstruction of resected arytenoid** ➔ if posterior glottic bulk not restored ➔ poor voice quality and aspiration
  - Muscle, tendon, fat, cartilage, epiglottis can be used
  - Most prefer use of remnant thyroid cartilage
Raw area is resurfaced with mucosa of adjacent pyriform fossa.

**COMPLICATIONS:**
- Aspiration, poor voice quality, cartilage necrosis, laryngeal stenosis.

**SUPRACRICOID LARYNGECTOMY WITH CHEP ie CRICOHYOIDOEPIGLOTTOPEXY**
- Paraglottic spread with more likeliness of thyroid cartilage invasion
- **VPL removes only part of thyroid cartilage but CHEP removes full thyroid cartilage**
- It is essential that Preepiglottic space is free of tumour as laryngeal entry superiorly is via the transepiglottic incision which cuts across the Preepiglottic space.
- Cricoid, Hyoid and Suprahyoid portion of epiglottis (maintains sphincteric action, prevents aspiration), SLN b/l is preserved.

**INDICATIONS**
- Immobility or fixity of vocal cord (usually due to paraglottic inv of Thyroarytenoid) in presence of mobile arytenoid
- Ie absent cricoarytenoid joint involvement
- Horseshoe lesions involving more than 1/3rd of C/L cord. Even VPL ie subtotal bifrontal laryngectomy can be tried but resection will necessitate mucosal reconstruction.

**CONTRAINDICATIONS**:
- Involvement of preepiglottic space
- Involvement of cricoarytenoid joint
- Subglottic extension involving cricoid
- Poor pulmonary reserve
- Poor general health of patient

**ADVANTAGES OVER VPL**
- Entry in VPL via cricothyroid membrane and so limited exposure. In Supracricoid laryngectomy entry via epiglottis above and cricothyroid membrane below both so **EXCELLENT EXPOSURE**
- Removal of thyroid cartilage has added oncological safety.
- It also preserves **nasal respiration and speech**.

**SUPRAGLOTTIC Ca PROCEDURES**
- MC i.e. 69% of all laryngeal cancers
- Marginal zone and suprahoid Ca more common than others
- Rarely invade thyroid cartilage or cross ventricle to involve glottis
- Spread upwards, involve preepiglottic space, valleculae, base of tongue usually

**HORIZONTAL SUPRAGLOTTIC LARYNGECTOMY**
- False cords, epiglottis, Preepiglottic space and upper 1/3rd of thyroid cartilage.
- Hyoid bone included in resection when Preepiglottic space is grossly infiltrated.
- Done for endolaryngeal lesions with mobile VC.
EXTENDED SGL

- I/L arytenoid, base of tongue, valleculae, pyriform sinus

INDICATIONS

- **Cord mobility** is an important prerequisite for SGL
- Once paraglottic involvement occurs tumour becomes Transglottic and SGL cannot be done
- Infrahyoid epiglottic lesions (as high propensity for preepiglottic space involvement) with mobile cords
- N2 N3 disease.
- Suprahyoid lesions where radiotherapy CI as in young patients and CO₂ laser unavailable

CONTRAINDICATIONS

- VC fixity
- Poor pulmonary reserve
- Involvement of thyroid cartilage
- Involvement of pyriform sinus upto apex
- Involvement of interarytenoid or retroarytenoid region
- Involvement of post cricoid region
- Extensive involvement of base of tongue.

PROCEDURE:

- GA via tracheostomy → 1 SCM to other horizontal incision → only perichondrium incised along upper border and reflected down → save perichondrium as assists in closure → cuts made in thyroid cartilage → avoid injury to anterior commissure as it may lead to permanent diff in speech and swallowing → save hyoid if limited spread to preepiglottic space allows early rehabilitation and more secure closure → in endolaryngeal central tumours only middle third of hyoid resected → one sided disease divide hyoid at junction of body and lesser cornu which helps preserve SLN → min one SLN has to be preserved →
- Excision of tumour → **Transvallecular approach** except in extended where even valleculae involved → epiglottis pulled downwards → aryepiglottic folds divided anterior to arytenoids → dissection continued inferiorly through ventricles → preserving true vocal cords → false removed

RECONSTRUCTION

- **Cricopharyngeal myotomy** can be performed to facilitate postop swallowing
- Closure performed by suturing cut edge of pyriform mucosa below to oropharyngeal mucosa above starting laterally then going medially.
- As region of resected supraglottis approached, primary mucosal closure is not possible
- Now approximate upper end of remaining thyroid cartilage to base of tongue using 3 or 4 strong nonabsorbable sutures.
- Thyroid perichondrium which was preserved acts as second layer of closure

EXTENDED SUPRAGLOTTIC PROCEDURES

- **ARYTENOID RESECTION** → Partial or complete → if complete carefully dislocate cricoarytenoid joint to prevent injury to recurrent laryngeal nerve → I/L vocal cord medialized
and anchored to cricoid cartilage → lower plane of anaesthesia induce cough and check → sometimes if extensive resection then posterior glottic bulk is maintained by using cartilage or muscle → raw area resurfaced using pyriform mucosa

BASE OF TONGUE/VALLECLAE RESECTION → ENTRY VIA UNINVOLVED VENTRICLE inferiorly → progress posteriorly → atleast one half of base of tongue has to be preserved along with blood supply → if direct closure not possible due to excess loss of soft tissue use PMMC flap.

RESECTION OF LATERAL WALL OF PYRIFORM SINUS :
- Lateral wall + posterior and lateral wall of pharyngeal mucosa. Closure requires PMMC

COMPLICATIONS OF SGL :
- Aspiration (can be prevented by preserving SLN), other surgical technique described are the cricopharyngeal myotomy and suspension of larynx via mandible
- Pharyngocutaneous fistula is a rare complication.

POSTOPERATIVE CARE
- Nasogastric tube feeds started 24 to 48 hrs following surgery.
- 4 to 5 days later when oedema decreases tracheostomy tube corked and nasal respiration is encouraged.
- Once tracheostomy tube removed subglottic pressure rises and decreases cough and decrease chances of aspiration.
- After 1 week → oral feeds
- After 2 to 12 weeks later → normal deglutition
- Majority of SG cancers are Marginal zone
- Seen mostly in elderly
- Neck mets very common so Rx with radiotherapy of neck.

PROCEDURES FOR TRANSGLOTTIC CANCER
- Transglottic aka transventricular cancers
- Total or near total laryngectomy with permanent tracheostomy
- Only in select few extended partial laryngectomy is feasible (vertical and horizontal laryngectomy combinations).
- Voice Conservation Procedure for transglottic cancers include →
  - Three Quarter laryngectomy
  - Supracricoid laryngectomy with CHEP
  - Minimum intact cricoid ring and atleast one functioning arytenoid.

THREE QUARTER LARYNGECTOMY :
- Vertical Hemilaryngectomy + SGL

INDICATIONS
- SG cancers spread to glottis and vice versa

CONTRAINDICATIONS
- Subglottic involvement
- Cord fixity due to cricoarytenoid joint involvement
- Thyroid cartilage invasion
Interarytenoid or postcricoid involvement

**RESECTION:**
- Body of Hyoid + thyroid cartilage + Preepiglottic space + I/L true vocal cord + Paraglottic space and I/L arytenoid if involved.

**GLOTTIC RECONSTRUCTION**
- Important to reconstruct ipsilateral VC for maintenance of functional laryngeal aditus.
- **RECONSTRUCTION USING MUSCLE FLAP**
  - *Sternohyoid muscle* → Sutured as close to C/L cord and covered with pyriform mucosa flap.
  - Cartilage flaps better as muscle flaps can contract during healing thus distorting glottic architecture and competence
- **USING CARTILAGE**
  - Remaining thyroid cartilage can be restructured and refashioned to form i/l cord.
  - Cartilage can be used as free graft or pedicled flap
  - Free grafts like muscle flaps may contract during healing get dislodged
  - Pedicled cartilage flap → corner of ipsi or contra thyroid cartilage along with attached constrictor muscle or simple fold over of the ipsi thyroid cartilage remnant.

**SUPRACRICOID LARYNGECTOMY WITH CHP**
- Best suited for Transglottic cancers that have no extension into the pyriform or the base of tongue.
- THYROID INVASION is NOT a CI for the procedure 😞 😞
- Entire thyroid + Pre + Paraglottic space + epiglottis resected
- Cricoid + Hyoid and atleast one arytenoid preserved

**INDICATION**
- Transglottic
- Paraglottic spread with mobile arytenoids
- Thyroid invasion
- Anterior commisure involvement

**CONTRAINDICATIONS**
- Cricoarytenoid jt involved
- Subglottic extension > 10mm anteriorly and 5 mm posteriorly
- Involvement of base tongue, valleculae, hyoid bone cant be saved as in massive preepiglottic space involvement
- Involvement of pyriform sinus
- Post cricoid and interarytenoid regions
- Prior tracheostomy is incompatible with procedure.

**PROCEDURE**
- Preop tracheostomy **AVOIDED** as level of the tracheostome will change after the reconstructive procedure is complete.
- Here anaesthesia is administered via Orotracheal tube.
- **Freeing mucosa of pyriform sinus and dislocation of cricothyroid joint**
- Inferior constrictor muscle along with the perichondrium of the thyroid cartilage is incised along the posterior border the thyroid cartilage → mucosa of pyriform fossa is then freed from the
cartilage using periosteum elevator ➔ cricothyroid joint is gently dislocated taking care to avoid injury to RLN and steps repeated on opposite side.

**DISSECTION OF PREEPIGLOTTIC SPACE**

The periosteum along the inferior border of hyoid bone is incised and stripped off its posterior surface. Hyoid bone preserved

**RESECTION OF TUMOUR**

- Larynx entered through VALLECULAE above and cricothyroid membrane below.
- Endotracheal tube passed via cricothyroid incision.
- Incision is along the aryepiglottic fold to superior border of cricoid cartilage
- Second cut between thyroid cartilage anteriorly and freed pyriform mucosa posteriorly.

**RECONSTRUCTION**

- The arytenoid cartilage if partially resected is fixed to the posterolateral border of cricoid cartilage
- Cricoid to hyoid via 1-0 prolene sutures
- To avoid tension on suture line the cervical and mediastinal trachea is mobilized using finger dissection anteriorly and laterally.
- Temp tracheostomy now made and closed after 4 days. Swallowing is promoted after one week ➔ pureed diet ➔ remove nasogastric tube

**CO₂ LASER EXCISION**

- Precise, haemostasis, postop oedema less
- Single sitting Rx (Radiation around 6 weeks treatment)
- Resection performed as a day care procedure. No tracheostomy required. And if treatment remains inadequate RT and surgery can still be done

**INDICATIONS**

**BENIGN LESIONS**

1. Vocal Nodule/polyp
2. Vapourization of papillomas
3. Laryngeal web release or post intubation stenosis
4. Arytenoidectomy in bilateral cord palsy.
5. Rienkes edema

**PRE MALIGNANT / MALIGNANT LESIONS**

- Early T1 T2 lesions of glottis
- Keratosis / dysplasia of VC and Ca in situ
- Supraglottic cancer confined to free border of epiglottis and aryepiglottic fold.
- Localised recurrent or residual disease following RT failure
- Avoiding Tracheostomy in patients undergoing RT, residual disease.
- With experience even T2b - T3 lesions can be treated with CO₂ laser

**PROCEDURE**

- Transorally using suspension laryngoscope and microscope
- Laser beam focussed on a spot size and manipulated using micromanipulator to permit precise excision in a relatively bloodless field.
Monobloc or multibloc resection based on area involved (avoids excessive sacrifice of normal tissue).

Fibrosis due to previous neck surgery, prior radiotherapy, large tongue etc may prevent adequate exposure and thus CO2 laser not preferred.

CO2 laser is an excellent cutting tool but limited coagulation capability.

Minor ooze controlled thus with a defocussed laser beam or usually a adr. cottonoid.

For arterial bleeds, electrosurgery is must usually required for supraglottic lesions.

ET tube wrapped with reflective aluminium foil to avoid combustion of inhaled gases.

Soaked cotton pledgets kept in larynx to prevent thermal damage.

Wear goggles to protect eyes.

Involvement of Anterior commisures, vocal process of arytenoid. Asso with higher recurrence so CO2 avoided.

Early supraglottic lesions are more demanding for laser excisions as exposure not adequate, haemostasis is a problem, defining margins difficult. Ideal lesion is one localised in free margin of epiglottis without involving base or small lesion of aryepiglottic fold.

CO2 laser can also be used to create an airway in advanced laryngeal cancer to avoid tracheostomy prior to definitive RT or surgery.

NEAR TOTAL LARYNGECTOMY:

Aka Pearson's procedure, extended vertical laryngectomy, subtotal laryngectomy or Parsimonious laryngectomy. When pyriform fossa mucosa also removed its called NTL pharyngectomy and if more extensive resection of pharynx with flap reconstruction then called Extended NTLP.

Preserves voice but not nasal respiration.

Too extensive for partial laryngectomies but have sufficient laryngeal mucosa left with nerve supply to form a shunt which diverts air into the pharynx for production of lung powered speech.

C/l RLN with arytenoid + Segment of cricoid forming cricoarytenoid joint + strip of posterior tracheal wall leading upto permanent tracheostome are preserved.

This innervated laryngeal remnant is fashioned in a sphincteric tube large act as a dynamic shunt for voice production by diverting air from trachea to pharynx.

So like total laryngectomy there is an end tracheostome which needs occlusion for voice production.

INDICATIONS

Subglottic extension
Involvement of pyriform apex.

Interarytenoid, retroarytenoid and postcricoid region must be free.

NTL may be done in patients on grounds of poor pulmonary reserve as an alternate to SGL.

CONTRAINDICATIONS:

Inter, retro arytenoid or post cricoid involvement
Mucosal involvement of > half of length of C/l cord anteriorly as this does not allow preservation of sufficient laryngeal remnant for shunt formation.

Prior radiotherapy relative CI if tissues oedematous.
PROCEDURE:

RESECTION

- Strap Muscles, I/L thyroid cartilage, thyroid lobe, I/L cricoid cartilage ring, upper tracheal rings resected
- Preepiglottic space, epiglottis, hyoid, if necessary valleculae resected
- I/L VC with involved C/L cord resected
- RLN needs preservation which innervated myomucosal shunt.
- Preop tracheostomy
- TRANSVALLEULAR entry / through uninvolved ventricle as told by pearson
- Mucosa of Interarytenoid region and over posterior cricoid lamina in incised, posterior cricoid lamina fractured in midline carefully avoiding damage to post cricoid mucosa.
- Resection completed saving one arytenoid with posterior tracheal wall between arytenoid and tracheostome.

CONSTRUCTION OF SHUNT

- 14F Foley’s or No 6 red rubber catheter used as a stent, adequate size and prevents blockage of shunt. Airway diameter formed by this is 6mm which is important to generate adequate subglottic pressure for phonation.
- Catheter passed through nostril via shunt and taken out via tracheostome

PHARYNGEAL RECONSTRUCTION:

- Neopharynx is closed as in total laryngectomy. Care taken near neoglottis to avoid post op pharyngocutaneous fistula.
- Patch pharyngoplasty using PMMC done in cases of extensive resection

POSTOP MANAGEMENT:

- Rubber tube used as as a stent is removed 24 to 48 hours after surgery.
- Once by 7th postop day wound completely healed and no salivary leak then oral feeds are started.
- Tracheostomy tube used only if tendency of stoma towards stenosis
- Speech after 3 to 4 weeks
- Allow suture wounds to heal
- In case of shunt stenosis dilate using bougies

VOICE PRODUCTION:

- Lung powered speech
- Unless shunt breakdown or stenosis

ADVANTAGES OF NTL OVER TEP:

- Quality of voice is superior
- TEP requires a Blom Singer prosthesis
- Cost 1500 to 3000 and lasts only few months
- Postoperative RT is difficult to tolerate in TEP.
COMPLICATIONS:
- Stent stenosis, aspiration, pharyngeal leak.

MANAGEMENT OF NECK IN LARYNGEAL CANCERS

Involvement of nodes decreases survival by 50 percent.
- Patients of SCC respond well to Chemotherapy (Cisplatin)
- RATIONALE OF CHEMO:
  - Many patients receiving and BENEFITTING from chemo might benefit well with radio and can replace radical surgery as chosen Rx and thus laryngeal preservation
  - Anterior chemotherapy may be used to reduce tumour burden before definitive therapy (patients experience relief in stridor, improvement in voice, and symptomatically better prior to radiation)
  - Thirdly, Chemo reduced tumour bulk and so patients for total laryngectomy might land up for Partial laryngectomy and laryngeal preservation.

LARYNX Preservation Plan

Anterior Chemotherapy (2 Courses)
- Responders
  - Definitive RT
    - Definite:
      - Complete Response (Larynx preserved)
      - Residual/Recurrence
        - Surgical salvage laryngectomy
- Non Responders
  - Surgery ± postoperative RT
SPEECH RESTORATION:
- MC is Oesophageal speech
- Patient swallows air into oesophagus by oropharyngeal trapping. Air released and exhalation across pharyngoesophageal mucosa produces sound by the apposition of mucous membranes.
- Electronic devices
- TEP problems - aspiration, tissue breakdown, infection, stenosis
- Shunt procedures better
- Blom singer prosthesis is 3.3mm in diameter and is retained in the oesophagus by a circular flange or collar in TEP. The Duck bill valve is easier to introduce but offers more resistance to airflow.
- About 40% if TEP do not develop prosthesis.
- There can be primary or secondary TEP. Rarely done now
  TEP PROCEDURE NOT MADE NOTES

HYOPHARYNGEAL MALIGNANCY

AETIOLOGY
- Smoking
- Alcoholism
- Inadequate intake of fruits and vegetables
- Saturated fatty acids
- Lack of vitamins (C and E)
- Immune mediated
- Increased exposure to welding fumes
- Exposure to polycyclic aromatic hydrocarbons was associated with oesophageal cancer
- Radiation exposure
- Smoking and alcohol have multiplicative effect
- HPV 16 and 18 have been implicated (p53 underexpression by stabilizing its protein)

EPIDEMIOLOGY
- Pyriform fossa 43%
- Post cricoid 43%
- PPW 9%
- Cervical esophagus
- F:M = 2:1
- Postcricoid cancer is associated with Patterson browne Kelly syndrome

BENIGN TUMOURS AND OTHER NON NEOPLASTIC LESIONS
- Leiomyomas, fibrolipomas and papillomas, and carcinoma in situ
- Once diagnosed they are usually readily dealt with endoscopically or occasionally by lateral pharyngotomy.
Nasogastric tube syndrome
Acquired stenosis of hypopharynx

MOLECULAR AND CELL BIOLOGY OF HYPOPHARYNGEAL CANCER

- Amplification of Chr 11q13
- Loss of tumour suppressor genes eg p53 (pathological stabilization of the p53 protein)
- Increased Ki67 is a proliferation marker expressed in the G1 and S phase of the cell cycle. Cells with high proliferation had a lower five year survival than patients with low proliferation.
- Loss of retinoblastoma (Rb) tumour suppresser gene.
- Overexpression of growth factor receptors or over secretion of growth factors may be considered as oncogenic events
- EGFR (epidermal growth factor receptor) overexpression in 30% patients
- Bax is proapoptotic and Bcl2 is antiapoptotic. (Bax expression is reduced)
- Cytokeratine 18 particularly appears to be expressed in nearly all cancers arising from the hypopharynx and larynx.
- Cathepsin-D over expression (degrades extracellular matrix allowing tumour invasion and mets) Is a potential independent predictor of cervical node metastases.
- Matrix-metalloproteases (MMP) also degrade the matrix. MMP 9 important. And under expression of its inhibitor TIMP 1.
- Cancer cells largely fail to express relevant MHC antigens necessary for an effective host response to the tumour.
- Increased Acute Phase Proteins regulated by IL6.

HISTOLOGY

- Most SCC Non Squamous are only 3.5%.
- Of the squamous cell carcinomas, the majority (70 percent) are moderately or well differentiated.

ANATOMY:

- Triangular space from Hyoid to cricoid
- Consists of : Pyriform sinus, pharyngeal wall and post cricoid region

PYRIFORM FOSSA

- Inverted pyramid.
- Superiorly ➔ Pharyngoepiglottic fold
- Inferiorly ➔ Apex at level of cricoid and continues with oesphagus
- Laterally ➔ Thyroid ala
- Medially ➔ Arytenoids and arypepiglottic folds superiorly and cricoid inferiorly
- Lateral wall is continuous with lateral pharyngeal wall.
- Transition between supraglottic larynx and pyriform occurs at arypepiglottic folds
**Posterior Hypopharyngeal wall:**

- Posterior pharyngeal wall from Hyoid to cricopharynx. Lateral boundary is the lateral wall of pyriform sinus

**Postcricoid region**

- Pyriform sinus and posterior hypoparyngeal wall lead below to post cricoid region which forms inlet of oesophagus.
- This circular space behind cricoid encompasses cricopharyngeus muscle that provides sphincteric action controlling passage of food from pharynx to oesophagus.

**Patterns of spread**

- Submucosal spread
- So more extensive than they appear externally
- Hence resection margins mapped out in cm and not mm
- **Rich lymphatics** and so nodal metastasis common
- Spread of PF malignancy ➔ superiorly tongue, postcricoid inferomedially, posteriorly to pharyngeal wall.
- Majority infiltrative so medially larynx and laterally thyroid cartilage with extralaryngeal involvement
- Ossified cartilages are more prone to tumour invasion
- Paraglottic extension can occur anteromedially fixing vocal cords in apical lesions.
- About half the cases of pyriform fossa cancer demonstrate vocal cord fixation at the time of presentation
- Even early lesions of pyriform apex are bad as very close to cricoid and voice conservative surgeries usually not feasible
- Vocal cord fixation can be due to **three causes**: invasion of the cricoarytenoid joint, invasion of the posterior cricoarytenoid muscle or involvement of the recurrent laryngeal nerve.
- Posterior pharyngeal wall tumours are relatively unusual.
- **Mets to Jugular LN II,III,IV, Submandibular (I) and Posterior triangle (V) rarely involved**
- Posterior hypopharynx will extend to Nodes of Rouvier and nodes around internal jugular. May involve prevertebral space and leading to difficulty in extending neck and restricted side to side mobility of larynx.
- Postcricoid carcinoma spreads circumferentially to cause obstruction to swallowing & extension to cervical oesophagus is very common.
- Lateral or Parapharyngeal spread can cause widening of hypopharynx and may even involve carotids.
- Sometimes anterolateral spread of Postcricoid Ca can present as swelling in region of thyroid leading to misdiagnosis of goitre.
- Both goitre and post cricoïd cancer are common in females.
- Often B/L cervical and mets along IJV with paratracheal LN involvement seen in postcricoid cancer.
- Postcricoid cancers are less often associated with neck node metastases than piri form fossa cancer.
- Distant mets to lungs
SYMPTOMS:

- Pharyngeal wall and pyriform usually symptomless unless gross in size
- 50% present with cervical LN mets and usually neck mass is first presenting feature
- PYRIFORM SINUS ➔ Irritation and mucous retention felt during swallowing, Otalgia.
- Otalgia has been well described and is due to referred pain. The vagus nerve supplies the supraglottis and piriform fossa mucosa, as well as the mucosa of the postcricoid.
- POST CRICOID ➔ Progressive dysphagia
- Voice change is late feature may be cause of RLN infiltration or paraglottic space involvement ie laryngeal musculature involvement.

SIGNS

- 90 Degree or 75 degree scope or flexible, fibreoptic nasopharyngolaryngoscope.
- Pooling of secretions ➔ both pyriform fossa and postcricoid lesions.
- Loss of crepitus due to prevertebral space inv. in case of Postcricoid Ca (TROTTER'S SIGN)
- See for neck swellings as postcricoid can present like goitrous swelling.
- Those patients without a node will almost always harbour occult nodal disease.
- See for Mobility of VC for Rx planning

INVESTIGATIONS:

- Barium Swallow ➔ filling defect in pyriform cancers. Will also determine lower limit of postcricoid cancer.
- DLScopy and Biopsy
- FNAC neck node. Open biopsy avoided
- CT scan
- CT-PET good for mapping out occult LN mets and also postradiation residual disease
- Disease active area will have high take up of FDG (fluorodeoxy glucose) and appear brighter.
- If lung mets present the thoracic surgeon carries out pneumonectomy or lobectomy and head and neck surgery performed 6weeks later.

STAGING

- T1 ➔ < 2 cm with one subsite
- T2 ➔ 2-4 cm more than one subsite without fixation of hemilarynx
- T3 ➔ >4 cm with fixation
- **T4a**: Tumour involves thyroid cartilage or gland, cricoid cartilage, hyoid bone, esophagus or central compartment soft tissue.
- **T4b**: Prevertebral fascia, encases carotid artery or involves mediastinal structures

**Rx DECISIONS IN HYPOPHARYNGEAL CA**

- Very aggressive cancers
- Invasion of laryngeal framework.
- IJV, retropharyngeal and paratracheal lymphnodal involvement
- **T1 T2**: RT with or without CT
- Neck even if N0 included in RT
- If N2 or N3 then first RND and then RT to both tumour and neck
- Partial Laryngopharyngectomy ➔ if T1 T2 of pyriform fossa in presence of large resectable LN
- Not widely practiced as pharyngeal leak or aspiration on swallowing
- CO2 laser excision with Microscope (1st choice these days)

**Staging of oesophageal cancer**

<table>
<thead>
<tr>
<th>Stage</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lamina propria, submucosa</td>
<td>Muscularis propria</td>
<td>Adventitia</td>
<td>Adjacent structures</td>
</tr>
<tr>
<td></td>
<td>Regional</td>
<td>Distal metastasis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Liverpool treatment policy for hypopharyngeal carcinoma**

<table>
<thead>
<tr>
<th>Radical radiotherapy</th>
<th>Larynx and partial pharyngectomy (± flap)</th>
<th>Total pharyngolaryngectomy (usually jejunal loop repair)</th>
<th>Total pharyngolaryngoesophagectomy (usually gastric transposition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piriform fossa T1, T2</td>
<td>Piriform fossa with opposite side clear and not extending to midline posteriorly</td>
<td>Piriform fossa post-cricoid area (30Gb)</td>
<td>Large post-cricoid</td>
</tr>
<tr>
<td>Post-cricoid &lt;5 cm</td>
<td>Posterior wall not invading larynx</td>
<td>Small post-cricoid</td>
<td>Cervical osophagus</td>
</tr>
<tr>
<td>Long and not bulky Low volume posterior wall</td>
<td></td>
<td>Larger posterior wall</td>
<td>Second tumour in oesophagus</td>
</tr>
</tbody>
</table>

- **T3**: Sx + RT
- CTRT
- Sx includes TL or NTL with partial pharyngectomy. Nodes even if not palpable ➔ II, III, IV clearance. If N+ then IJV nodes are cleared b/l
- Post cricoid or posterior hypopharyngeal wall cancer will entail a total laryngectomy with circumferential pharyngectomy. IJV nodes are cleared b/l. Meticulous clearance of retropharyngeal, paratracheal, Parapharyngeal LN clearance.
- **T3** not leading to fixation of cords can be operated using CO2 laser only.
- Neck dissection done 4 to 5 days later. With post op RT
- If T3 is superficial No neck node ➔ Avoid Neck dissection as well as RT. Rather 2 cycles chemotherapy is given postoperatively as an added caution and close followup is maintained.
- Stenotic lesions of post cricoid do not respond to CTRT
Neck dissection always favoured in T3 lesions with large mets node
Chemo includes ➔ Cisplatinum + 5FU. Give 2 cycles, if response satisfactory the continue with full dose RT ie around 70 Gy. If CT response poor RT wont work surely
Continuous 5FU infusion might lead to cardiopasm and can be limitation in some individuals.
Cisplatin can also be given concurrently with RT
Mucosal toxicity is very High.
Nutritional support mandatory via Ryles or feeding gastrostomy.
Complication of CTRT is tight stenosis condemning the patient to a lifetime gastrostomy feeding
For T4 lesions nonsurgical CTRT not recommended. So only surgery.

VOICE CONSERVATIVE SURGERY IN HYOPHARYNGEAL CANCER

Transoral Microlaryngeal CO₂ surgery
Radiation
T3 T4 ➔ No scope
Lateralised hypopharyngeal still can be taken up for NTLP with lung powered speech with sacrifice of nasal respiration.
Pyriform cancers are MC hypopharyngeal malignancies (Lateralised commonest)
T1, T2, T3 superficial with mobile cords ➔ Partial LP or CO₂ excision
Extended SGLP

Supracricoid Hemilaryngeopharyngectomy (growth localised to pyriform)

There should be no Cord fixity one sided, no thyroid erosion, no paraglottic inf, apex of pyriform and retroarytenoid free of disease
High rate of complications, don’t do if pulm insuff

Transoral Endoscopic CO₂ Laser excision:

Transoral CO₂ provides early restoration of oral feeding and post op tracheostomy not needed.
Oral feeds can be started 2 days postop
Can be carried out on a day care basis
Hypopharynx more vascular and thus procedure more demanding.
Segment by segment resection carried out, submucosal resection can be carried out retaining arytenoids and attached soft tissues and thus prevents post op aspiration
For Superficially infiltrative lesions only
Cervical spondylosis, fibrosis due to previous radiation or surgery, SMF etc are relative CI
In cases where lateral pharyngeal wall is resected it is better to defer neck dissection by about 4-5 days.
Post CO₂ surgery for T1, T2 lesions, RT done only if incomplete resection but for T3 lesions its mandatory to give adjuvant treatment even if resection margins free of tumour in form of Cisplatin + 5FU two cycles at an interval of three weeks (RT is avoided).
Never done merely to debulk tumour, always intent is to resect with tumour free margin.
RT is reserved for recurrences only.
RT for N1 with capsular invasion, N2, N3
NTPL is only voice conservative procedure where large segment of cricoid ring is resected.
In NTPL laryngeal remnant is tubed to form a myomucosal shunt.
MANAGEMENT OF THE NECK IN HYPOPHARYNGEAL CANCER:

- b/l spread common in postcricoid and posterior wall of hypopharynx.
- Level 1 and 5 are at least risk of metastasis, so only 2,3,4,6 and retropharyngeal nodes are targeted.
- **N0 Disease:**
  - CO2 laser with N0 ➔
  - No RT if histologically normal, if present then CT
  - Open surgery ie NTLP or TLP ➔
  - Pyriform fossa malignancy ➔ I,II,III,IV,VI cleared I/L and if frozen comes positive for mets, C/L also cleared
  - Posterior wall and postcricoid ➔ b/l dissection.
  - Post of radiotherapy is depends on advanced stage of primary.
- **N+ disease:**
  - Managed surgically always except
    1. in <3cm node RxOC = RT or CTRT with b/l neck included in RT. Salvage neck desection after 2 months for residual disease.
    2. In N2a/N3 if anterior chemo is dramatic and nodes shrink to very small size, RT preferred and then salvage surgery for residual disease.
    3. In cases where cure not possible then only CTRT
       - CO2 laser excision with N+ ➔ ND 4 to 5 days later I/L. If no residual disease or capsular invasion of LN then only CT if invasions + then RT B/l.
       - CT can downstage disease, can be curative for few, reduces incidence of distant mets.
       - So it can be CTRT together or CT then RT or only RT.
       - Concurrent chemo radiotherapy is better