

LARYNGEAL MALIGNANCIES

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Introduction

- ▣ 1.7% of all cancer in male in KSA **
- ▣ Laryngeal cancer affects nearly 12,720 men and women
- ▣ 3,600 people will die of laryngeal cancer in the United States per year
- ▣ Geographic variations in the incidence and mortality of laryngeal cancer suggest that a larger proportion of the cases occur in South-Central Asia, Eastern Asia, Central Europe, and Eastern Europe
- ▣ Men are more commonly affected than women (3.6 : 1)
- ▣ This ratio has decreased over the years likely secondary to the increased rate of tobacco use in females

**National tumor registry report , 2013

Introduction

- ▣ Over 40% of laryngeal cancers present with advanced-stage disease
- ▣ The larynx is the second most common site of primary epithelial malignant tumors of the head and neck.
- ▣ Laryngeal cancer accounts for 0.3% of all cancer-related deaths

Site/pathology distribution

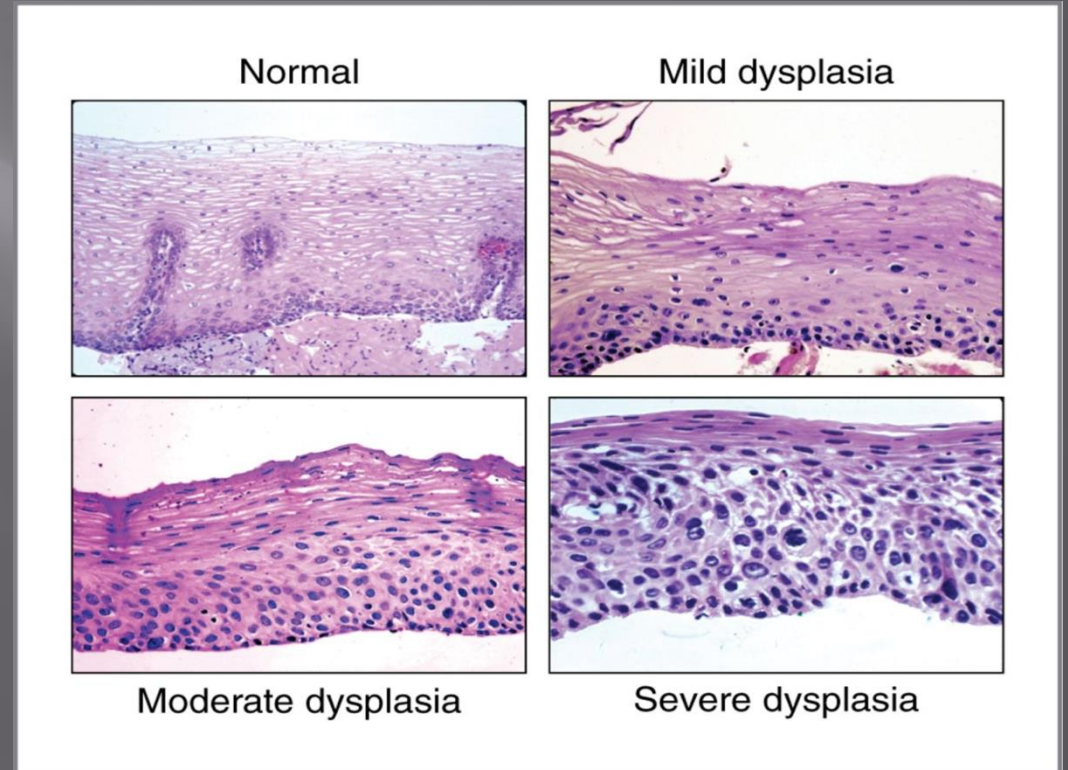
- ▣ Glottis 51 %
- ▣ Subglottis 2%
- ▣ Supraglottis 32%
- ▣ Laryngeal Cartilage 1%
- ▣ Larynx NOS 9%
- ▣ Overlapping lesion of larynx 4%

Pathology

- ▣ 95% of primary laryngeal cancers arise from the stratified squamous epithelium lining the larynx (dysplasia , CIS , SCC)
- ▣ Others:
- ▣ Verrucous squamous cell carcinoma (a highly differentiated variant with low incidence for metastases),
- ▣ Adenocarcinoma,
- ▣ Spindle cell carcinoma,
- ▣ Fibrosarcoma,
- ▣ Chondrosarcoma.
- ▣ Neuroendocrine tumors, though rare, are the most common nonsquamous tumors encountered and have a predilection for the supraglottic larynx

Precancerous lesion

- ▣ Pathological changes start at basement membrane
- Mitoses count per hpf, high NC ratio, large nucleoli
- ▣ Dysplasia
 - Mild , moderate , severe
- ▣ CIS (whole thickness)
 - ▣ 29% of CIS ----- SCC
- ▣ Microinvasive --- basement membrane
- ▣ Invasive --- TA muscle



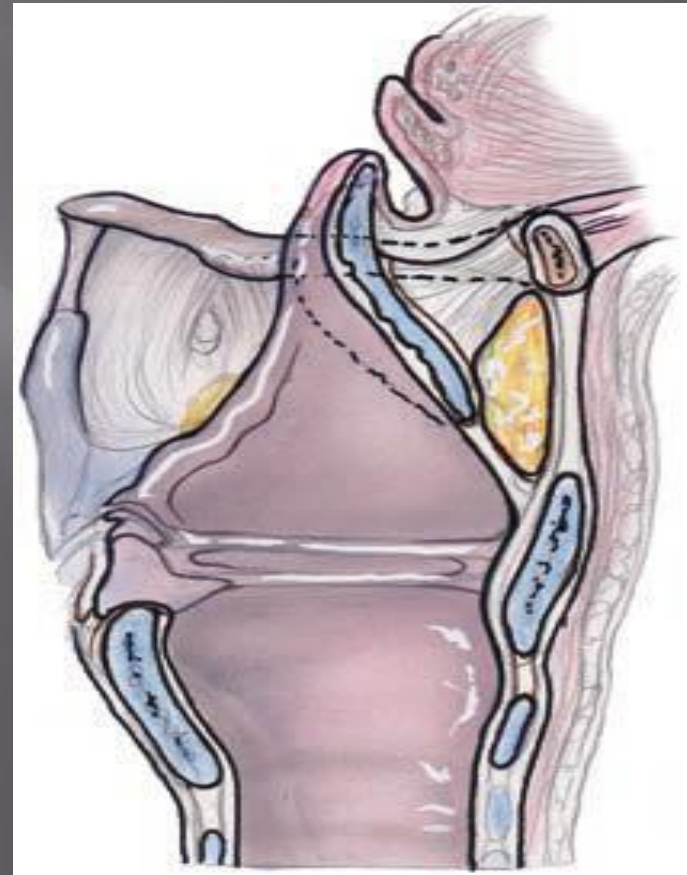
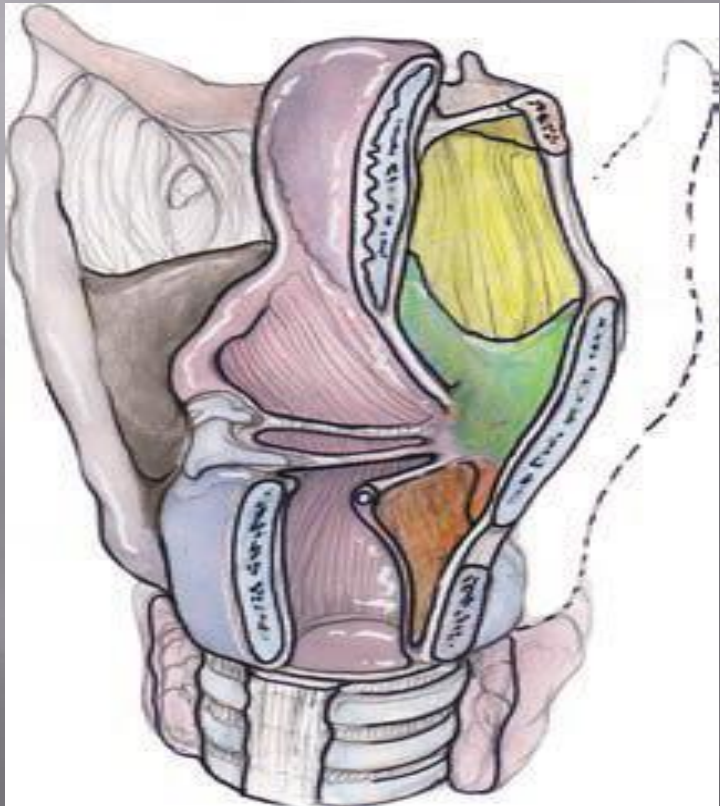
Etiology

- ▣ Cancer of the larynx is strongly related to cigarette smoking.
 - The risk decline among ex-smokers after 5 years
 - Reach Nonsmokers after 10 years of abstention.
- ▣ Role of alcohol in inducing laryngeal cancer remains still unclear

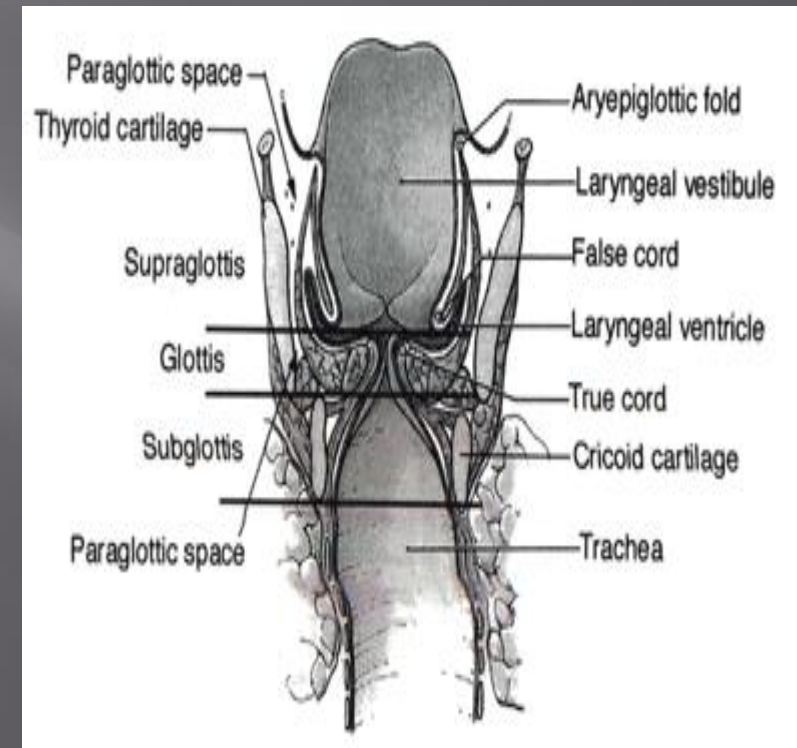
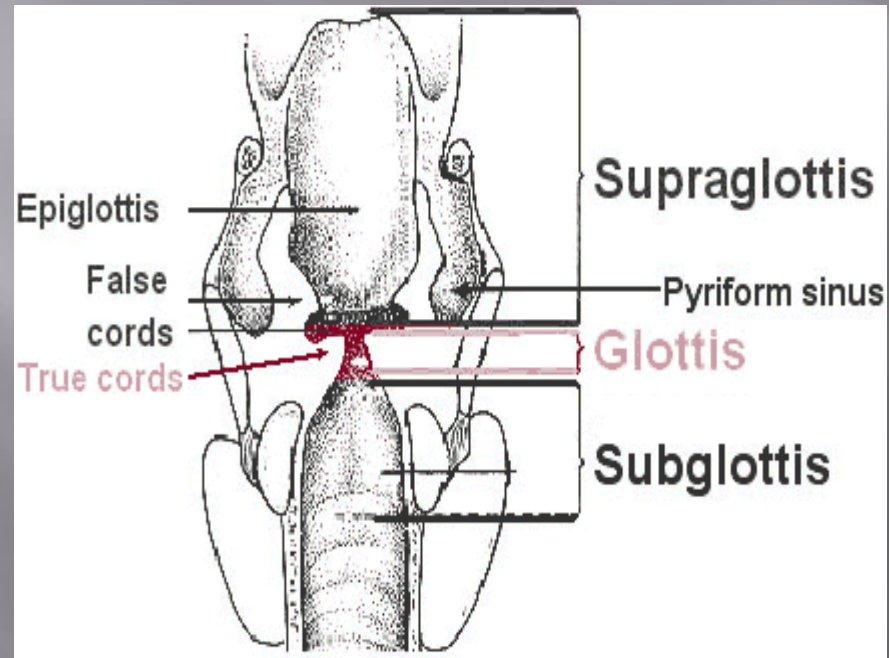
Etiology

- ▣ About 5% of laryngeal cancers occur in nonsmokers and nondrinkers, suggesting that other factors :
 - ▣ Diet,
 - ▣ Gastroesophageal reflux,
 - ▣ Previous radiation,
 - ▣ Viral infection
 - ▣ Human papillomavirus (16 & 18) in 5% to 32% of analyzed samples in laryngeal cancer
- ▣ Occupational exposures to wood dust, polycyclic hydrocarbons, and asbestos

Anatomy



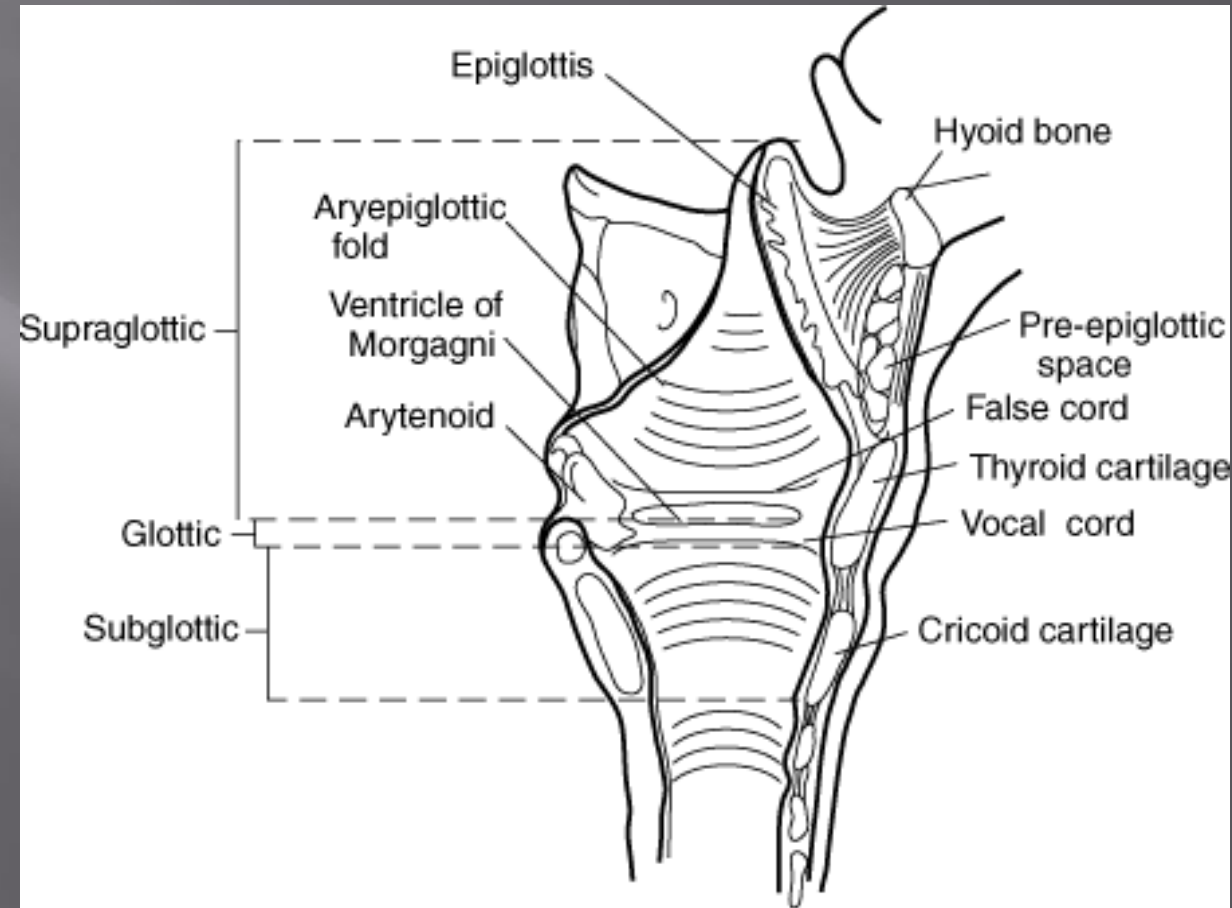
Anatomy



Supraglottis

- ▣ Extends from the epiglottis to the ventricular apices.
- ▣ Contents :
False cords,
Aryepiglottic folds,
Arytenoids,
Laryngeal surface of the epiglottis
- ▣ Epithelial lining : ciliated columnar epithelium

****Malignancy : 32%**

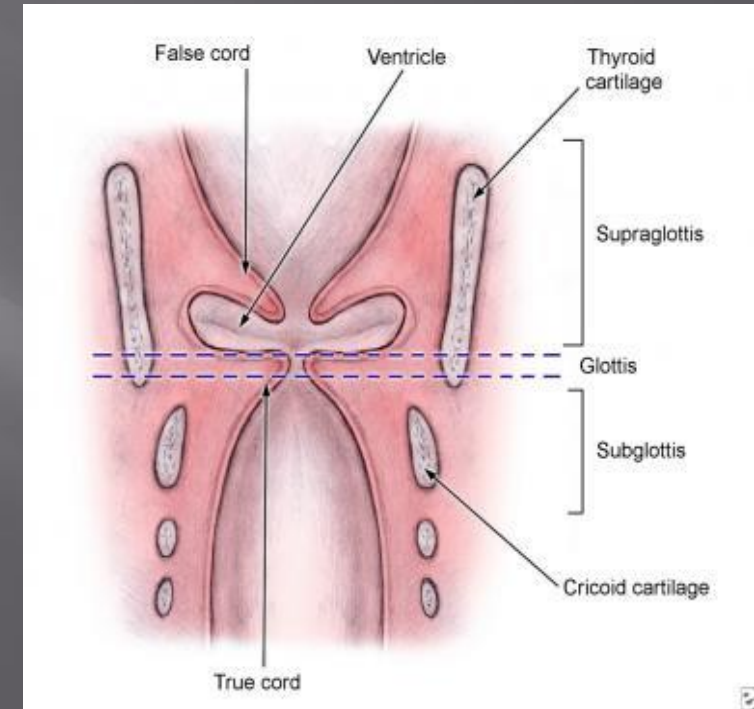


Source: Lalwani AK: *Current Diagnosis & Treatment in Otolaryngology—Head & Neck Surgery*, 2nd Edition: <http://www.accessmedicine.com>

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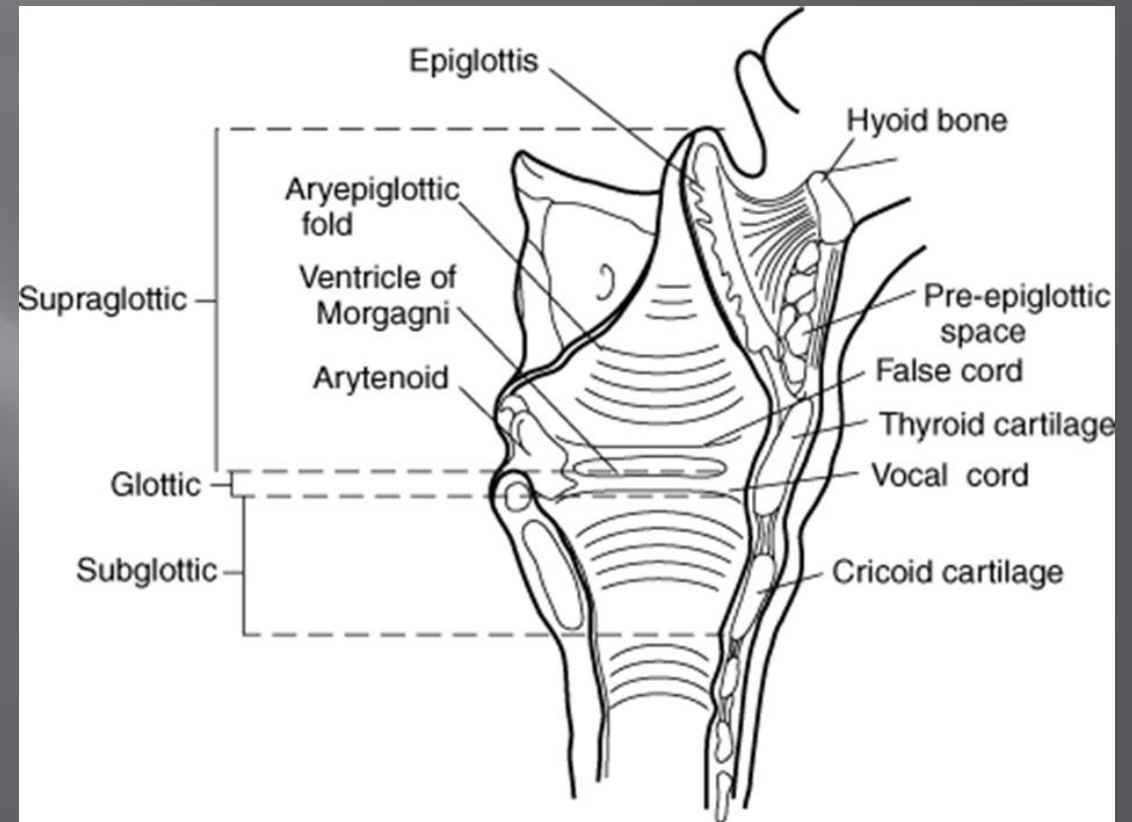
Glottis

- ▣ Extends: from the ventricle between the true and false cords to 0.5 cm below the free edge of the true cords
- ▣ Contents :
True vocal cords,
Anterior commissure,
Interarytenoid region
- ▣ epithelial lining : Stratified squamous epithelium
- Malignancy : 51 %



Subglottis

- ▣ Extends : from lower border of the glottis to the lower border of the cricoid cartilage.
- ▣ Epithelial lining : ciliated columnar epithelium
- Malignancy : 2%

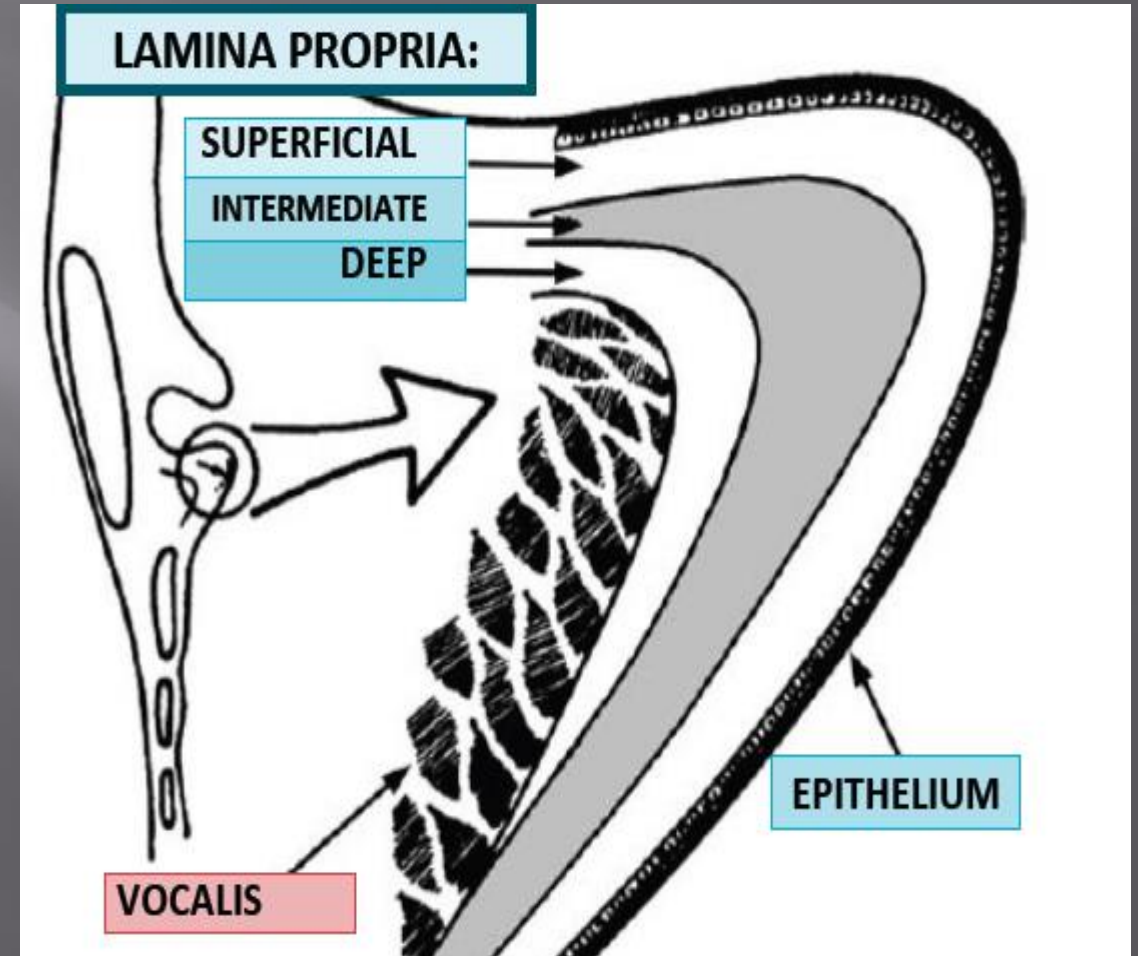


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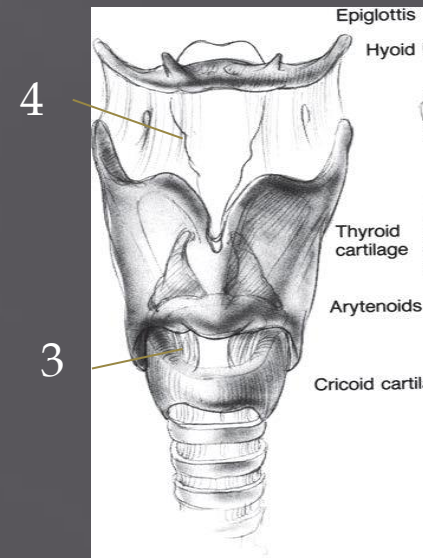
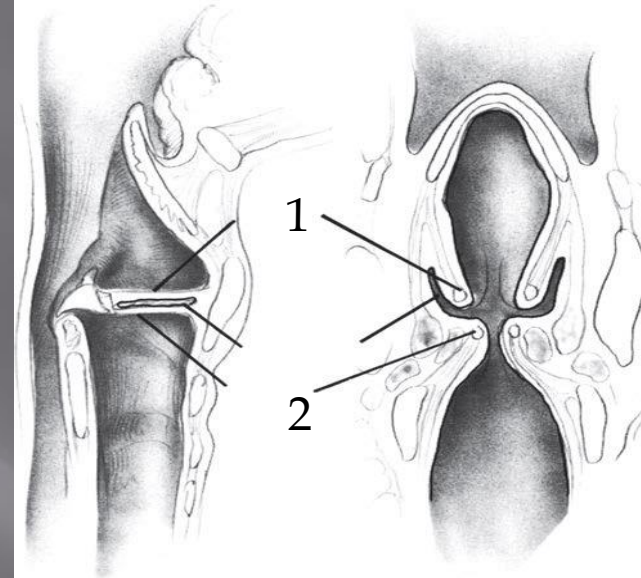
Vocal cord anatomy

- Epithelium : Stratified squamous
- LP : The superficial layer :
 - Loose fibrous tissue
 - Rarely lymphatics
 - Resistance to the spread of early glottic tumors
- Vocalis :
 - Tumor invasion : Vocal cord immobility



Laryngeal membrane

- 1- Quadrangular membrane
- 2- Conus elasticus
- 3- Cricothyroid membrane
- 4- Thyrohyoid membrane
- 5- Inner perichondrium

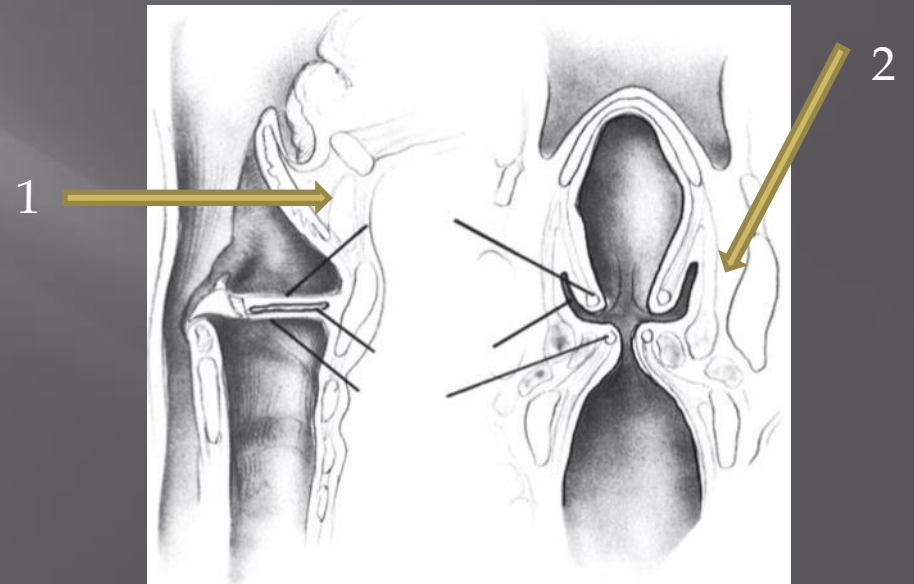


Laryngeal spaces

- 1- Pre epiglottic space
- 2- Paraglottic space
- 3- Broyle's tendon: vocalis tendon insertion into thyroid cartilage
 - Deficient perichondrium

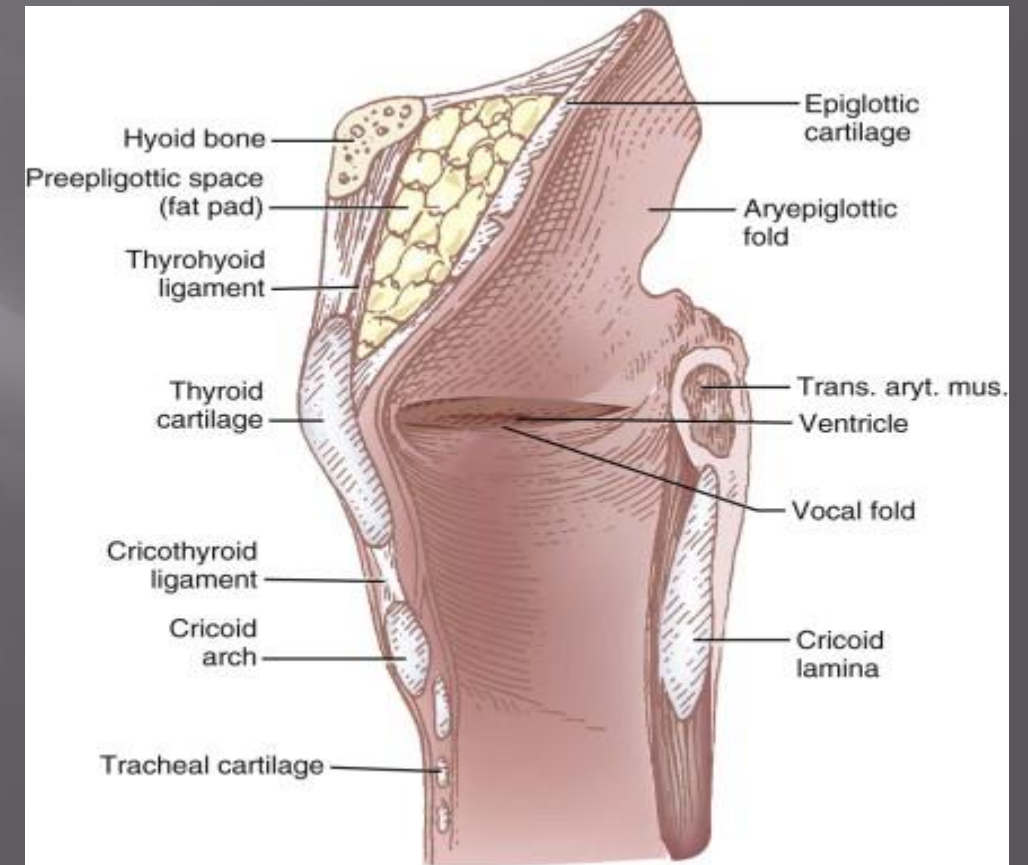
** Allowing spread of laryngeal cancer

**Planning of conservation surgical procedures.



Pre epiglottic space

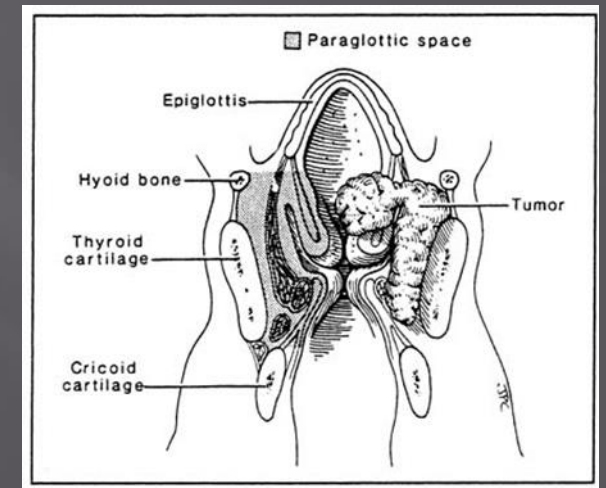
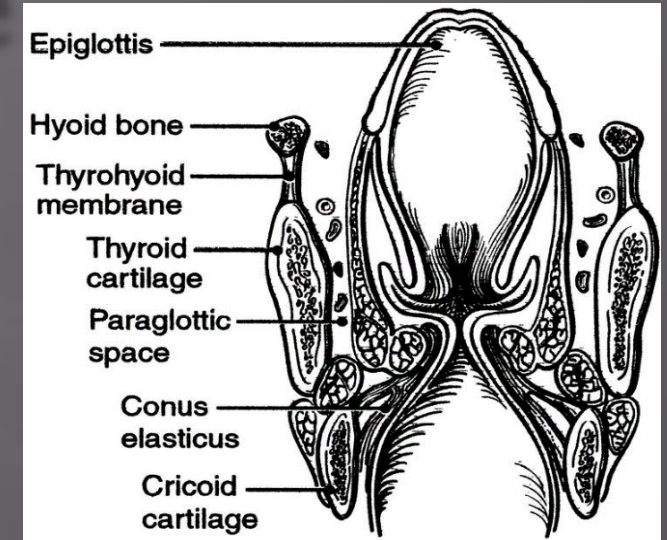
- ❑ Anterior : Thyrohyoid membrane , hyoid bone
- ❑ Posterior : epiglottis
- ❑ Inferior : attachment of epiglottis to thyroid cartilage
- ❑ Superior : hyoepiglottic ligament
- ❑ Lateral : in continuity of paraglottic space



Paraglottic space

- ▣ Lateral : thyroid cartilage & cricothyroid membrane
- ▣ Medially :
 - ▣ Quadrangular membrane
 - ▣ Conus elasticus
- ▣ Posterior : piriform sinus

****Allow transglottic tumor,
extension of tumor above and
below the ventricle**



Lymphatic drainage

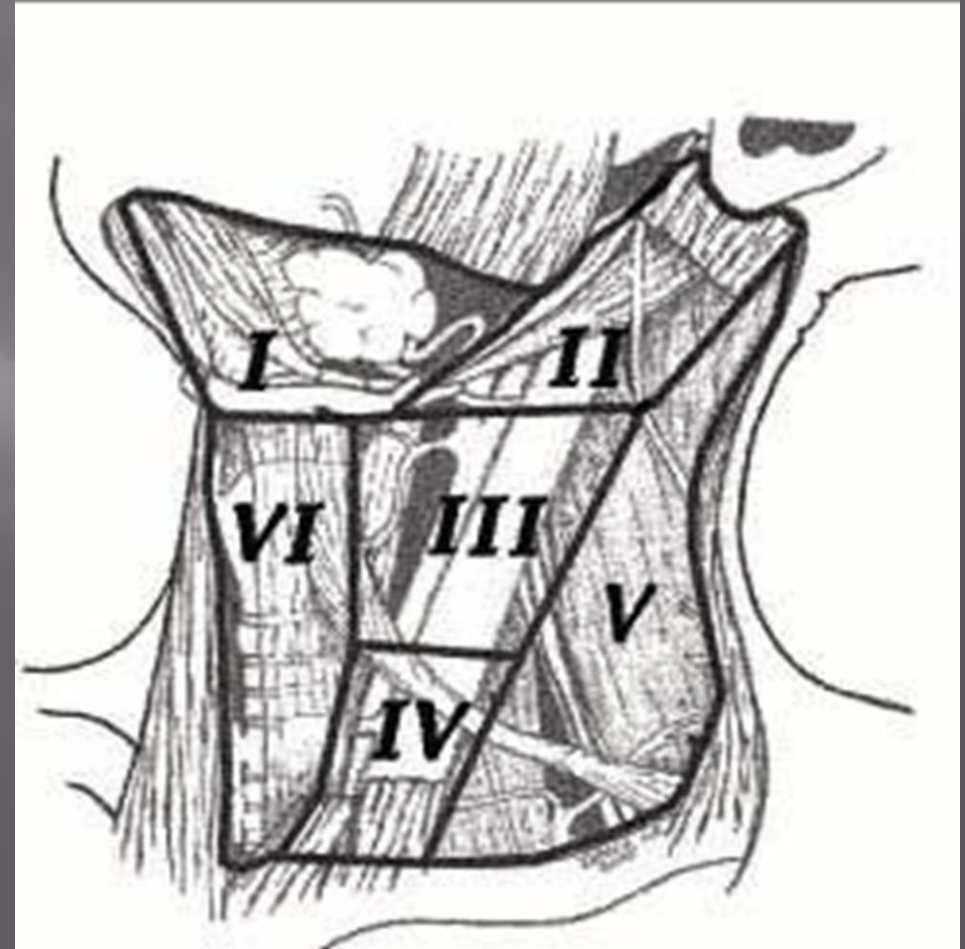
Supraglottis :

- ▣ Level II, III , IV

Glottis :

- ▣ non existent
- ▣ **Subglottis**
- ▣ Level IV ,VI & VII

** contralateral drainage for midline lesion



Larynx Cancer: Incidence of Neck Metastases by Site.

	T1	T2	T3	T4
Supraglottic	40-15 %	25-40 %	50-60 %	65%
Glottic	< 5 %	5 - 10 %	10-20 %	20-40 %

Incidence of occult metastasis > 20 % ----- treatment of the neck

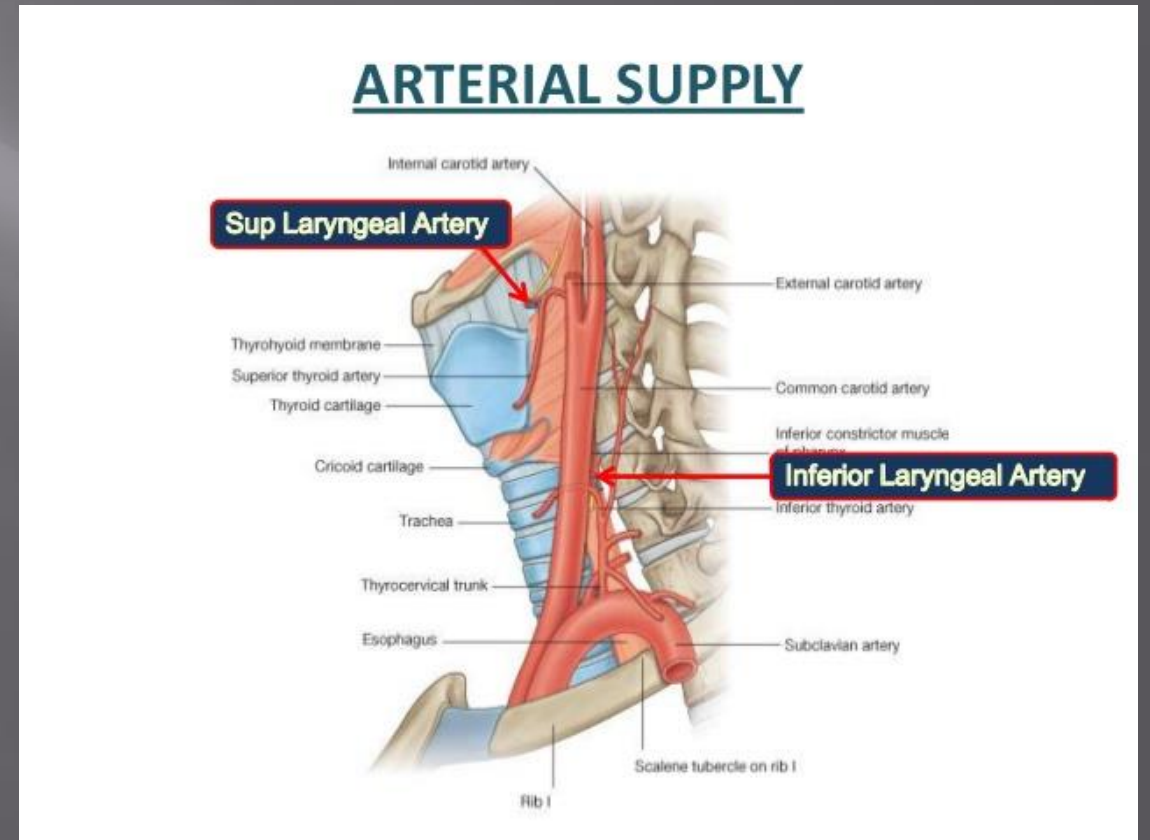
Blood supply

- ▣ Supraglottis

Superior laryngeal artery,(STA)

- ▣ The lower half of the larynx :

Inferior laryngeal artery (ITA)



Physiology

- ▣ Airway protection
- ▣ Respiration
- ▣ Phonation
- ▣ Swallowing

** Effects on this complex mechanism must be taken into account when formulating a treatment plan.

Work up

- ▣ History
- ▣ Physical examination,
- ▣ Fiberoptic laryngoscopy
- ▣ Imaging
- ▣ Direct laryngoscopy under anesthesia for biopsy and assessment of secondary neoplasm

History

- ▣ Dysphagia
- ▣ Vocal changes ---- glottic
- ▣ Stridor ---- glottic /subglottic
- ▣ Aspiration
- ▣ Otalgia
- ▣ Blood-tinged sputum ---- supraglottic
- ▣ Neck mass
- ▣ Cachexia
- ▣ Dyspnea
- ▣ Pain
- ▣ Halitosis

History

▣ Past medical history :

- Assessing patient comorbidities,
- History of cancer,
- Immunologic status.

Treatment preferences

▣ Social history

- Synergistic effect when tobacco is combined with alcohol
- Delirium tremen
- Tobacco withdrawal

▣ Occupation :

- Risk factors : metal workers, construction workers (asbestos),and textile processors.
- Treatment preferences : Professional voice user

Physical examination

- ▣ Airway distress , mandate urgent airway protection
- ▣ Neck exam :
 - Lymphadenopathy
 - Fixed larynx : advanced laryngeal tumor
- ▣ Laryngeal endoscopy :
 - Extension of the lesion
 - Vocal cords mobility
 - Airway patency
 - Second primary tumors ---- 9 %

Diagnostic imaging

- ▣ CT head , neck , larynx with contrast
- ▣ MRI head & neck
- ▣ Chest xray
- ▣ PET /CT scan

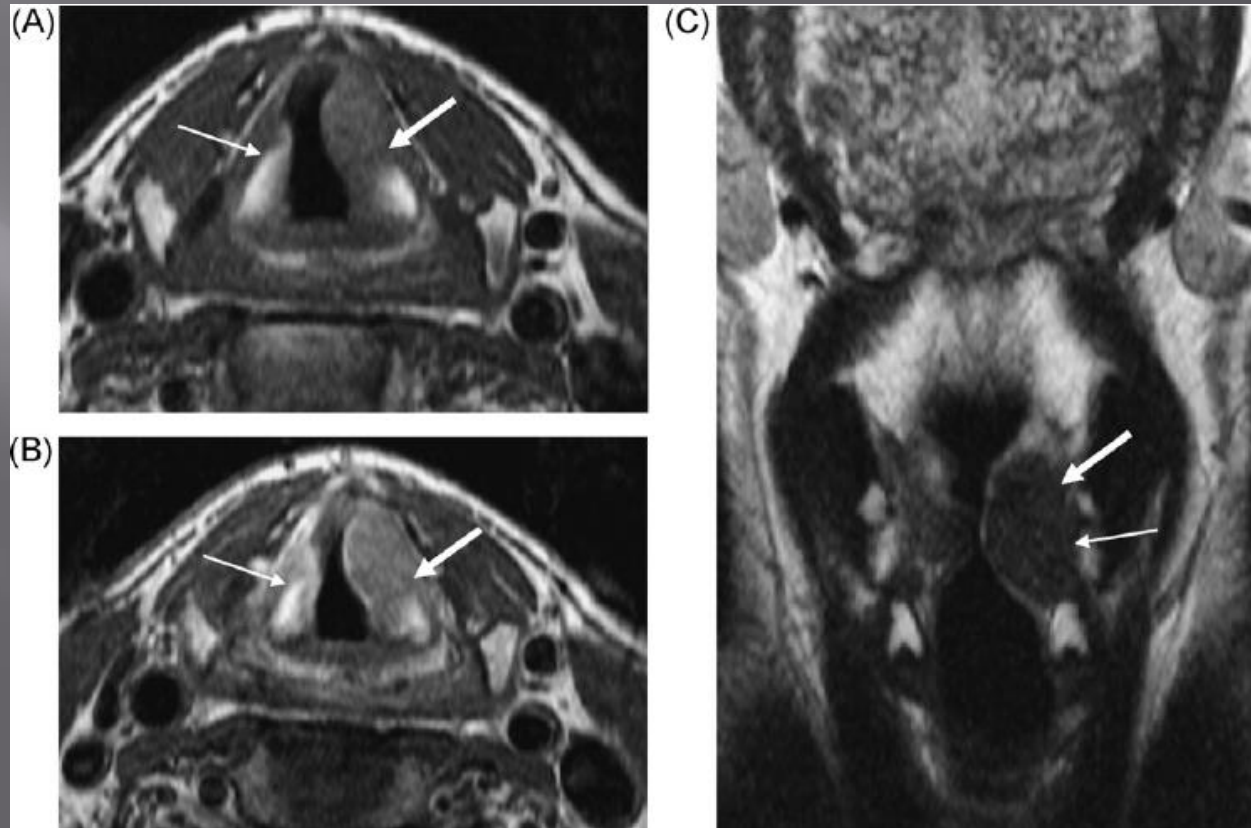
CT scan Neck

- ▣ Standard imaging modality for advanced laryngeal cancers
- ▣ Specific for cartilage invasion



MRI Neck

Identification of subtle extralaryngeal spread or early cartilage destruction.

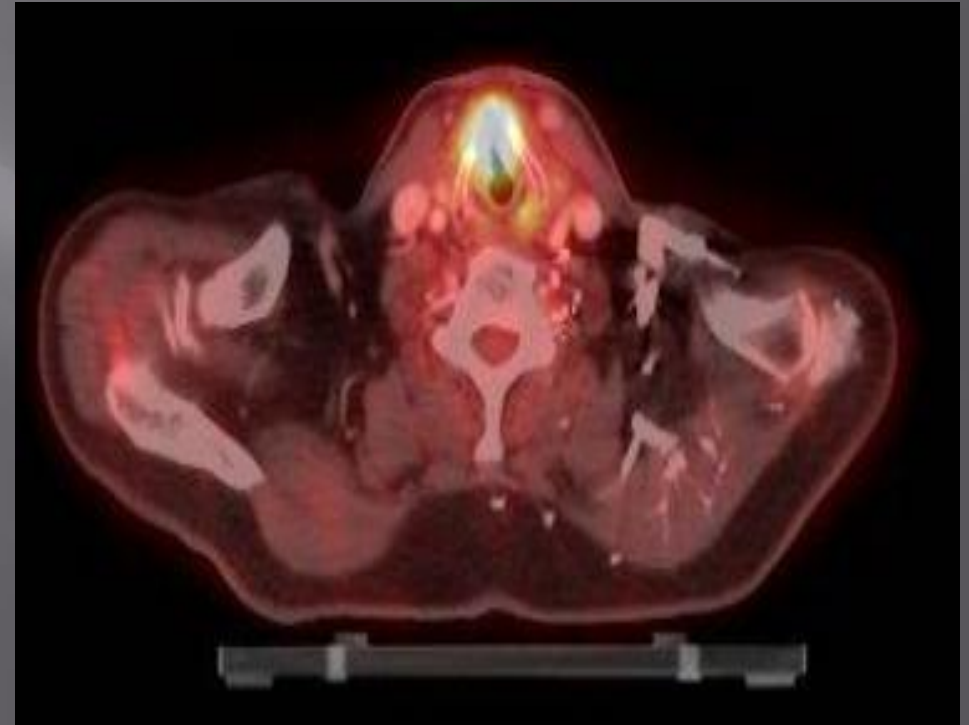


Chest x-ray

- ▣ Preoperative assessment :
 - Chronic pulmonary disease
- ▣ Evaluation and staging of laryngeal cancer.
 - Synchronous or metastatic lung mass/tumor.
- ▣ Abnormalities on chest x-ray : CT chest

PET scan

- ▣ Standard assessment of regional cervical metastasis
 - ▣ Sensitivity 84%
 - ▣ Specificity 100 %
 - ▣ Nodes measuring < 5 mm were not detected
- ▣ Assessment of distant metastasis.
 - ▣ sensitivity 86 %
 - ▣ specificity 84%
- ▣ Evaluation of loco regional recurrence.



Laboratories test

- ▣ complete blood count,
- ▣ Coagulation studies,
- ▣ Liver function tests and calcium and alkaline phosphatase
 - ▣ High level ---- CT abdomen , bone scan or PET

AJCC staging 2013 .

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NCCN Guidelines Version 2.2013 Staging Head and Neck Cancers

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Table 3

American Joint Committee on Cancer (AJCC) TNM Staging System for the Larynx (7th ed., 2010)

(Nonepithelial tumors such as those of lymphoid tissue, soft tissue, bone, and cartilage are not included)

Primary Tumor (T)

TX Primary tumor cannot be assessed
T0 No evidence of primary tumor
Tis Carcinoma *in situ*

Supraglottis

T1 Tumor limited to one subsite of supraglottis with normal vocal cord mobility
T2 Tumor invades mucosa of more than one adjacent subsite of supraglottis or glottis or region outside the supraglottis (eg, mucosa of base of tongue, vallecula, medial wall of pyriform sinus) without fixation of the larynx
T3 Tumor limited to larynx with vocal cord fixation and/or invades any of the following: postcricoid area, pre-epiglottic space, paraglottic space, and/or inner cortex of thyroid cartilage
T4a Moderately advanced local disease
Tumor invades through the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus)
T4b Very advanced local disease
Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

Glottis

T1 Tumor limited to the vocal cord(s) (may involve anterior or posterior commissure) with normal mobility
T1a Tumor limited to one vocal cord
T1b Tumor involves both vocal cords
T2 Tumor extends to supraglottis and/or subglottis, and/or with impaired vocal cord mobility
T3 Tumor limited to the larynx with vocal cord fixation and/or invasion of paraglottic space, and/or inner cortex of the thyroid cartilage
T4a Moderately advanced local disease
Tumor invades through the outer cortex of the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus)
T4b Very advanced local disease
Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

Subglottis

T1 Tumor limited to the subglottis
T2 Tumor extends to vocal cord(s) with normal or impaired mobility
T3 Tumor limited to larynx with vocal cord fixation
T4a Moderately advanced local disease
Tumor invades cricoid or thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, soft tissues of neck including deep extrinsic muscles of the tongue, strap muscles, thyroid, or esophagus)
T4b Very advanced local disease
Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

[Continued on next page](#)

AJCC staging 2013

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Table 3 - continued

**American Joint Committee on Cancer (AJCC)
TNM Staging System for the Larynx (7th ed., 2010)**

(Nonepithelial tumors such as those of lymphoid tissue, soft tissue, bone, and cartilage are not included)

Regional Lymph Nodes (N)*

- NX** Regional lymph nodes cannot be assessed N0; no regional lymph node metastasis
- N1** Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
- N2** Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
- N2a** Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension
- N2b** Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
- N2c** Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
- N3** Metastasis in a lymph node, more than 6 cm in greatest dimension

*Note: Metastases at level VII are considered regional lymph node metastases.

Distant Metastasis (M)

- M0** No distant metastasis
- M1** Distant metastasis

Anatomic Stage/Prognostic Groups

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1	N1	M0
	T2	N1	M0
	T3	N1	M0
Stage IVA	T4a	N0	M0
	T4a	N1	M0
	T1	N2	M0
	T2	N2	M0
	T3	N2	M0
	T4a	N2	M0
Stage IVB	T4b	Any N	M0
	Any T	N3	M0
Stage IVC	Any T	Any N	M1

Histologic Grade (G)

- GX** Grade cannot be assessed
- G1** Well differentiated
- G2** Moderately differentiated
- G3** Poorly differentiated
- G4** Undifferentiated

Treatment

Multidisciplinary team approach

- ▣ Surgeon
- ▣ Radiation oncologist
- ▣ Medical oncologist
- ▣ Speech pathologist
- ▣ Dental
- ▣ Nutritionist
- ▣ Psychosocial evaluation

** Ultimate goal : cure from cancer

** Secondary goal : preservation of function

Management

- ▣ Pan endoscopy & examination under anesthesia :
 - Assessment of the boundaries of the primary site (T stage)
 - Candidacy for conservation laryngeal surgery
 - Assessment of adequate exposure for endoscopic laser resection.
 - Evaluation of a second primary tumor :
 - Oropharynx
 - Hypopharynx
 - Larynx
 - Esophagus
 - Trachea & bronchi

- ▣ Secure the airway if needed
 - Awake fibro optic intubation
 - Awake tracheostomy

Management

Preoperative assessment

▣ Pulmonary function test:

- Crucial planning for conservative surgery
- $FEV1 > 75\%$ or $FEV1 / FVC < 65\%$ ---- Increase risk of aspiration

Treatment

Early stages (T1, T2)

Single modality

- Surgery (Endoscopic / open) or
- External beam radiation therapy

Treatment neck N0 & N1

- ▣ Observation or
- ▣ Neck dissection or
- ▣ Radiation therapy

** supraglottic —————> bilateral level II, III & IV

** If radiation is the treatment option, the field can be extended to include the nodal basins at risk.

** If surgery is the best treatment option, a selective neck dissection can be performed with limited morbidity

Treatment of neck N2 & N3

- ▣ Modified radical Neck dissection & post op XRT

*Bilateral neck dissection for midline lesion or advanced T stage

Management premalignant lesion

- ▣ Smoking cessation
- ▣ Eliminate risk factor , LPR
- ▣ Observation for mild dysplasia
- ▣ Stripping / microlaryngoscopy and excision with/out CO2 laser
- ▣ RT (radiation therapy)
- ▣ Follow up with outpatient laryngoscopy

Management

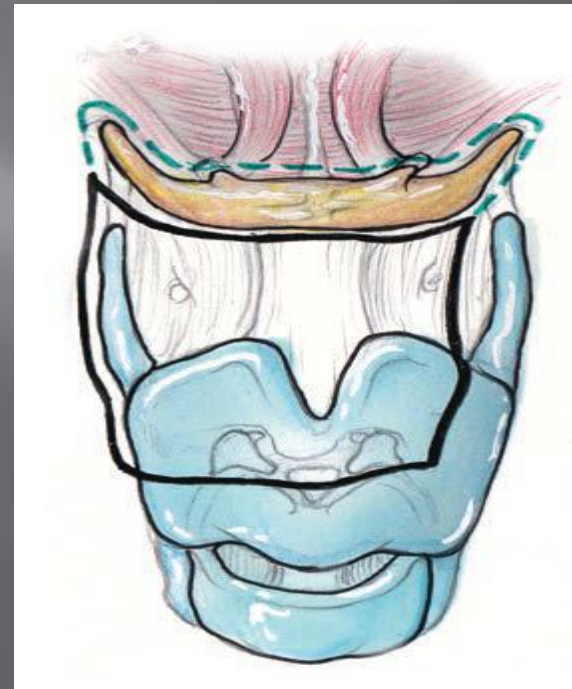
Early supraglottic SCC T1,T2 & N0

- ▣ Primary surgery or definitive radiotherapy (RT)
- ▣ Surgery :
 - Primary :
 - ▣ Endoscopic resection : TLM (transoral laser microsurgery) or TORS
 - ▣ Open procedure : horizontal supraglottic or supracricoid laryngectomy
 - Neck :
 - ▣ Occult metastatic rate ranging from 4% to 35%
 - ▣ Bilateral neck dissection vs RT

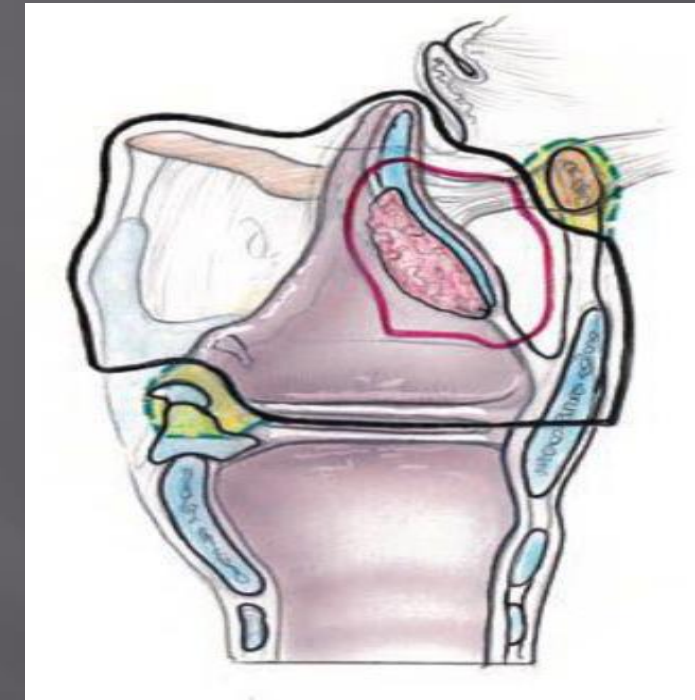
Management

Early supraglottic SCC T1,T2 & N0

- ▣ TLM VS horizontal supraglottic laryngectomy :
 - Less resection of normal structures in TLM
 - Knowledge of site-specific “inside out” anatomy



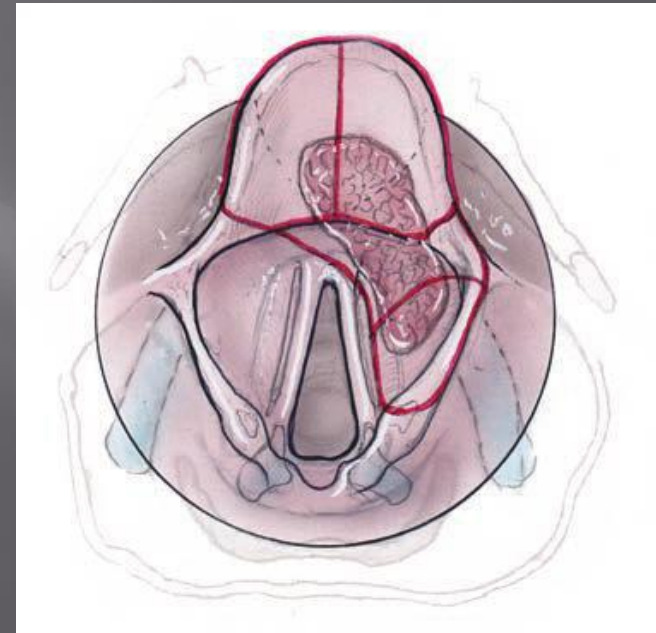
Supraglottic
laryngectomy



TLM

TLM (transoral laser microsurgery)

- ▣ Endoscopic management of supraglottic cancer dates back to 1939.
- ▣ The basic technique of transtumoral cuts to assess the depth of disease .
- ▣ Multibloc transoral laser resection is distinct from the time honored principle of en bloc tumor resection.



TLM

The fundamental requirements :

- ▣ Careful training in the technique,
- ▣ knowledge of site-specific “inside out” anatomy,
- ▣ Good endoscopic access,
- ▣ Strict enforcement of laser-specific precautions in the operating room

TLM

contraindication :

▣ Limitations of endoscopic access:

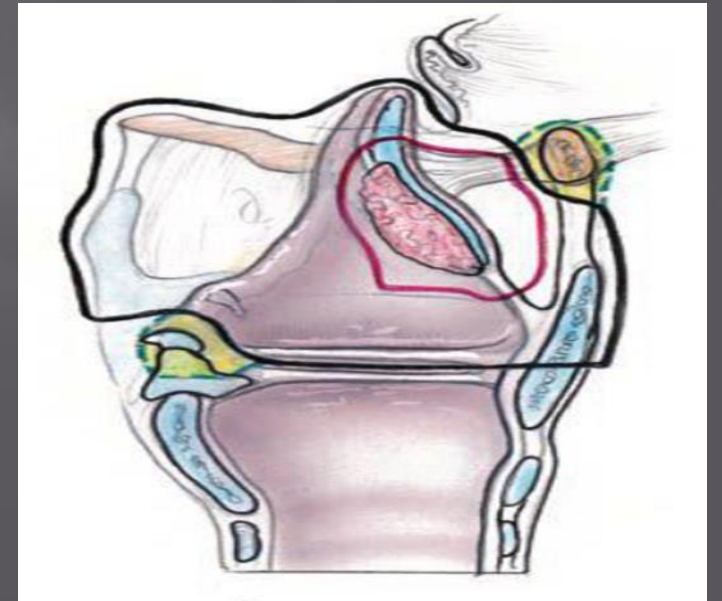
- Teeth (prominent),
- Trismus,
- Transverse dimensions (narrow mandibular arch),
- Tori (mandibular),
- Tongue (bulk),
- Tilt (atlanto-occipital extension),
- Treatment (prior radio- or chemoradiotherapy),
- Tumor (site and size).

TLM contraindication

- ▣ Intraoperative involvement of the following :
 - ▣ Preepiglottic
 - ▣ Paraglottic space,
 - ▣ Bilateral arytenoid,
 - ▣ Thyroid cartilage.

Supraglottic laryngectomy

- ▣ Indication
- ▣ T1, T2, or T3 supraglottic tumors with limited preepiglottic space involvement.
- ▣ Requirement :
- ▣ Mobile vocal cords,
- ▣ Cartilage involvement : none
- ▣ Limited base of tongue extension,
- ▣ Pyriform sinus involvement : none
- ▣ Good pulmonary reserve



Early supraglottic SCC functional outcomes

	TLM	Open procedures
Swallowing	Better	Worse
Need of Nasogastric tube	Rare	Common
Speech	Better	Worse
Need of tracheostomy	none	common
Aspiration	Less likely	Common 40 %
Hospitalization	Short /day surgery	Longer
Surgical complication Pharyngecutenous fistula , wound dehiscence	None	Less common

Early supraglottic SCC

Oncological outcomes

	TLM	Open procedures
5-year disease-free survival	80%	72%
5-year laryngeal preservation rate	86%	80%
5-year disease-specific survival	89%	80%

Early supraglottic SCC RT

- ▣ The success is often correlated with the tumor volume
- ▣ In the era of endoscopic approaches to early supraglottic tumors :
 - RT is indicated for treatment of patients who are not physiologically suitable for conservation surgery.
- ▣ local control rates :
 - T1 : (75 - 100%)
 - T2 : (71- 83%)
 - laryngeal preservation rate of about 80%

Management

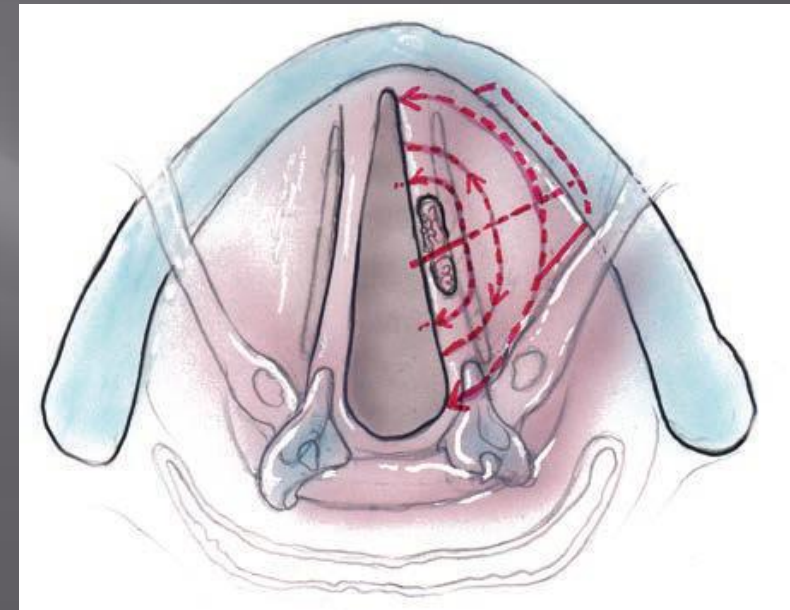
Early glottic SCC T1,2 & N0

- ▣ Primary surgery or definitive radiotherapy (RT)

- ▣ Surgery
 - Primary :
 - ▣ Endoscopic resection: TLM
 - ▣ Open procedures : Laryngofissure , Vertical partial laryngectomy & supracricoid laryngectomy .
 - Neck :
 - ▣ Occult metastasis < 10 %

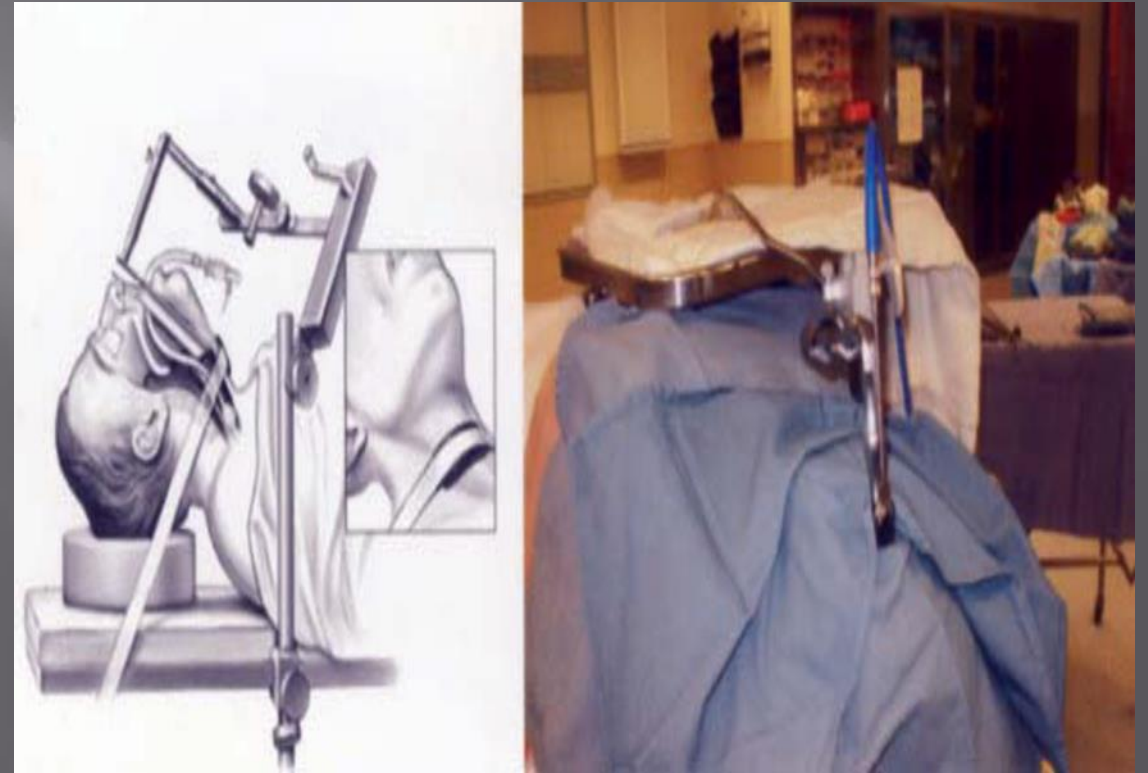
Surgical management T1/2 glottic TLM

- ▣ The basic technique of transtumoral cuts to assess the depth of disease .
- ▣ Multibloc transoral laser resection is distinct from the time honored principle of en bloc tumor resection



Surgical management T1/2 glottic TLM

- ▣ The concept of endoscopic excision of early glottic cancer was pioneered by Lynch in 1920.
- ▣ The procedure being popularized with CO2 laser , later by Steiner in 1980s.



TLM

contraindication

- ▣ Subglottic extension (≥ 5 mm)
- ▣ Postcricoid extension
- ▣ Invasion of the piriform sinus
- ▣ Cartilage invasion
- ▣ Vocal fold fixation (relative)
- ▣ Arytenoid extension (relative)
- ▣ Involvement of the base of the tongue

Early glottic SCC

TLM VS RT , Functional outcome

	TLM	RT
Voice handicap index	Mildly affected	Accepted quality
Age	Younger	Old
Duration & Cost	Day procedure , less cost	5-7 weeks , expensive
High risk anesthesia	Avoided	Better option
Sub sites/extension	T1a +/-1 anterior commissure	T1b or anterior commissure

Early glottic SCC

surgical management , oncological outcome

	TML	RT
Local control %	89	75
Laryngeal preservation %	100	83

Early glottic SCC

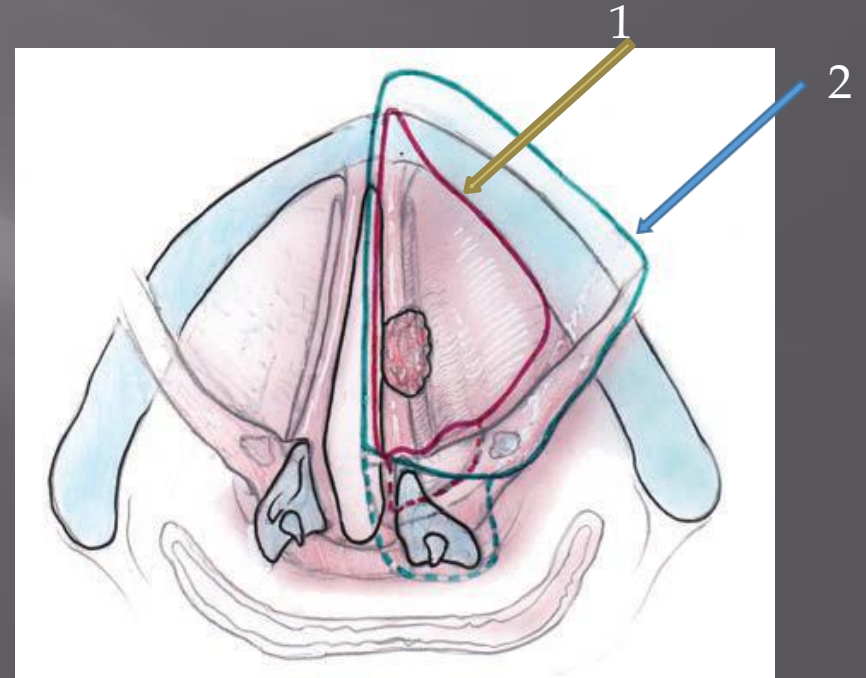
Surgical management : functional outcome

	TML	Open procedures
Hospitalization	Day surgery	longer , minimum 7 days
Need of tracheostomy	None	Common
Voice handicap index	Severely affected	Severely affected
Swallowing	Normal	, +/- dysphagia (NGT) .
Aspiration	Rare	Common
Salvage after recurrence	Smooth	Difficult

Early glottis SCC

Open procedures

- 1- Laryngofissure & cordectomy
 - 2- Hemilaryngectomy
- Tracheostomy & Nasogastric tube feeding are a must in most cases



Advanced laryngeal CA

Advanced laryngeal CA management

- ▣ The goal of treatment is cure
- ▣ Secondary goals of preserving speech and swallowing function.
- ▣ The patient should be included in all aspects of the decision-making process and be allowed to make an informed decision on which treatment option is best for him or her.

Treatment

Advanced stages (T3 , T4) ,N2 & N3

Multimodality approach:

- Radio chemotherapy (organ preservation approach) or
- Surgery & post operative EBRT +/- chemotherapy

Radiation therapy

- ▣ Primary therapy
- ▣ Post operative adjuvant therapy
- ▣ Palliative therapy.

Radiation therapy

- ▣ The goal of radiation therapy is to achieve better outcomes with tumor eradication while preserving normal tissue.
- ▣ The typical total treatment dose of radiation is 60 - 70 Gy given 5 days per week over a period of 6 to 7 weeks.
- ▣ Indication :
 - ▣ Primary : T3
 - ▣ Neck : N+ or occult nodal metastasis > 20%
 - ▣ palliation in unresectable tumors & poor surgical candidates

Post operative radiation therapy

- ▣ Adjuvant radiation be given in the postoperative period (after laryngectomy)
- ▣ Indications :

A. Primary tumor :

- ▣ Advanced stage disease
- ▣ Subglottic extension of tumor.
- ▣ Positive margins
- ▣ Perineural spread
- ▣ Angiolymphatic spread of tumor

B. Lymph node :

- ▣ Multiple involvement
- ▣ Extracapsular spread

Chemotherapy

- ▣ Primary therapy in conjunction with RT
- ▣ Post operative adjuvant therapy in conjunction with RT
- ▣ Palliative therapy.

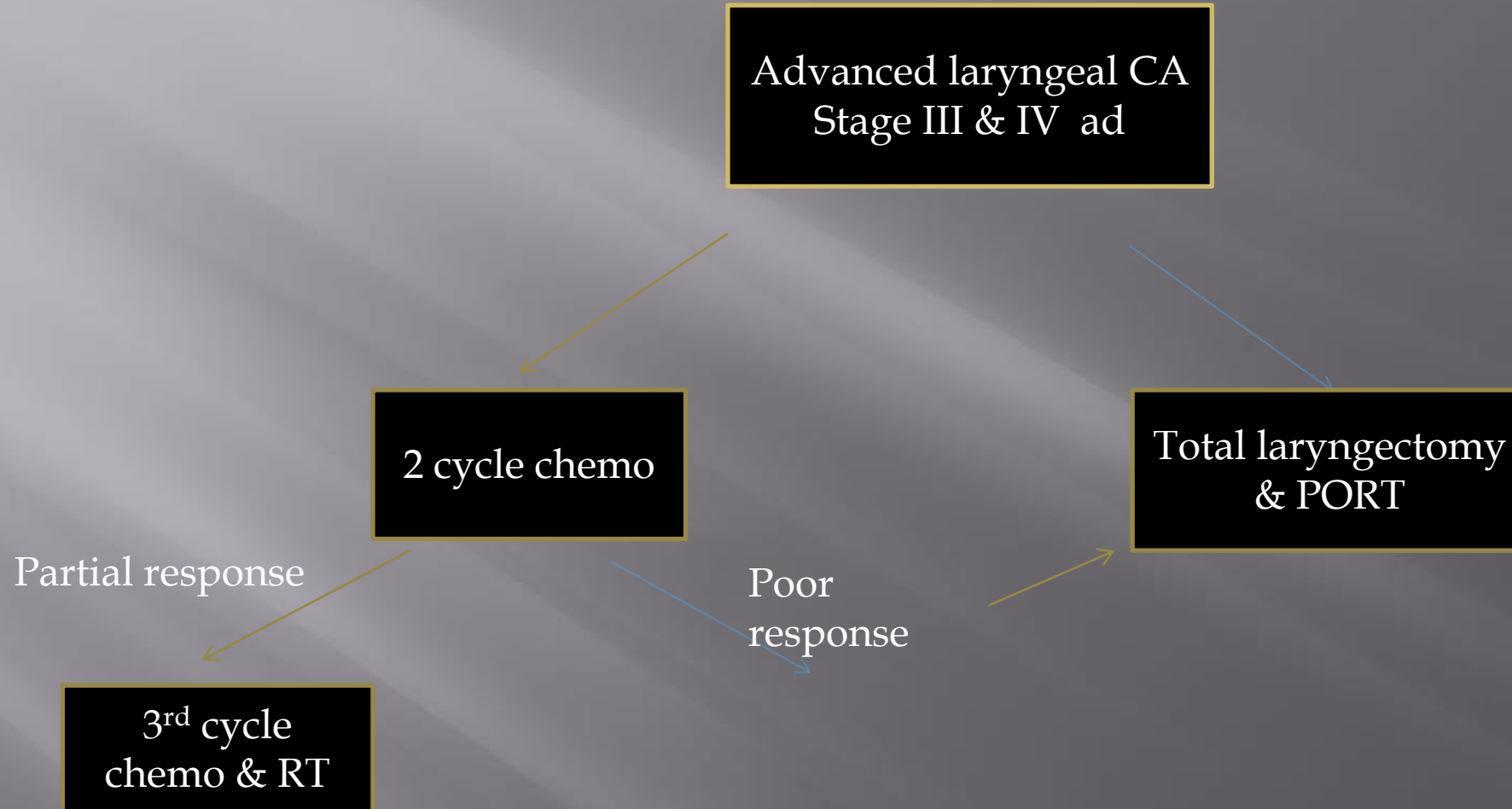
Chemotherapy

- ▣ Almost always in conjunction with RT
- ▣ Methods of chemotherapy delivery :
 - Induction
 - Concomitant
- ▣ Cisplatin and 5-fluorouracil are the two most commonly used agents.
- ▣ Main usage as :
 - Radiosensitizer
 - Systemic antineoplastic effect
- ▣ Distant metastases appear to be decreased with chemotherapy

Organ preservation therapy Veterans Affairs Study Group (VA)

- ▣ Pivotal in establishing the role of non-surgical methods of treatment for advanced laryngeal cancers.
- ▣ Inception of organ preservation strategies took seed in the early 80s with initial trials demonstrating the potential of chemotherapy to cause tumor regression as well as predict response to RT.
- ▣ Provide a landmark induction study for laryngeal cancer.

VA study group



VA study group

- ▣ Patients treated with induction chemotherapy followed by radiation had a similar survival to those treated with total laryngectomy and postoperative radiation .
- ▣ This approach was able to achieve larynx preservation in 64% maintaining similar overall survival in both arms

Surgical treatment .

- ▣ The key to the surgical treatment of laryngeal cancer is to determine the correct patient for the correct procedure while accounting for the expertise of the surgeon

Surgical treatment

- ▣ Trans oral laser resection
 - Seldom for bulky T3 or T4
- ▣ Open conservative laryngeal approaches
 - Vertical Hemilaryngectomy
 - Supraglottic (horizontal) laryngectomy
 - Supracricoid laryngectomy
- ▣ Total laryngectomy

Open conservative laryngectomy

- ▣ Procedures that maintain physiologic speech and swallowing without the need for permanent tracheostoma
- ▣ Goal :
 - maximal laryngeal function without compromising cure rate
 - Preservation of swallowing, respiration, phonation, and airway protection.
 - Proper patient selection is critical.
- ▣ One cricoarytenoid joint is preserved and one laryngeal valve (epiglottis, false vocal cords, or true vocal cords) is mandatory to be maintained.

Vertical hemilaryngectomy

- ▣ It is an organ-sparing procedure used for the treatment of glottic malignancies
- ▣ Indication :
 - Selected T3
 - Seldom in T4
- ▣ Tracheostomy is mandatory
- ▣ Contraindications :
 - ▣ Fixed true vocal fold,
 - ▣ Posterior commissure/interarytenoid involvement,
 - ▣ Invasion of bilateral arytenoids,
 - ▣ Bulky transglottic lesion,
 - ▣ Thyroid cartilage invasion,
 - ▣ Preepiglottic space involvement,
 - ▣ Subglottic extension that involves the cricoid cartilage,
 - ▣ Extralaryngeal spread
 - ▣ Poor pulmonary reserve .

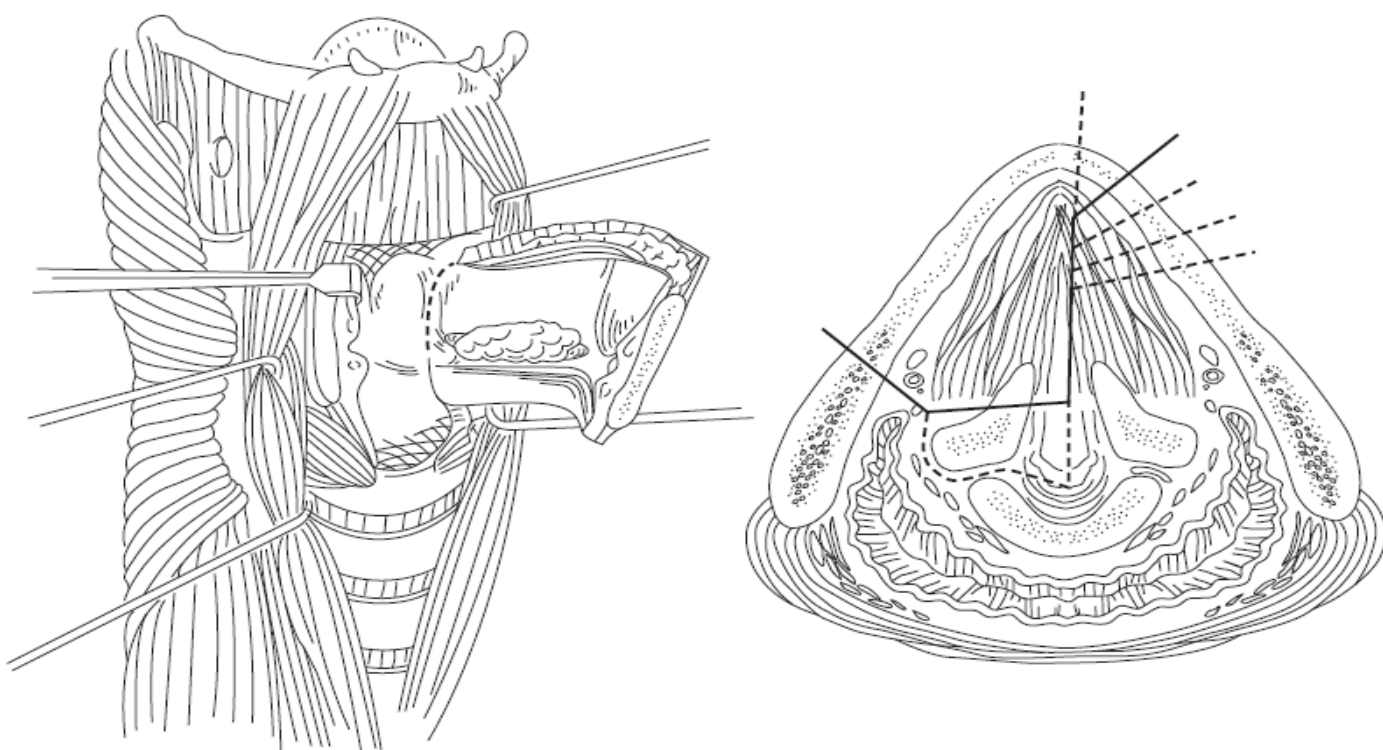
Vertical hemilaryngectomy

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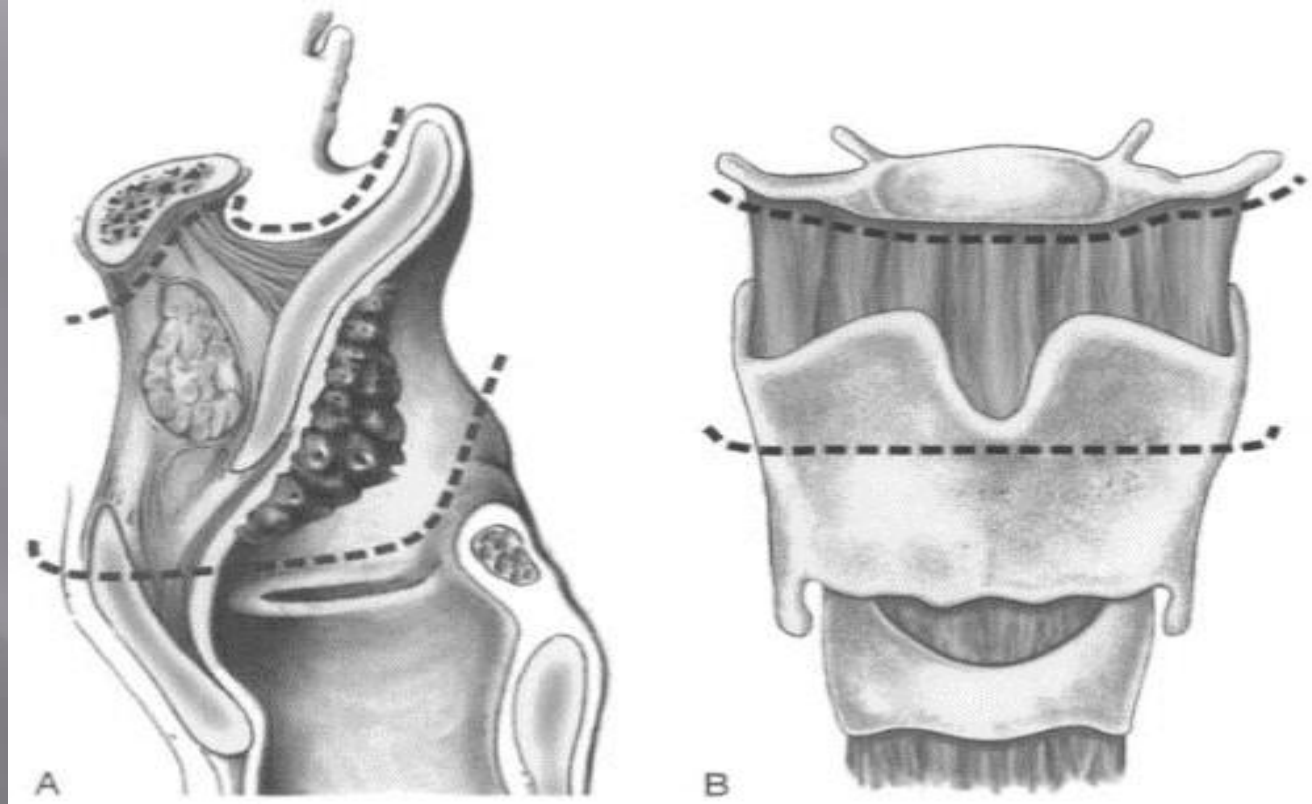
▲ **Figure 31-8.** Schematic of the anatomic resection for a vertical hemilaryngectomy. (Modified and reprinted, with permission, from Myers EN, Suen JY. *Cancer of the Head and Neck*, 3rd ed. WB Saunders, 1996.)

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Horizontal laryngectomy

- ▣ It is an organ-sparing procedure used for the treatment of supraglottic malignancies.
- ▣ Indication :
 - T3 with limited preepiglottic involvement .
- ▣ Tracheostomy is mandatory .
- ▣ Contraindication :
 - ▣ Thyroid cartilage invasion,
 - ▣ Vocal cord fixation
 - ▣ Involvement of Anterior commissure , posterior commissure , the pyriform apex, ,postcricoid mucosa base of tongue & bilateral arytenoids.
 - ▣ Poor pulmonary reserve

Horizontal laryngectomy



Horizontal laryngectomy

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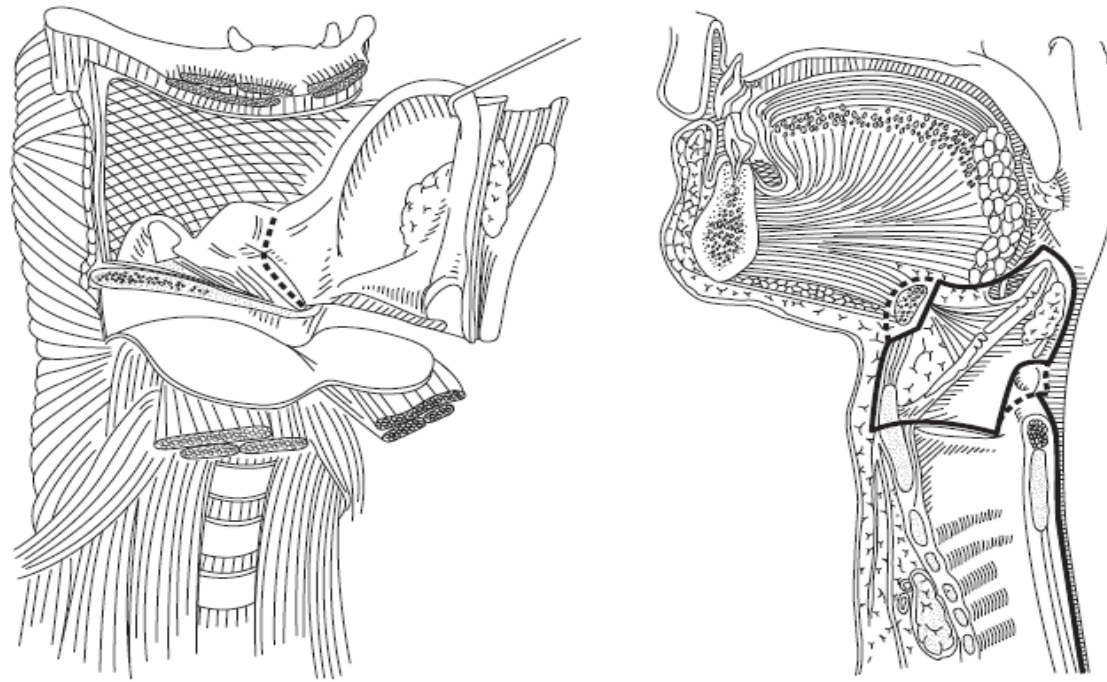
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MALIGNANT LARYNGEAL LESIONS

CHAPTER 31

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▲ **Figure 31-10.** Schematic of the anatomic resection for a supraglottic laryngectomy. (Modified and reprinted, with permission, from Myers EN, Suen JY. *Cancer of the Head and Neck*, 3rd ed. WB Saunders, 1996.)

Supracricoid laryngectomy

▣ This technique adds to the previous supraglottic laryngectomy to remove the supraglottis plus the true vocal cords and thyroid cartilage.

▣ Tracheostomy is mandatory .

▣ Indications :

▪ Supraglottic or glottic cancer

- Anterior commissure involvement
- Ventricle invasion
- Minimal thyroid cartilage invasion
- True vocal cord immobility
- Paraglottic and moderate preepiglottic space involvement
- Transglottic tumors

Supracricoid laryngectomy

- ▣ Cricoid
 - ▣ Hyoid
 - ▣ One arytenoid
- preserved .

** poor pulmonary reserve is contraindication .

Supracricoid laryngectomy

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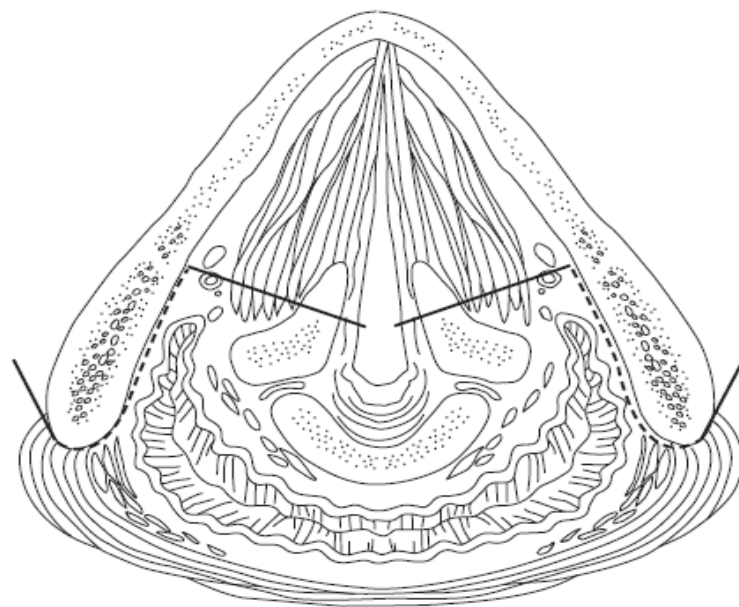
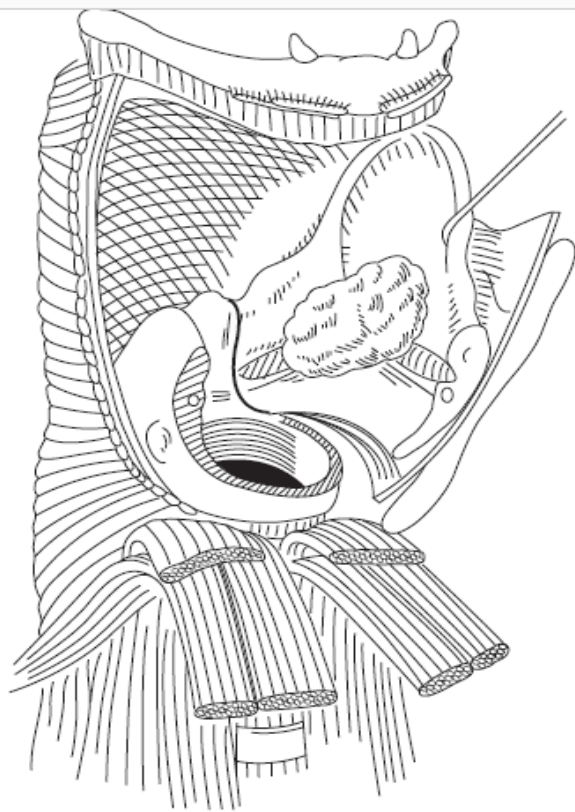


468

(489 of 1034)



125%



▲ **Figure 31-12.** Schematic of the anatomic resection for a supracricoid laryngectomy. (Modified and reprinted, with permission, from Myers EN, Suen JY. *Cancer of the Head and Neck*, 3rd ed. WB Saunders, 1996.)

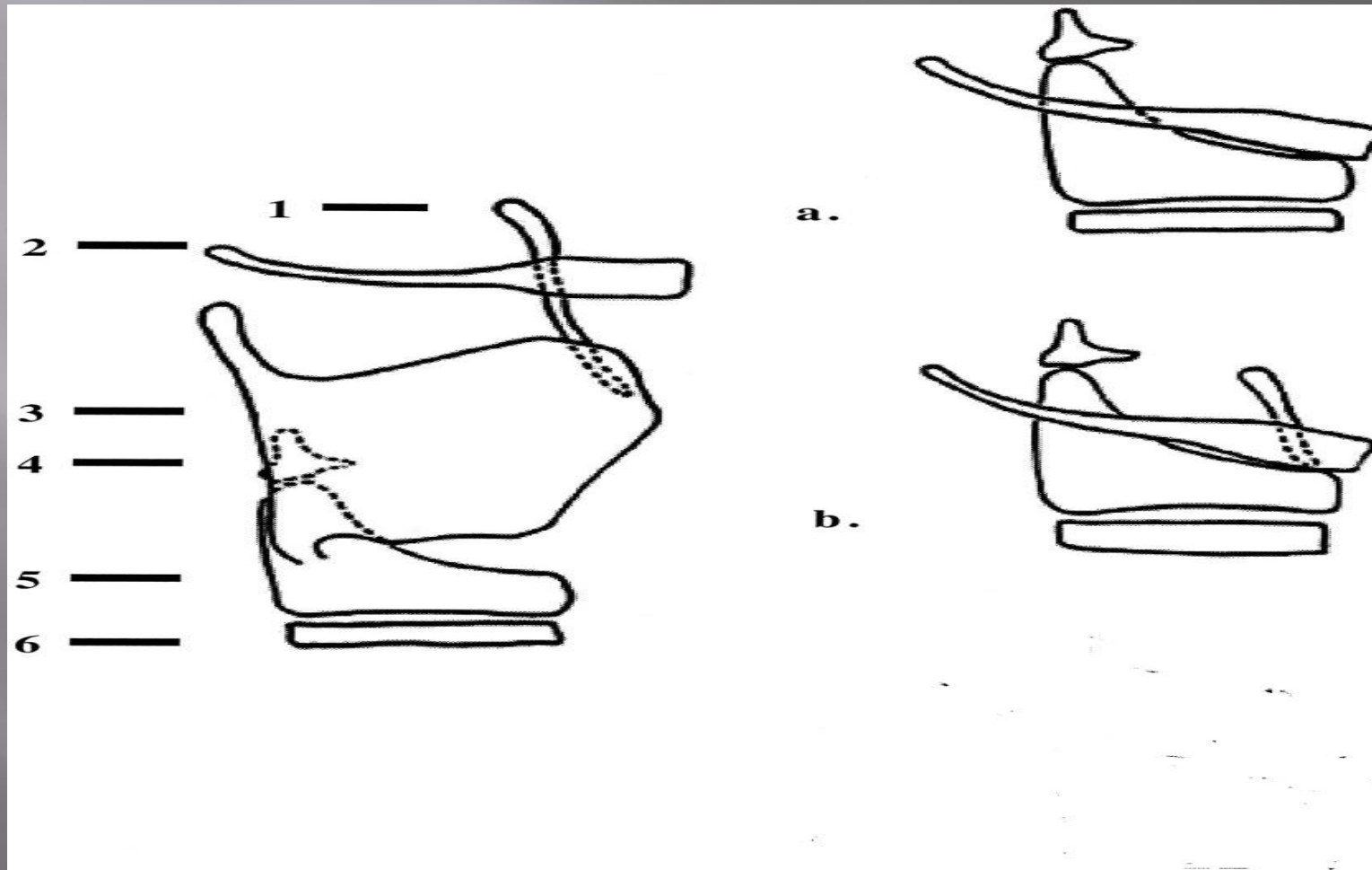


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Supracricoid laryngectomy reconstruction



CHP (epiglottis resected)

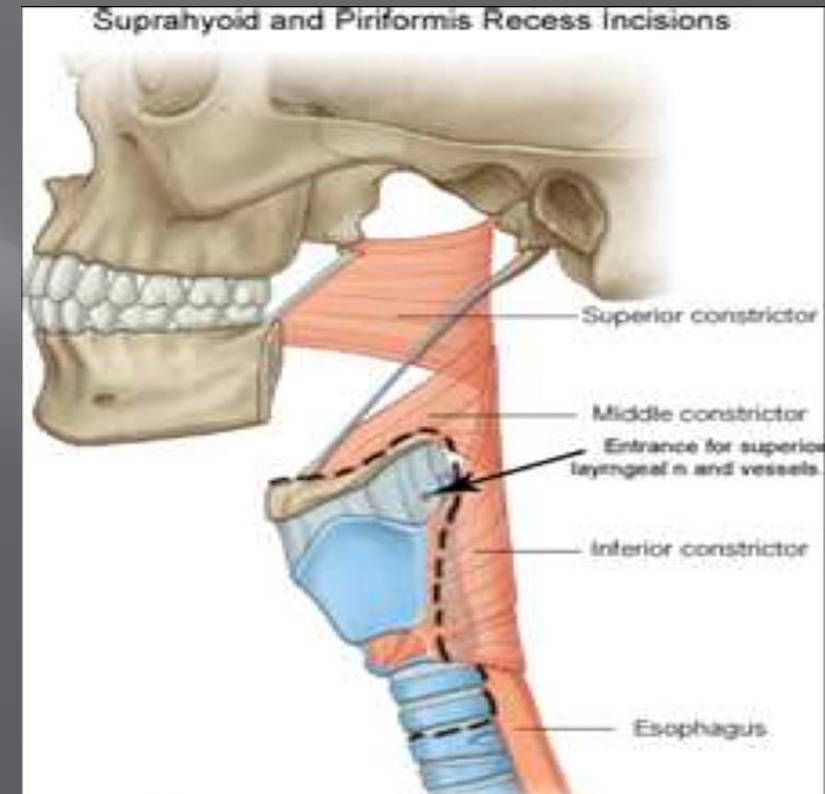
CHEP

Total laryngectomy

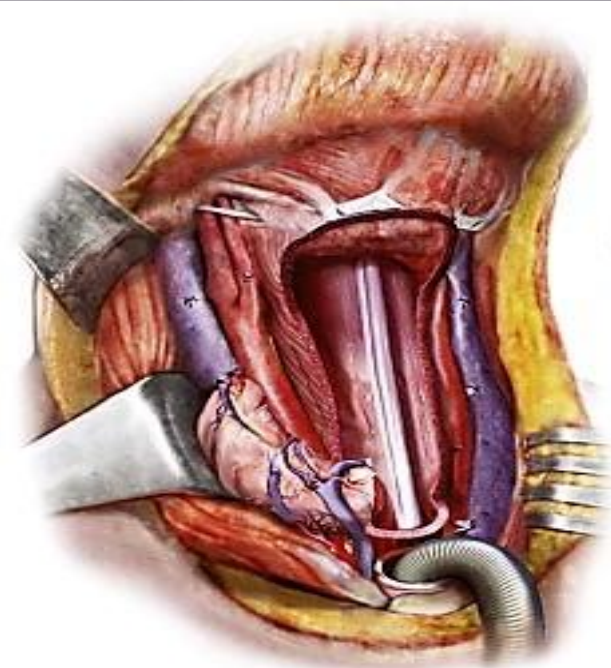
- ▣ Gold standard treatment for laryngeal cancer and has the
- ▣ Best oncologic outcome for which all partial laryngectomies should strive to achieve.
- ▣ Indication
 - T4 & selected T3 cancers,
 - CCRT failures
 - Conservation laryngeal surgery failures
- ▣ Advantage : excellent control rate
- ▣ Disadvantage : sacrifice natural voice

An en bloc resection of all the following :

- ▣ larynx,
- ▣ Hyoid bone,
- ▣ Thyroid cartilage,
- ▣ Cricoid cartilage Proximal tracheal rings inferiorly

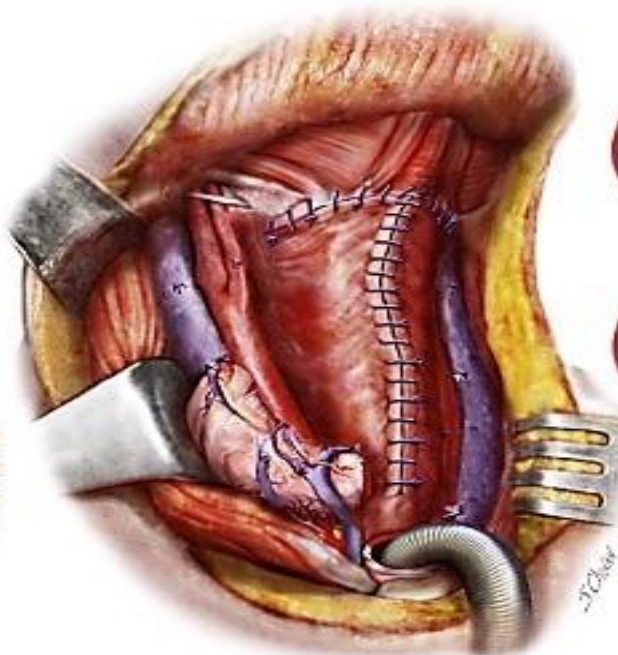


Total laryngectomy pharyngeal closure



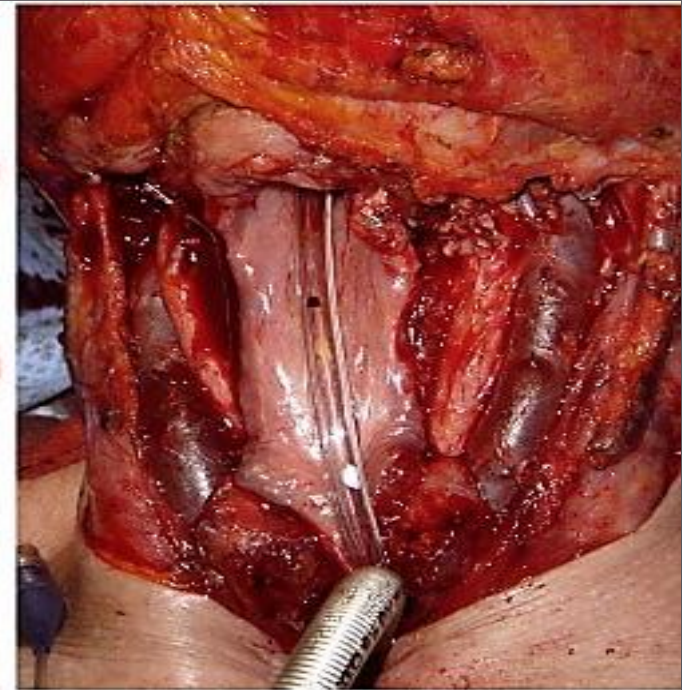
J1

Specimen removed and
nasogastric tube placed



J2

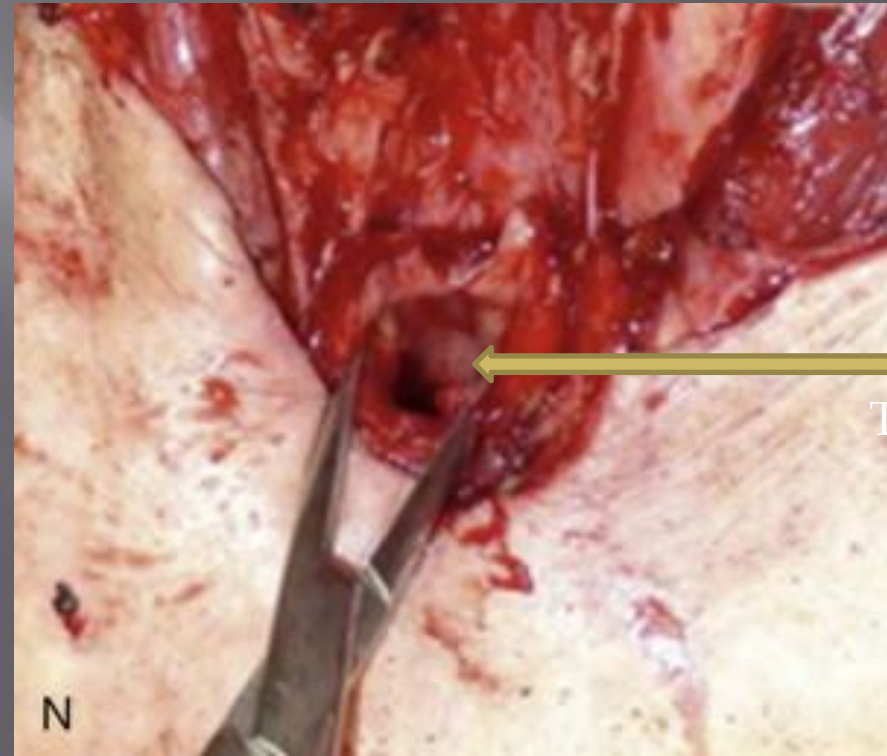
T-shaped closure
with 3-0 polyglactin sutures



J3

Total larygectomy creation of tracheostoma

- ▣ The trachea is sutured to the skin to form a tracheostoma.
- ▣ Avoidance of stomal stenosis is key for best voice restoration procedure.



Total laryngectomy oncological outcome

- ▣ T4 tumors of the glottis
 - 5-year overall survival : 32% to 63%
 - The overall recurrence rate for Stage III and IV glottic : 37%
 - 19% recurring at the primary site & 17% recurring in the neck

Salvage total laryngectomy

▣ Indication :

- Failure of organ preservation therapy with chemoradiation therapy
- fails conservation laryngeal surgery

▣ overall survival:

- 5 years ----- 65%
- 10 years ---- 37%

**Higher surgical complication rate , pharyngocutaneous fistula (30%).

, carotid blow out .

Surveillance

- ▣ 4 to 8 weeks for 1st 2 years,
- ▣ 3 months for the third year,
- ▣ 6 months for years 4 and 5,
- ▣ Annually for life
 - ▣ Physical examination , outpatient laryngoscopy
 - ▣ Annual chest radiograph
 - ▣ Annul TSH

Recurrent laryngeal SCC

- ▣ Hoarseness
- ▣ Pain, even if there is no obvious tumor.
- ▣ Fixation of a previously mobile vocal cord , persistent edema .
- ▣ PET /CT scan is key diagnostic test Post therapy
- ▣ Generous deep biopsies are required , if recurrence is suspected .

Recurrence laryngeal SCC management

- ▣ RT failure :
 - Cordectomy, or
 - Hemilaryngectomy, or
 - Total laryngectomy

- ▣ Surgery (conservative) failure
 - Low volume ---- RT
 - High volume ---- total laryngectomy

Prognosis (overall 5 year survival)

Stage	Glottis %	Supraglottis%	Subglottis %
Stage III	55	55	40
Stage IV	22-52	28 -35	25%

Case 1

- ▣ A 45-year-old woman with a 4-month history of hoarseness that has not improved on antibiotics. She does note that her mother underwent chemoradiation for a lung cancer and she wishes to avoid radiation at all costs.

- ▣ Professionals:
- ▣ Social habits : 25 pack-year history of smoking:
- ▣ Sociofinancial status :
- ▣ Pulmonary function status

Physical examination

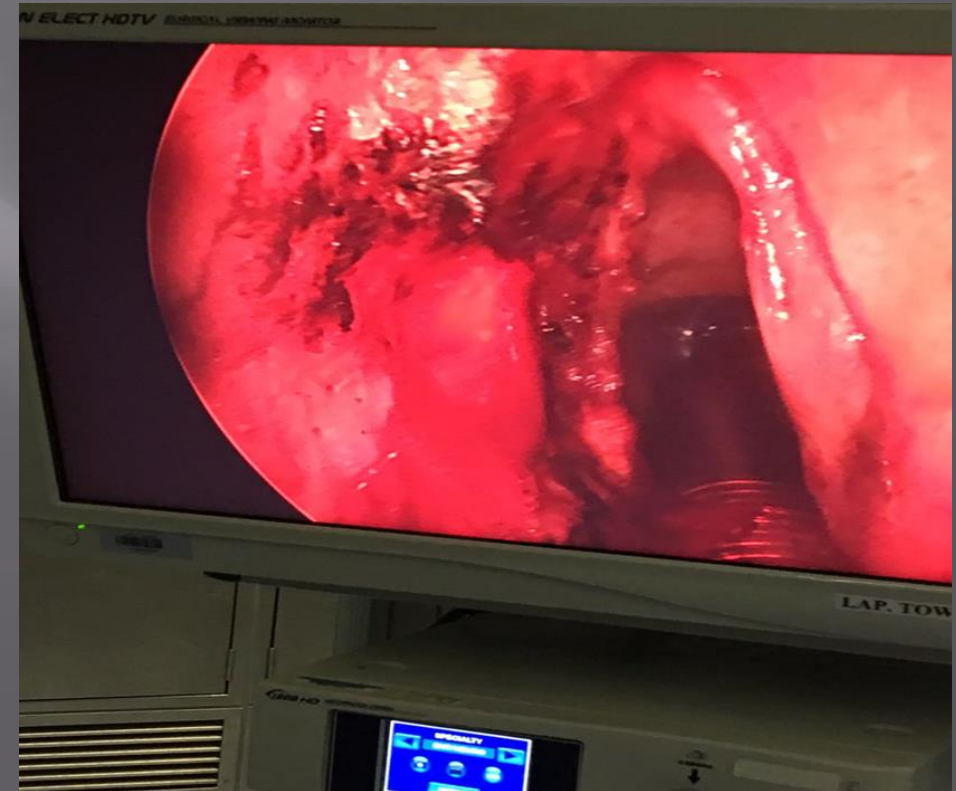
- ▣ Neck : no LAP
- ▣ Flexible fiberoptic examination reveals :
- ▣ 1.5-cm mass involving the whole length of left true vocal cords. Both vocal cords demonstrated normal motion with both arytenoids appearing normal as well.



Diagnostics

- ▣ CT neck , larynx with contrast
- ▣ Chest x-ray
- ▣ Panendoscopy & biopsy : SCC
- ▣ PFT
- ▣ What is the stage?

- ▣ T1aN0 glottic SCC
- ▣ What is the recommended treatment ?
 - ▣ TLM
 - ▣ Vertical partial laryngectomy
- ▣ Does she need neck dissection ?
- ▣ What is the follow up rational ?



Case 2

- ▣ The patient is a 45-year-old man with a 4- month history of hoarseness. He is a 25 pack-year smoker.

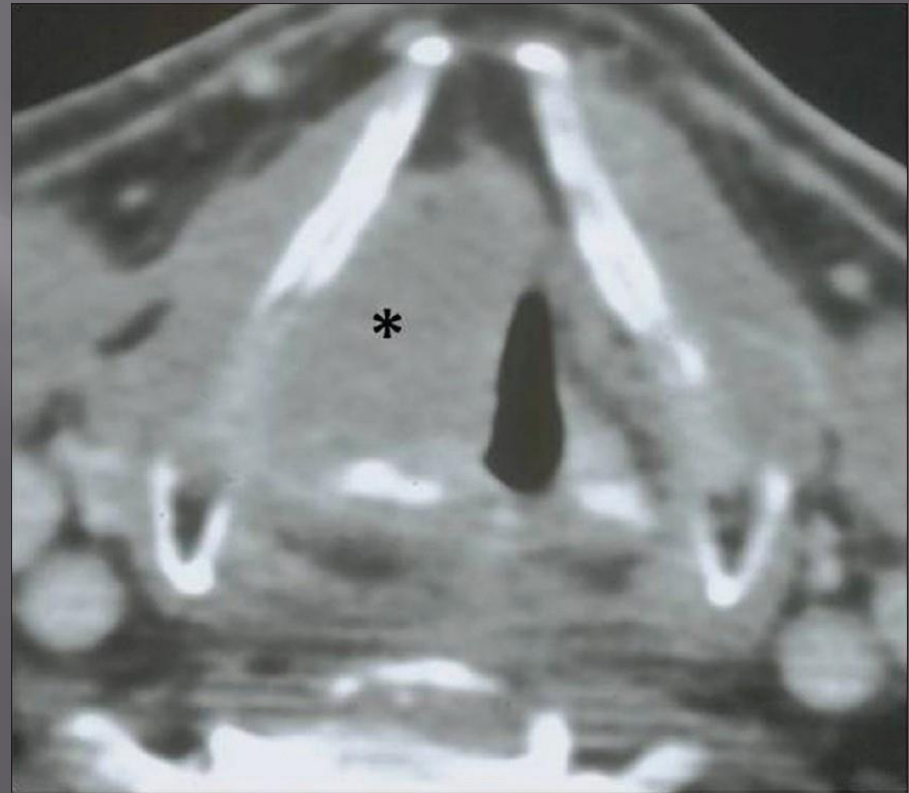
He is currently self-employed as a trial lawyer.

Physical examination

- ▣ Neck ; No LAP
- ▣ Laryngeal crepitus : preserved
- ▣ Flexible fiberoptic laryngoscopy:
- ▣ What is the next step in diagnosis ?



- ▣ CT neck , larynx with contrast
- ▣ Chest X-ray
- ▣ +/- PET scan
- ▣ PFTs
- ▣ What is the next step ?



- ▣ Panendoscopy & biopsy : no subglottic extension and spares both of the arytenoid complexes.

Pathology : SCC

What is the stage ?

- ▣ Supraglottic SCC , T3N0M0
- ▣ What is the recommended management ?

- ▣ Multimodality treatment :
- ▣ CCRT (Primary & bilateral neck level II, III & IV)
 - Primary : 70 Gy
 - Neck : 56-60 Gy
- ▣ Surgery & PORT
 - Supracricoid laryngectomy ,CHP or
 - Total laryngectomy
 - Bilateral neck dissection levelII,III & IV

Thank you