

CARCINOMA OF THE LARYNX

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Carcinoma of the larynx:

Carcinoma of the larynx is the most common head & neck cancer, this has a high cure rate which may reach 90%.

Incidence:

It is more common in males than females in ratio 5:1.

More common in elderly, peak age is the seventh decade.

Aetiology:

- The exact cause of Carcinoma of the larynx is not known, but a number of related factors including:
 1. Tobacco smoking
 2. Alcohol drinking
 3. Asbestos exposure
 4. Radiation exposure
 5. Pre-malignant conditions as leukoplakia, keratosis, atypia, papilloma .

Pathology:

- The commonest site is the glottic region (true vocal cords). constituting about 75% of cases.
- 20% in the supraglottic region.
- 5% in the subglottic region.

Histopathology: The majority is Squamous cell carcinoma, The tumour may be well, moderately or poorly differentiated, the first type is radio resistant in contrast to the last one which is radiosensitive.

Spread:

Direct spread: invasion of laryngeal framework in vertical & circumferential direction, & may spread outside the larynx into adjacent tissues surrounding the larynx as the thyroid gland, trachea, pharynx, esophagus & even the skin. Fixation of the vocal cords in Ca larynx may result from invasion of arytenoid cartilage, crico-arytenoid joint, crico-thyroid muscle or recurrent laryngeal nerve.

Lymph node spread: to the deep cervical lymph nodes (jugular), prelaryngeal or paratracheal lymph nodes.

supraglottic region has a rich lymphatic drainage, & less for the subglottic region, but the glottic region (vocal cords) has practically no lymphatic drainage, so that Ca of the vocal cords rarely spread to the lymph nodes

Distant metastasis: rare for all sites, only 5% of patients presented with Ca larynx have distant metastasis, which is mainly to the lung.

Clinical features:

General

Laryngeal cancer may present with general symptoms like weight loss, anemia and paraneoplastic symptoms like neuropathy and rash.

1. Progressive & unremitting Dysphonia or hoarseness (change of voice), this is an early symptom in glottic tumor.
2. Pain: more common in supraglottic tumors & it may radiate to the ear. It indicates invasion of the laryngeal cartilage.
3. Dyspnea & stridor: indicates advanced tumor. Subglottic tumor may present with these symptoms as the only symptoms.
4. Dysphagia: also in advanced tumor, indicates invasion of the pharynx or esophagus.
5. Cervical lymphadenopathy: which may be bilateral, it is more for supraglottic Carcinoma & rare in glottic Carcinoma.
6. Cough & hemoptysis.
7. Anorexia, cachexia are late symptoms.

Glottic cancer;

Change of voice or hoarseness is the early symptom and any patient has hoarseness that continues for more than 3 weeks should be subjected for laryngeal examination by laryngoscope.

Advanced lesions may lead to airway obstruction causing progressive **dyspnea and stridor** .

Hemoptysis is usually associated with larger tumours.

Referred otalgia is a sinister sign suggesting deep invasion.

Dysphagia and odynophagia are rare and indicate advanced disease.

Cervical lymphadenopathy is rare presenting symptom .



Supraglottic cancer;

Change of voice ,voice alteration is different from that seen with glottic and subglottic cancer.

Small supraglottic lesions may present with **globus or foreign body sensation** .

Hemoptysis in exophytic lesions.

Hot potato voice in large lesions.

Hoarseness if there is extension to the vocal cords.

Referred otalgia ,odynophagia and true dysphagia indicate lateral extension of the tumour.

Cervical lymph adenopathy may be the first presenting symptom without any laryngeal symptoms .

Stridor is late presentation and indicates advanced cancer.

Subglottic cancer;

Globus feeling or foreign body sensation in the throat.

Hoarseness due to glottic or recurrent laryngeal nerves involvement.

Progressive dyspnea and stridor in circumferential lesions.

The tumour may involve the thyroid and may mimic a thyroid isthmus lesion.

Examination;

It includes general and ENT examination.

ENT examination;

It includes complete examination by endoscope to check the site of the lesion, extension to the adjacent subsites, pyriform fossa, base of the tongue and check the mobility of the vocal cords .

Neck examination to detect the cervical lymphadenopathy and thyroid gland to exclude its involvement.

Radiology ;

1.CT scan.

Laryngeal tumours on CT scan are typically of soft_ tissue attenuation and enhance with intravenous contrast media.

2.MRI .

The tumour has high water content and so has high intrinsic contrast on T2-weighted MRI .

Both CT and MRI are complementary in detection of the tumour,its size ,extension and cartilage invasion.

It is better to do radiological examination before taking biopsy because taking biopsy will affect the size and extension of the tumour.

Endoscopy and biopsy.

Any patient with suspected laryngeal mass should be subjected for direct laryngoscopy (DL) and taking biopsy under general anesthesia. Complete investigations should be done for the patient before surgery in addition to ECG and chestX-ray .

The patient should be informed that tracheostomy may be needed during or after surgery.

The biopsy taken should be representative and not taken from necrotic areas.

While the patient under GA ,we can asses the neck well for the presence or absence of cervical lymphadenopathy.

At recovery from anesthesia,vocal cord mobility can be checked.

TNM classification of laryngeal tumor: TNM classification help us in determine the treatment plan & prognosis of the tumor.

“T” Tumor

Tis: carcinoma in situ.

T1: tumor limited to one subsite with normal vocal cord mobility.

T2: tumor extends to more than one region with or without impaired vocal cord mobility.

T3: tumor limited to the larynx with vocal cord fixation

T4: tumor extends outside the larynx or invade thyroid &/or cricoid cartilage.

GLOTTIS

T1a	Tumor limited to 1 vocal cord with normal mobility
T1b	Tumor involves both vocal cords with normal mobility
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, an/or inner cortex of the thyroid cartilage
T4a	Moderately advanced local disease: Tumor penetrates the outer cortex of the thyroid cartilage and/or invades tissues beyond the larynx
T4b	Very advanced local disease: Tumor invades prevertebral space, encases carotid artery, or involves mediastinal structures

AJCC TNM classification of carcinoma of SUPRAGLOTTIS

Stage	Description
Primary tumor (T)	
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ
Supraglottis	
T1	Tumor limited to 1 subsite of supraglottis, with normal vocal cord mobility
T2	Tumor invades mucosa of more than 1 adjacent subsite of supraglottis or glottis or region outside the supraglottis, without fixation of the larynx
T3	Tumor limited to larynx with vocal cord fixation and/or invades any of the following: postcricoid area, preepiglottic 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
T4b	Very advanced local disease: Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures

Staging of subglottic cancer (TNM) STAGING



Staging

- **Subglottis**

- **Tis:** CA in-situ
- **T1:** limited to subglottis
- **T2:** extends to vocal cord with normal or impaired mobility
- **T3:** limited to larynx w/vocal cord fixation
- **T4a:** invades cricoid or thyroid cartilage, and/or invades tissues beyond the larynx
- **T4b:** invades prevertebral space, encases carotid artery, or invades mediastinal structures

- **Nodes**

- **N0:** no regional node mets
- **N1:** single ipsilateral node, ≤ 3 cm
- **N2a:** single ipsilateral node, > 3 cm, ≤ 6 cm
- **N2b:** multiple ipsilateral nodes, ≤ 6 cm
- **N2c:** bilateral or contralateral nodes, ≤ 6 cm
- **N3:** node > 6 cm

- **Mets**

- **Mx:** unknown
- **M0:** no distant mets
- **M1:** distant mets

·Stage 0: Tis N0M0.

·Stage I: T1 NO M0.

·Stage II: T2 NO M0.

·Stage III: T3 NO M0

Or (T1-T2-T3) N1M0

·Stage IV: T4any N any M.

Or any T (N2-N3) any M.

Or any T any N M1.

outside the larynx or invade thyroid &/or cricoid cartilage.

Treatment of Ca larynx:

Staging of the laryngeal carcinoma (T staging) depends on the sub site

but the (N and M) staging is the same for all.

Treatment;

As mentioned previously, the type of treatment depends on the site of tumour ,size and the presence or absence of lymph nodes.

Treatment requires a multidisciplinary team including surgeons,radiotherapists,physicians and speech therapists.

Early_stage disease(stage I & II):

may be treated endoscopically or with radiotherapy.

Advanced disease (stage III & IV): may be treated with laryngectomy or chemo radiotherapy.

1. Radiotherapy;

This type of treatment is indicated for early(T1) tumours but scrupulous follow-up is needed to detect the recurrence early.

It may be complicated by laryngeal perichondritis which may require heavy antibiotics and even admission to hospital.

It may be given after surgery for extensive tumor to eradicate microscopic metastasis.

2. Chemotherapy.

It can be given alone for the patient or in combination with radiotherapy

3. Endoscopic resection.

It is indicated for early lesions, and can be done with the aid of CO2 laser and should be done by expert surgeon.

4. Laryngectomy .

It is partial or total removal of the larynx and may be classified into the following;

A. Partial laryngectomy which includes partial vertical (cordectomy) and partial horizontal laryngectomy.

B. Total laryngectomy which includes removal of the whole larynx with its cartilages in addition to partial thyroidectomy, strap muscles and hyoid bone and the patient will be left with permanent tracheostomy.

5. Treatment of the lymph nodes .

Treated by radiotherapy or surgery (neck dissection)

III- Palliative treatment: for patients with:

- Distant metastasis.
- Inoperable primary tumor.
- Poor general health (patient unfit for radical treatment).

Palliative treatment includes:

1. Pain relief (using analgesics).
2. tracheostomy for airway obstruction.
3. Radiotherapy & Chemotherapy

Complications of radiotherapy:

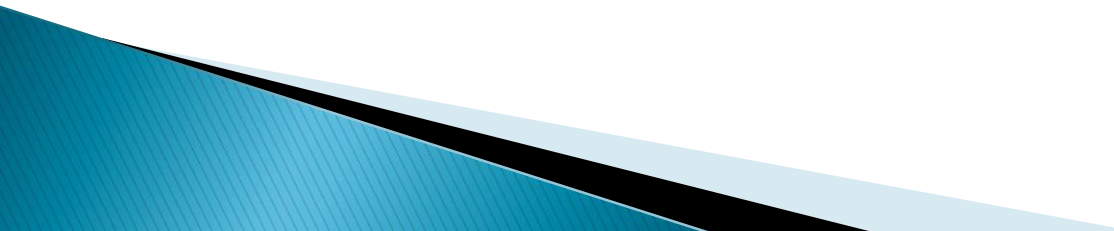
1. Mucositis: painful ulceration in the oral cavity & pharynx.
2. Skin complications: desquamation, necrosis, pigmentation & telangiectasia.
3. Perichondritis of the laryngeal cartilages.
4. Laryngeal edema.
5. General side effects: malaise, anorexia & weakness.
6. Late complications: induction of secondary malignancies as thyroid tumor, osteosarcoma.

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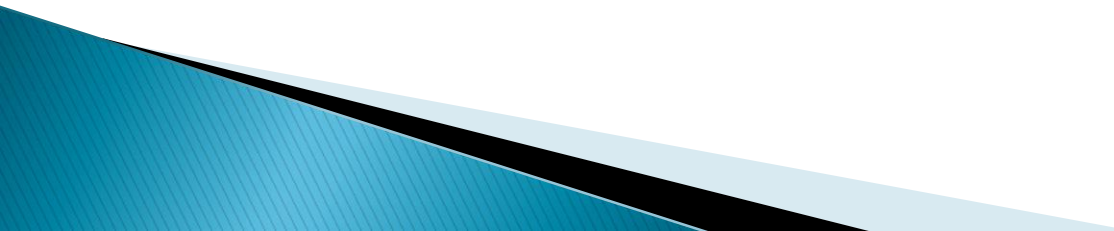
Vocal cord paralysis

Position of the Vocal folds

The position of the vocal folds may be described as being in various positions.

- 1- Abducted position 30 to 45 degrees from the midline. This is the position of maximal abduction during inspiration.
 - 2- Cadaveric position, or intermediate, 15 to 20 degrees from the midline. This is the position of immediate total denervation of both the SLN & RLN as in high vagal paralysis.
 - 3- Paramedian position, just off midline. The resting position of vocal folds after long-term RLN injury.
 - 4- Median position, the position of SLN paralysis & normal larynx during phonation.
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Aetiology of Vocal cord paralysis:

- 1-Tumor in the thyroid gland, mediastinum, esophagus, or larynx.
 - 2-Surgical trauma (most commonly by thyroidectomy).
 - 3-Mediastinal compression (cardiac hypertrophy, aortic aneurysm, mediastinal and lung masses).
 - 4-Toxic neuritis following influenza, alcohol, lead or arsenic poisoning.
 - 5-Collagen vascular diseases.
 - 6-Sarcoidosis (diagnosed by ACE level).
 - 7-Lyme disease (diagnosed by Lyme titer).
 - 8-Syphilis (FTA-ABS, VDRL).
 - 9-Infectious mononucleosis.
 - 10-Diabetic neuropathy.
 - 11-Central lesion (rare).
 - 12-Unknown (about 20%).
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Symptoms:

Depend on, if the VC paralysis unilateral or Bilateral, & if the type of the VC paralysis if abductor or adductor type (clinically VC paralysis divided into 2 types: abductor & adductor type depend on the direction of movement which is the VC can not make it)

1) unilateral abductor VC paralysis(Paramedian position)(pure unilateral RLN injury)

Hoarseness is usually the only symptom of unilateral laryngeal paralysis. Initially, some patients have aspiration of liquids during swallow, and this symptom improves with time.

2) unilateral adductor VC paralysis(Cadaveric position)(injury of both the SLN & RLN as in high vagal paralysis).Patient complain from breathy dysphonia, vocal fatigue, and dyspnea with speaking. aspiration of liquids during swallow , this symptom often gradually disappears as the healthy vocal fold increases its excursion beyond the median line.

Treatment of 1)& 2)

Treatment may be nonsurgical (i.e. voice therapy) or surgical therapy which includes the following;

1-vocal fold injection

2-medialization thyroplasty

3-arytenoid adduction

4-laryngeal reinnervation

3) Bilateral abductor paralysis (Paramedian position)

Bilateral abductor paralysis is the most common form of bilateral motor paralysis, mostly caused by extensive thyroid surgery. Symptoms include hoarseness, cough mechanism is less forceful & as the vocal cords approach the median line, respiratory embarrassment may become increasingly severe, progressive dyspnea with exertion, stridor may need emergency tracheostomy.

Treatment may include tracheostomy with speaking valve, endolaryngeal or extralaryngeal arytenoidectomy, CO₂ laser cordotomy, laryngeal reinnervation.

4) Bilateral adductor paralysis (Cadaveric position)

mostly caused by neurological causes(CVA,CNS neoplasm,head trauma)Symptoms include hoarseness, breathy dysphonia, vocal fatigue, and dyspnea with speaking. aspiration of liquids during swallow, Severe glottal incompetence in the postoperative patient may result in poor pulmonary toilet, which prolongs patient morbidity .

Treatment

- 1-vocal fold injection.
- 2-epiglottopexy.
- 3- nasogastric tube & permanent tracheostomy.
- 4-Total laryngectomy

Investigations:

1. Full hematological investigations: including CBP & ESR.
 2. Biochemical & serological tests : including blood sugar.
 3. Radiological: X Ray of neck & nasopharynx , CT Scan from skull base to mid thorax, thyroid scan & barium swallow.
 4. laryngeal EMG .
 5. Endoscopic examination: panendoscopic examination for the larynx, pharynx, esophagus & bronchial tree & biopsy from the suspected area &/or from the nasopharynx & bronchial carina sent to histopathology.
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