

UPDATE MANAGEMENT OF OBSTRUCTIVE AIRWAY DISEASE

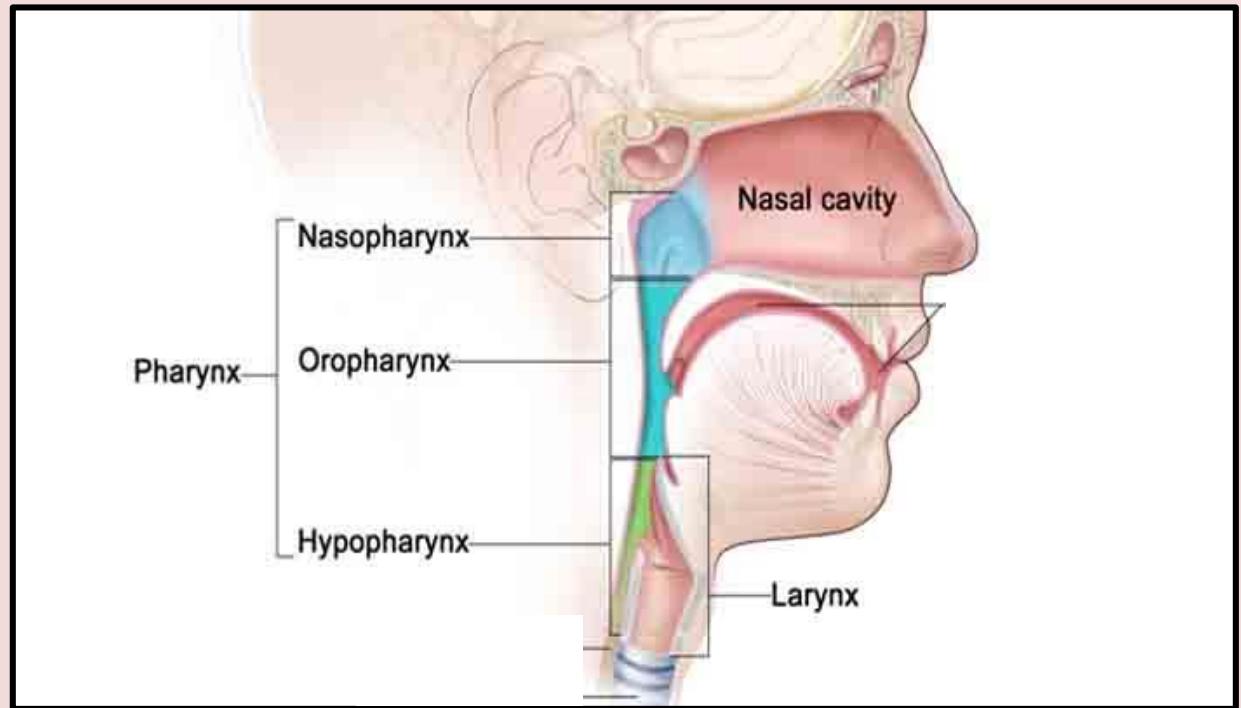
Sutji Pratiwi Rahardjo

AIRWAY



UPPER AIRWAY

- ✓ Nose
- ✓ Pharynx
- ✓ Larynx



2

Upper Airway Obstruction → Emergency

ETIOLOGY



INFECTION

- Croup syndrome
- Acute epiglottitis
- Retropharyngeal abscess



CONGENITAL

- Laryngomalacia
- Subglottic stenosis
- Web laryngeal



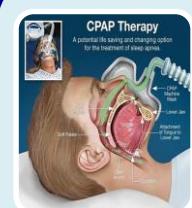
Trauma

- Maxillofacial Trauma
- Laryngeal trauma



Tumor

- Laryngeal Benign Tumor
- Laryngeal Malignant Tumor



Others

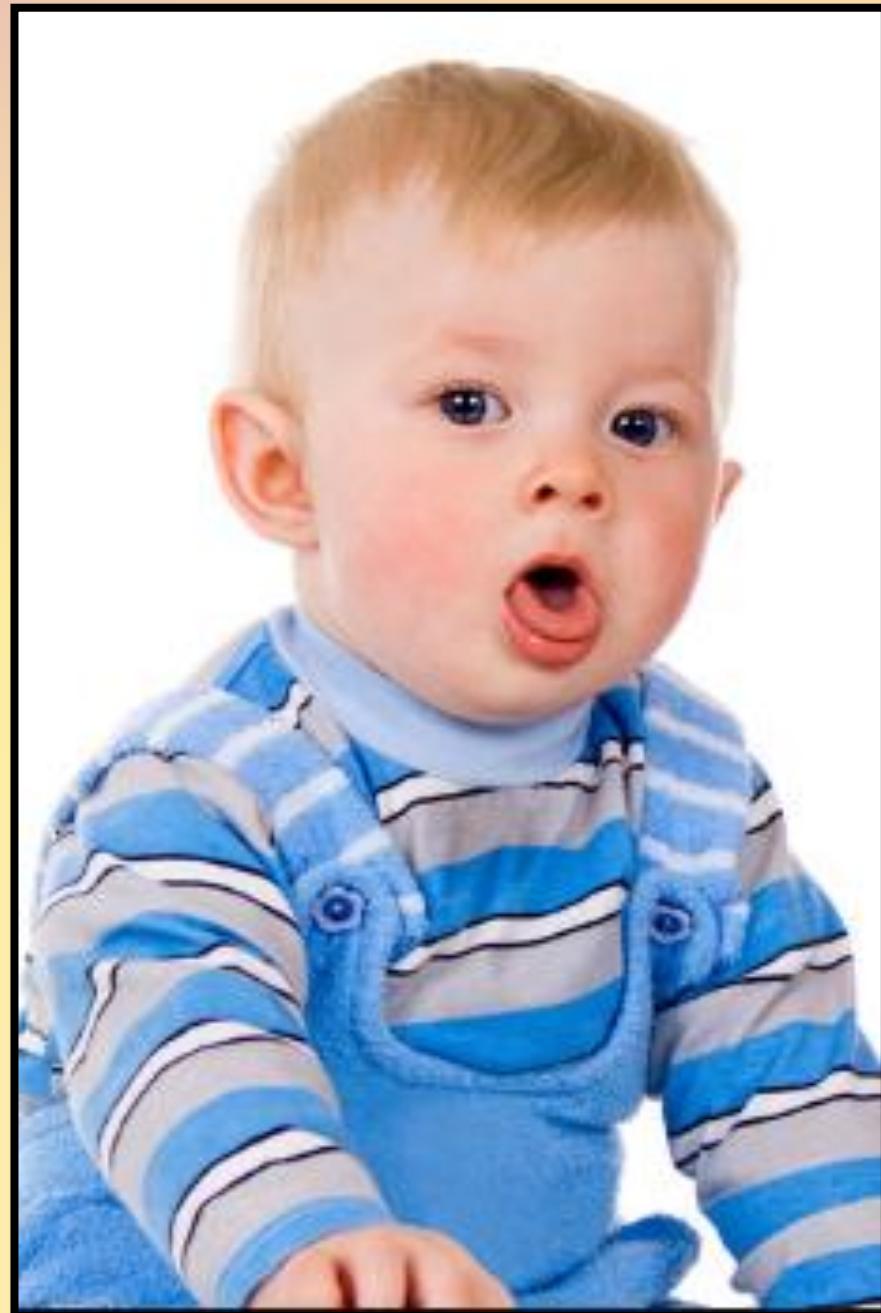
- OSAS

CROUP (ACUTE LARYNGOTRACHEOBRONCHITIS)

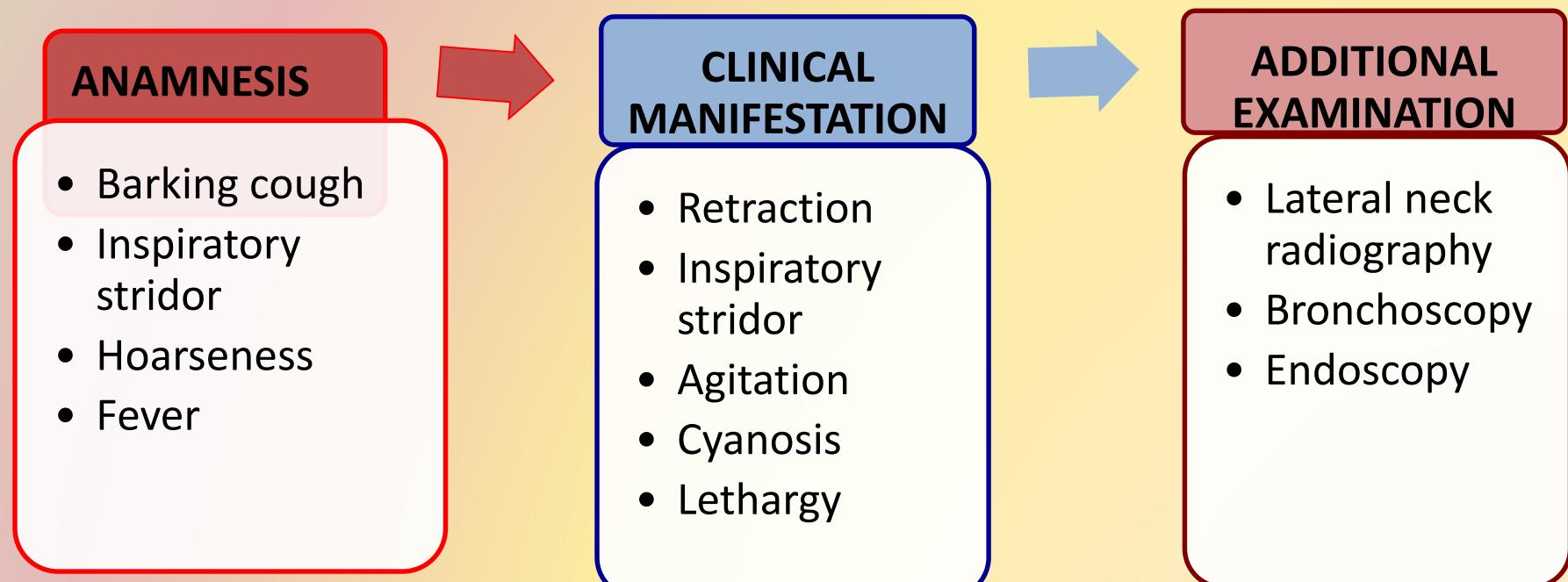
Croup manifests as hoarseness, a seal-like barking cough, inspiratory stridor, and a variable degree of respiratory distress.

Croup syndrome usually occurs in children 6 months - 6 years old.

Males > females, with ratio of approximately 3 : 2



DIAGNOSIS



WESTLEY SCORE

Feature	Number of points assigned for this feature					
	0	1	2	3	4	5
Chest wall retraction	None	Mild	Moderate	Severe		
Stridor	None	With agitation	At rest			
Cyanosis	None				With agitation	At rest
Level of consciousness	Normal					Disoriented
Air entry	Normal	Decreased	Markedly decreased			

A total score of ≤ 2 : *Mild croup*

A total score of 3-5 : *Moderate croup*

A total score of 6 -11 : *Severe croup*

A total score of ≥ 12 : *Impending respiratory failure*

CLINICAL MANIFESTATION

MILD	Barking cough	SEVERE	Barking cough
	Inspiratory stridor		Inspiratory stridor
	Retraction		Retraction of the respiratory muscles
MODERATE	Barking cough	IMPENDING RESPIRATORY FAILURE	Lethargy
	Inspiratory stridor		Barking cough
	Retraction		Inspiratory stridor
	Agitation		Retraction
Lethargy or decrease consciousness		Cyanosis	

A close-up, endotracheal view of the larynx. The glottis is severely swollen and appears as a narrow, vertical slit, characteristic of acute epiglottitis. The surrounding mucosal tissue is also inflamed.

ACUTE EPIGLOTTITIS

- Acute inflammation in the supraglottic region
- Caused by viruses and bacterial infections
- Usually occurs in children 2-7 years old



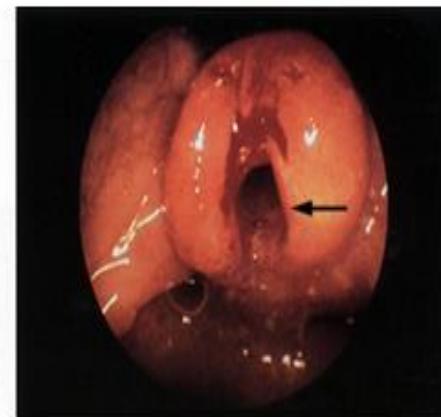
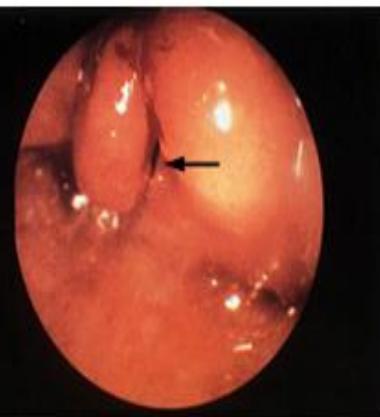
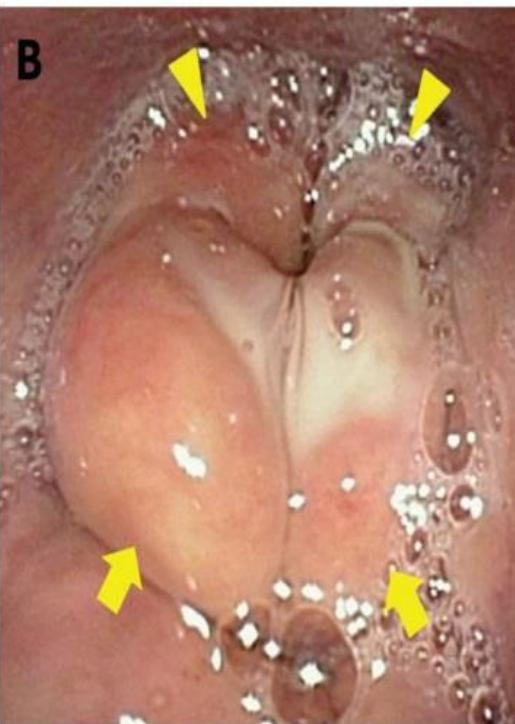
CLINICAL MANIFESTATION

- Sore throat
- Odynophagia
- Dysphagia
- Drooling
- Fever
- Hot potato voice
- Inspiratory stridor

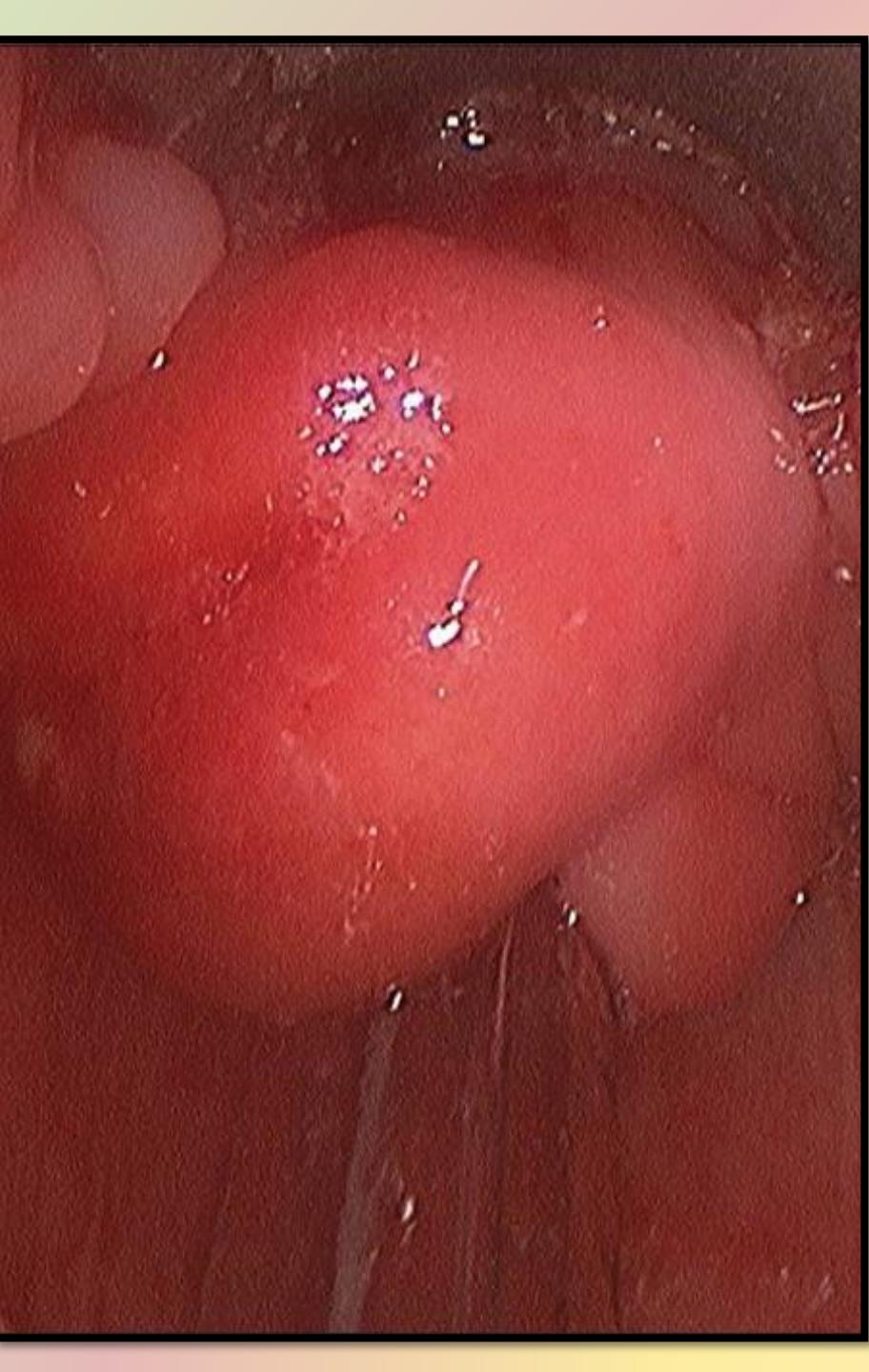
Physical and additional examination

- Indirect laryngoscopy: edematous epiglottitis
- *Radiologic finding*: thumb sign

Lateral X-Ray of Epiglottitis showing the enlarged epiglottis. This is also known as the thumb sign.



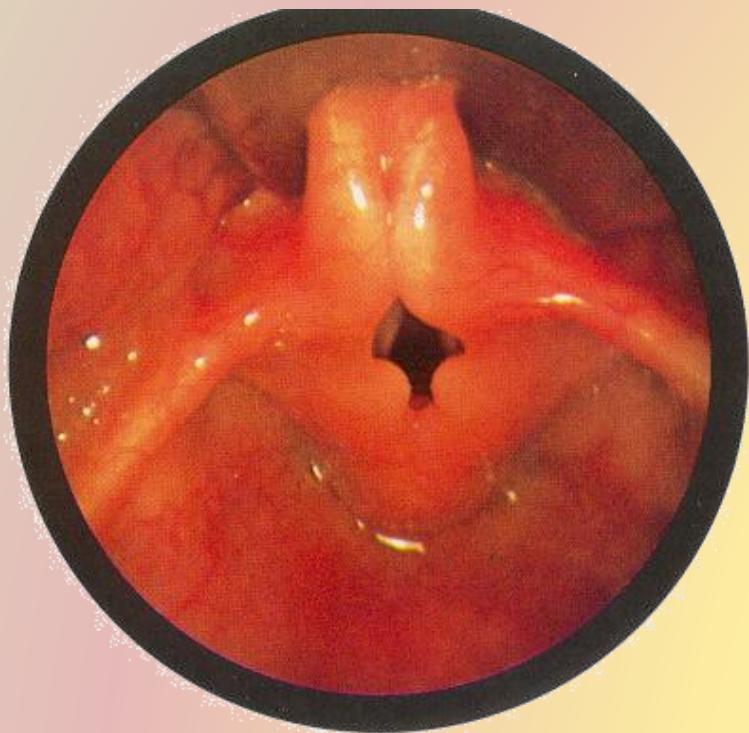
On the left, an endoscopic view of the throat shows almost complete blockage of the airway (arrow). This finding is typical of epiglottitis. On the right, the airway has been opened (arrow) after insertion and removal of an endotracheal tube, although some redness and blood remain.



MANAGEMENT

- Infection: Antibiotic
- Inflammation: corticosteroid
- Symptomatic : analgesic - antipyretic
- Airway management

LARYNGOMALACIA



- ✓ The most common congenital laryngeal anomaly.
- ✓ The most frequent congenital cause of stridor in infants.
- ✓ Prolapse of supraglottic structures.
- ✓ Often self-limited and typically resolves between the ages of 12 and 24 months.
- ✓ The baby's cry is usually normal.
- ✓ The etiology of laryngomalacia is a matter of some debate.



CLINICAL MANIFESTATION

Signs and symptoms:

- Stridor
- Retraction of the neck and chest muscles
- Gastroesophageal reflux

Symptoms may come and go over months depending on growth and level of activity.

MANAGEMENT

Most children with laryngomalacia experience spontaneous resolution.

Children with symptoms of gastroesophageal reflux disease may benefit from treatment with histamine blocker, or proton pump inhibitors.

Children with severe laryngomalacia, surgical intervention can provide significant improvement in respiratory and feeding symptoms.

TABLE. Common Causes of Upper Airway Obstruction

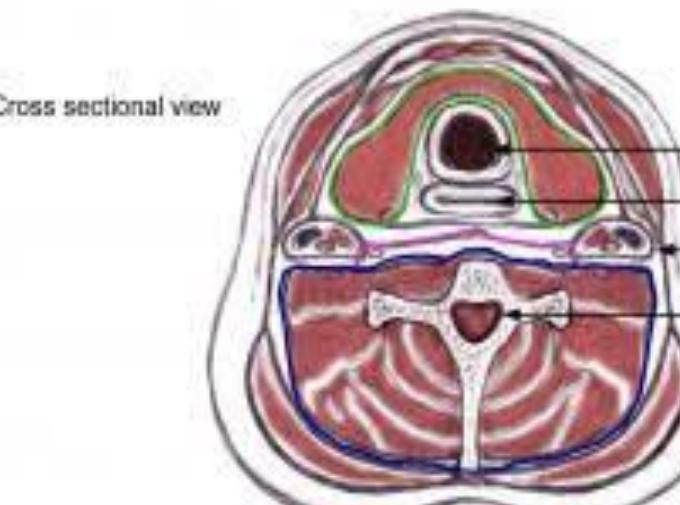
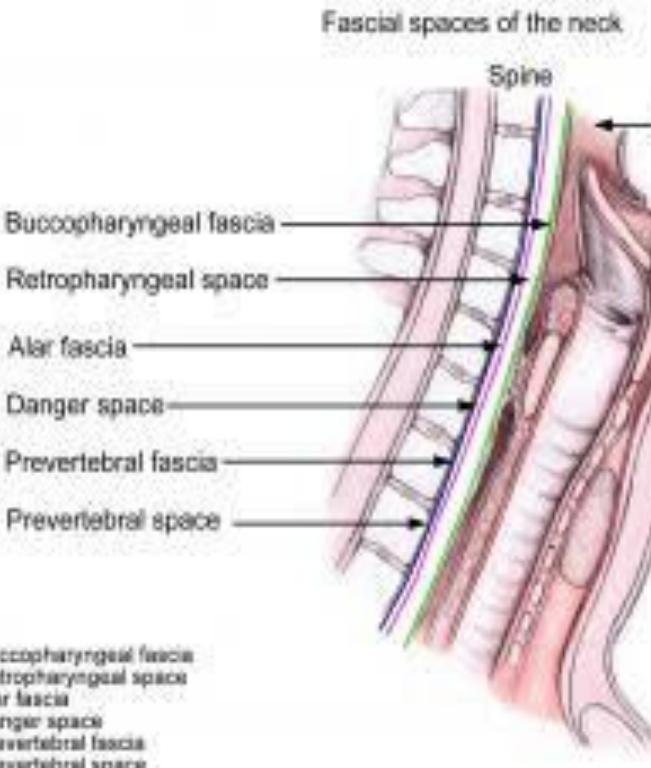
VARIABLE	LARYNGOMALACIA	SUPRAGLOTTITIS (EPIGLOTTITIS)	LARYNGOTRACHEITIS (CROUP)	BACTERIAL TRACHEITIS
Affected site	Supraglottis	Supraglottis	Subglottis	Trachea
Common ages	2–4 weeks, resolves around 18 months	2–6 years	6–36 months	3 months to 6 years
Onset	Slow	Rapid	Slow	Rapid
Stridor	Inspiratory	Inspiratory, biphasic	Biphasic	Biphasic
Toxic appearance	Uncommon	Yes	Uncommon	Yes
Drooling	No	Yes	No	No
Hoarseness	No	Uncommon	Yes	Possible
Cough	No	Possible	Yes	Yes
Microbiology	None	Bacterial: <i>Haemophilus influenzae</i> , <i>Streptococcus pneumoniae</i> , β-hemolytic streptococci, <i>Staphylococcus aureus</i>	Viral: parainfluenza	Bacterial: <i>S aureus</i> , <i>S pneumoniae</i> , <i>H influenzae</i> , <i>Moraxella catarrhalis</i>

RETROPHARYNGEAL ABSCESS

The condition occurs most frequently in children, but its incidence is increasing in adults

Caused by trauma to the posterior pharynx

As a retropharyngeal abscess grows in size, it can lead to upper airway obstruction and asphyxia





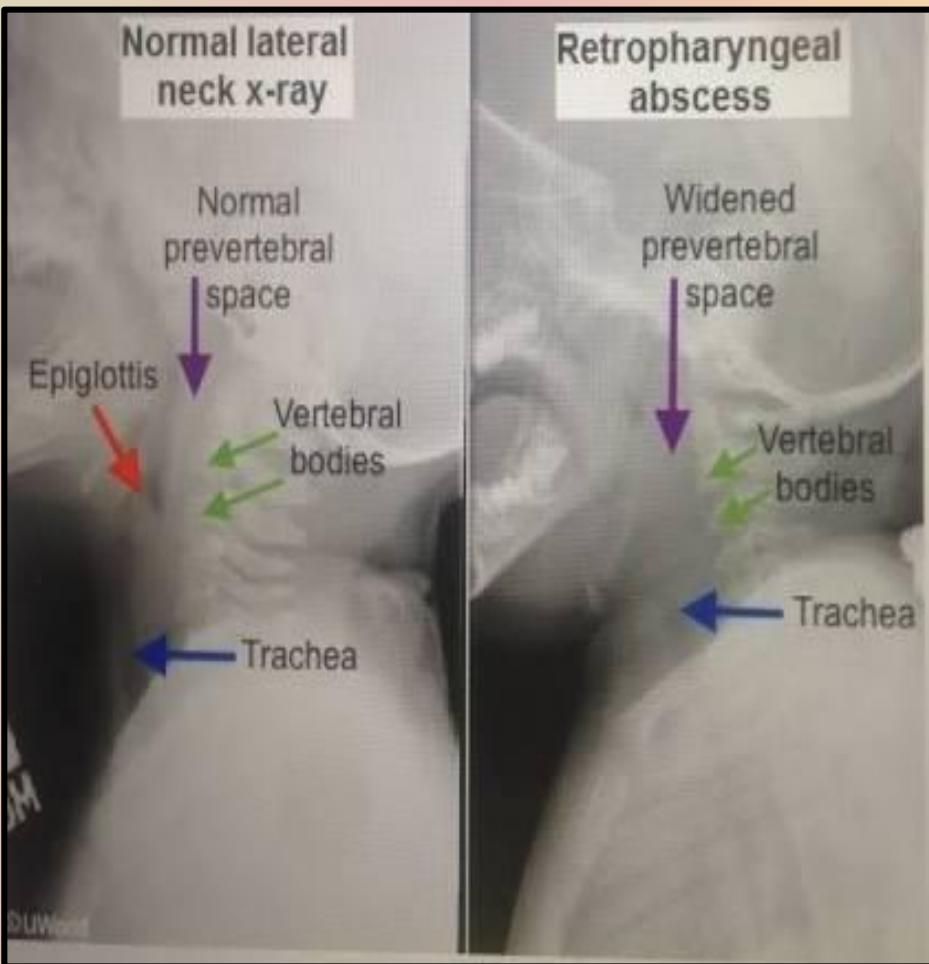
Signs & Symptoms

- Sore throat
- Fever
- Odynophagia
- Dysphagia
- Neck pain
- Hypersalivation
- Torticollis
- Hot potato voice
- Inspiratory stridor
- Trismus

Diagnosis

- History of dental infection, upper airway infection or trauma
- Clinical signs and symptoms
- Investigation: lateral neck radiography, CT-Scan of the neck, ultrasonography

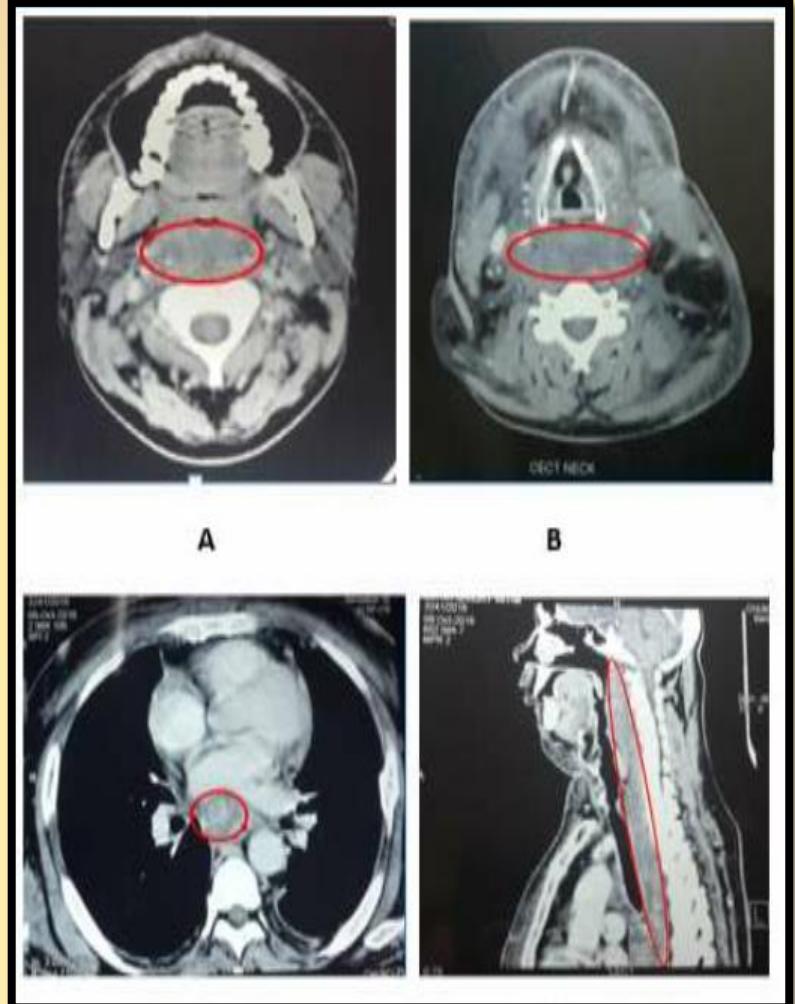
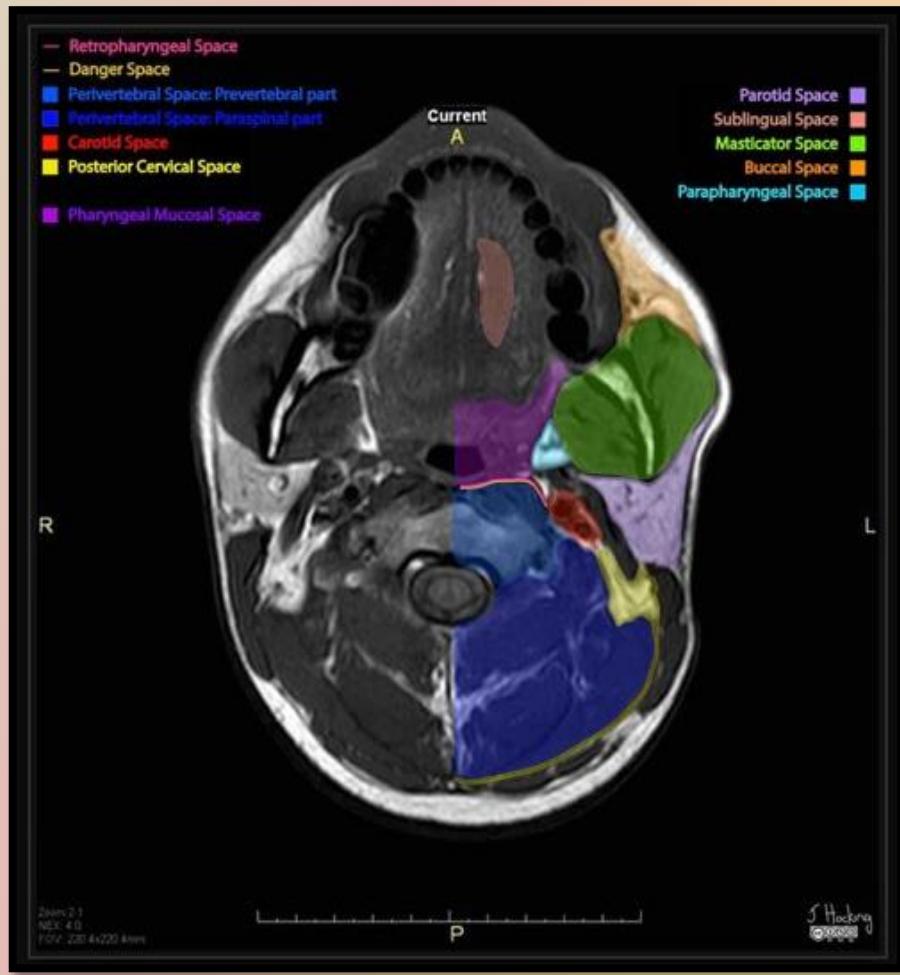
Lateral Neck Radiography



Widening of the retropharyngeal soft tissues with retropharyngeal abscess as more than 7 mm at C2 and more than 14 mm at C6.

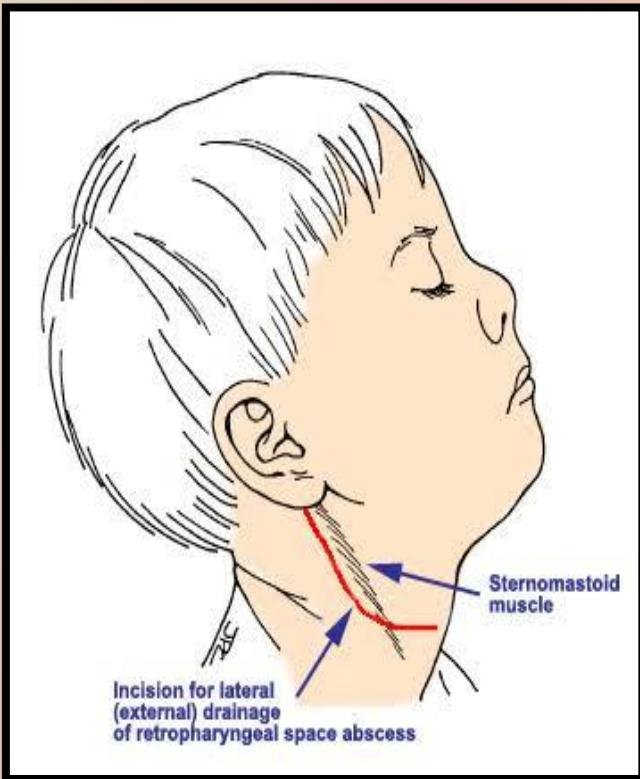
In addition to showing widening of the prevertebral space, the lateral neck radiography rarely may show a gas-fluid level, gas in the tissues, or a foreign body.

CT-Scan of the neck



¹Singh, I et al. Acute Retropharyngeal Abscess in Adults : A Case Series. India : International Journal of Otorhinolaryngology and Head and Neck Surgery; 2016

²<https://radiopaedia.org>

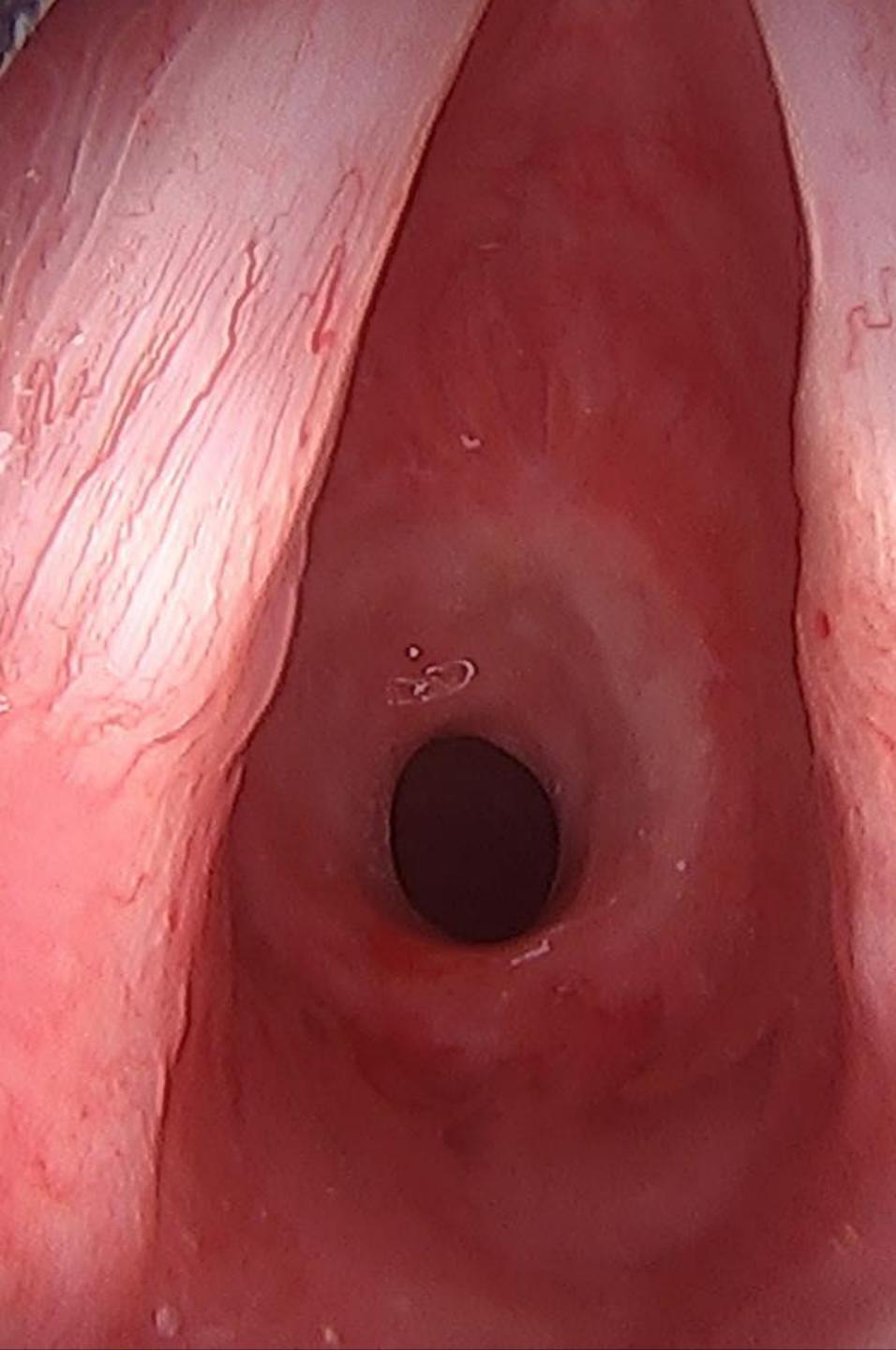


Management

- High-dose antibiotic
- Incision Drainage
- Airway management (Tracheostomy may be required for definitive airway management)

Complication

- Airway obstruction
- ARDS (Acute Respiratory Distress Syndrome)
- Mediastinitis
- Sepsis

A close-up, high-magnification image showing the interior of a larynx or trachea. A dark, circular endotracheal tube is centered in the glottis, surrounded by pinkish-red mucosal tissue. The surrounding tissue shows some folds and variations in color.

SUBGLOTTIC STENOSIS

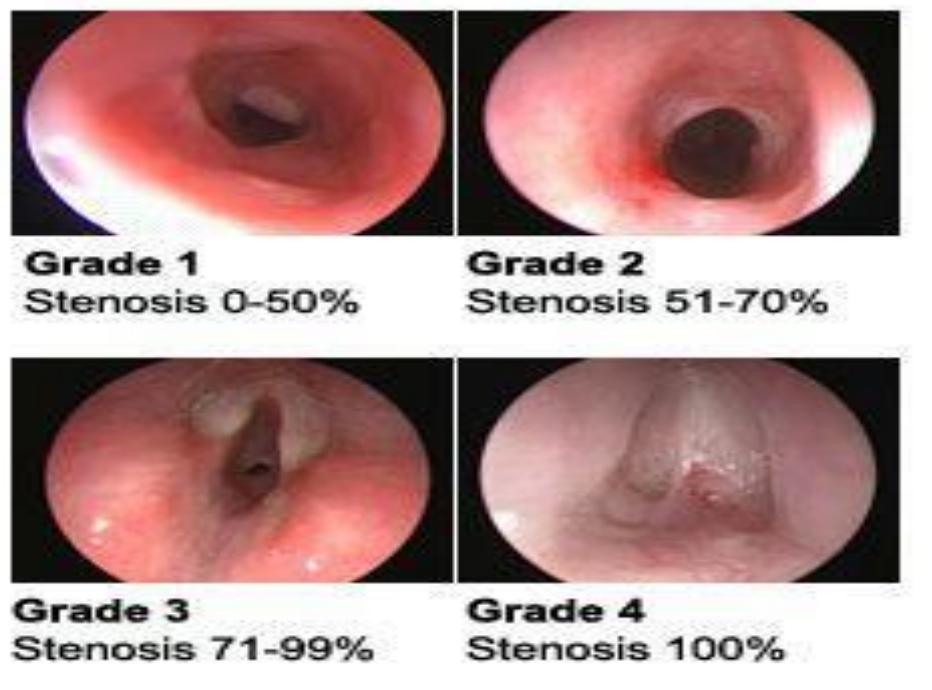
There are two kinds of subglottic stenosis:

- **Congenital subglottic stenosis**
This occurs when the airway did not form normally before birth
- **Acquired subglottic stenosis**
This most commonly occurs due to infection, trauma, or problems associated with intubation.

Clinical manifestation

What are the sign and symptoms of subglottic stenosis?

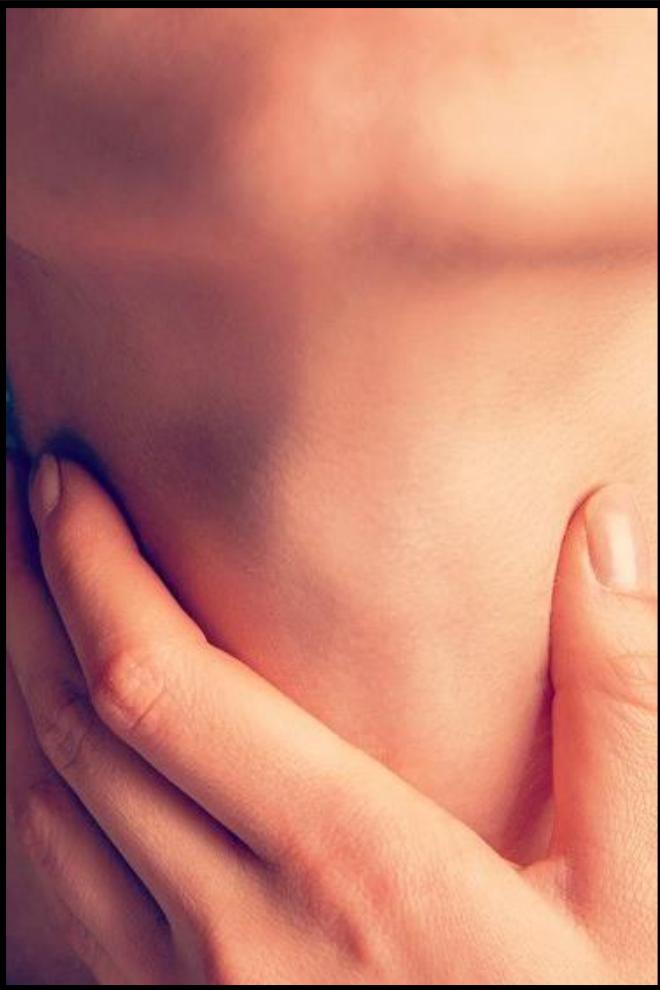
- High pitched noisy breathing (stridor)
- Recurrent croup
- Poor weight gain
- Cough
- Hoarseness
- Shortness of breath
(during exercise and sometimes at rest)



MANAGEMENT

- Mild subglottic stenosis
May not need any intervention
- Moderate or severe subglottic stenosis
May need surgery

LARYNGEAL TRAUMA



Mechanisms of injury

I. Blunt trauma injury

The main mechanisms are:

1. High speed injuries

(motor vehicle accidents and sports injuries)

1. Strangulation type injuries

II. Penetrating injuries

III. Iatrogenic laryngeal trauma



Clinical manifestation

Signs and symptoms:

- ✓ Stridor
- ✓ Laryngeal tenderness
- ✓ Haemoptysis
- ✓ Subcutaneous emphysema

CLASSIFICATION & MANAGEMENT OF LARYNGEAL TRAUMA

Grade	Laryngeal findings	Airway	Management
1	No fractures/minor lacerations/ minimal oedema	Minimal airway symptoms	Observation Medical supportive care
2	Undisplaced fractures/mucosal disruption without cartilage exposure	Mild airway compromise	Tracheostomy Microlaryngoscopy Bronchoscopy Oesophagoscopy
3	Displaced fractures/vocal cord immobility	Significant airway compromise	Tracheostomy Microlaryngoscopy Bronchoscopy Oesophagoscopy Open laryngeal exploration
4	Multiple fractures with instability	Significant airway compromise	Tracheostomy Microlaryngoscopy Bronchoscopy Oesophagoscopy Open laryngeal exploration
5	Laryngotracheal separation	Catastrophic airway obstruction	Tracheostomy Microlaryngoscopy Bronchoscopy Oesophagoscopy Open laryngeal exploration

LARYNGEAL TUMORS

Classification of laryngeal tumors are:

- ✓ Benign tumors of the larynx
- ✓ Malignant tumors of the larynx



Laryngeal tumors are tumors that form in laryngeal tissue.

The most common benign tumors of the larynx is papilloma (85%)

The most common malignant tumors of the larynx is squamous cell carcinoma.

Etiologi Tumor laring

Berbagai macam etiologi dari tumor laring, baik tumor jinak maupun tumor ganas

Radiasi

Riwayat radiasi pada leher karena lesi jinak

Merokok

Berperan sebagai karsinogen pada epitel laring

HPV

Human papillomavirus tipe tertentu

Trauma

Pekerjaan yang butuh tuntutan vokal ekstrem

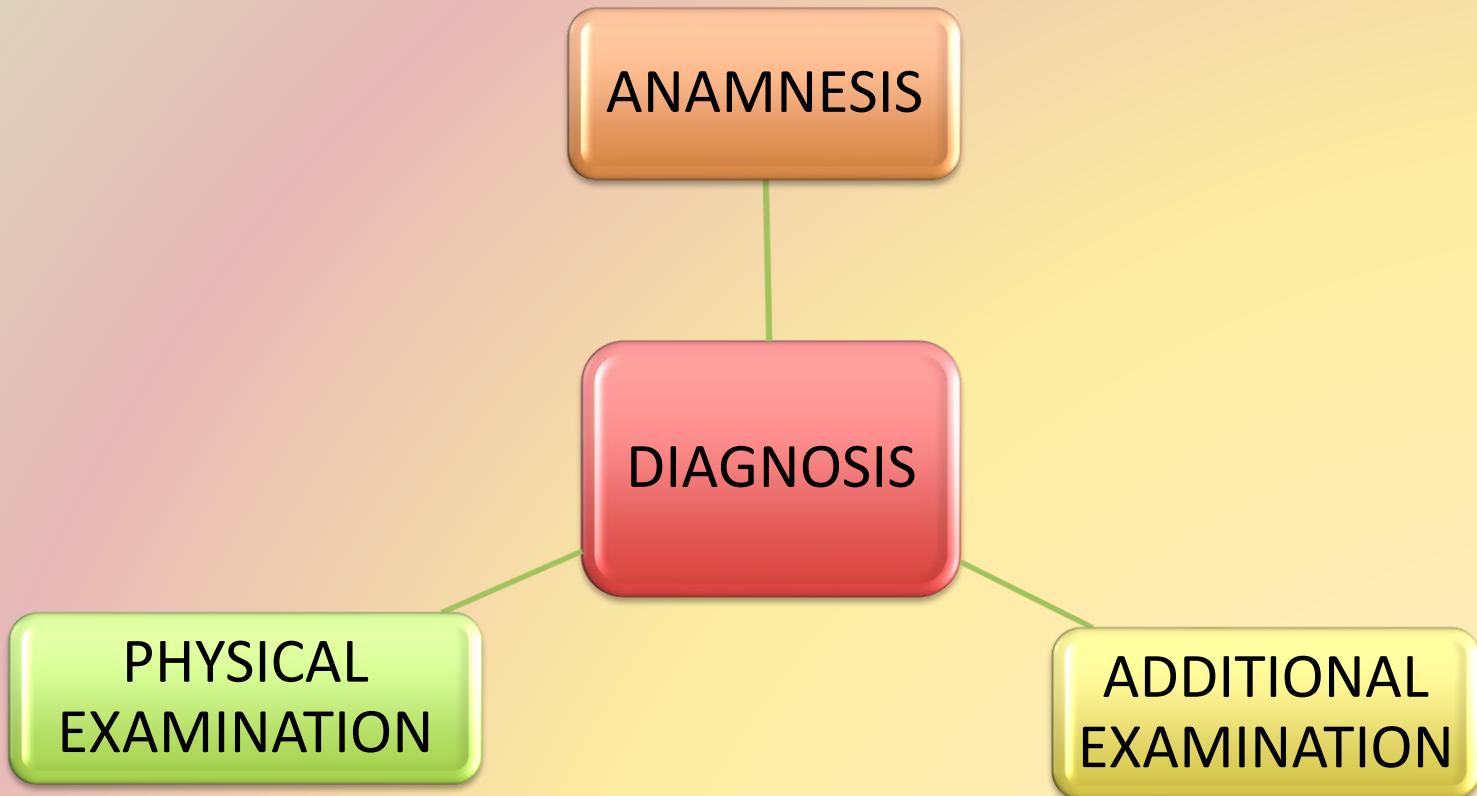
Chemical

Pekerjaan yang terpapar asbestos, bahan kimia, produk petroleum

Alkohol

Kofaktor karsinogenesis

Genetik



LARYNGEAL TUMOR

Laryngeal tumor diagnosis based anamnesis and clinical symptoms, physical examination like laryngoscopi indirect, lymph nodes palpation. Additional examinotion like radiology and biopsy.

PEMERIKSAAN FISIS



Laringoskopi indirek

maupun endoskopi
serat optik
→ Nilai perubahan
kontur, warna,
karakteristik getaran,
dan mobilitas yang
irregular pada pita
suara.



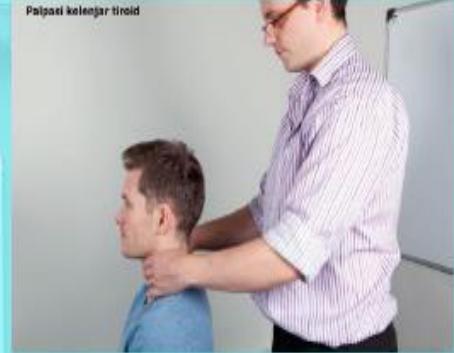
Video laringoskopi

→ Nilai kelainan
minimal pada
getaran mukosa,
periodisitas, dan
penutupan pita
suara.



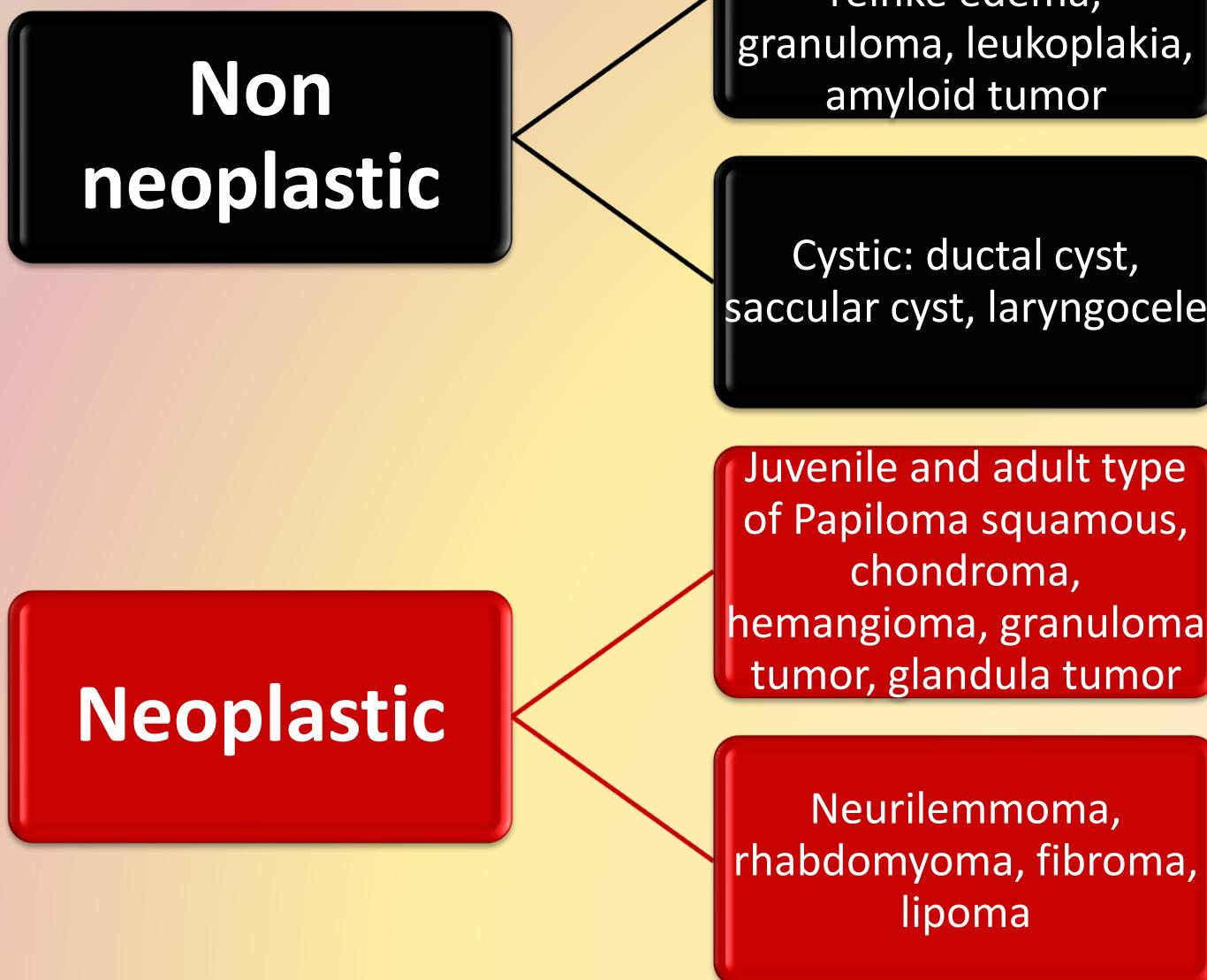
Pemeriksaan leher

Mencari
penyebaran ekstra
faring dan
metastasis nodul.



Dhingra PL. Diseases of the Ear,
Nose and Throat & Head and Neck
Surgery. Sixth Edition. Elsevier:
2014.

Benign Laryngeal Tumor



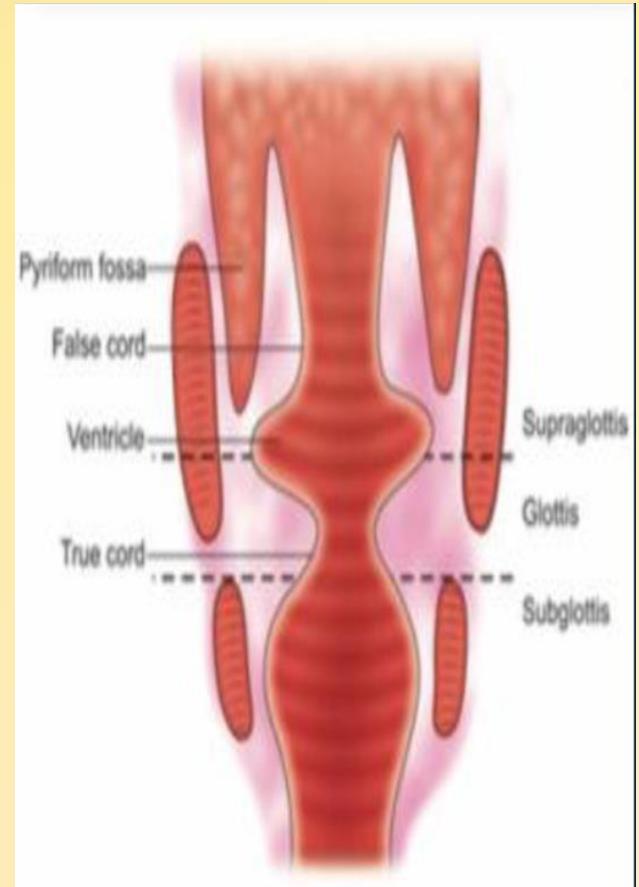
CLASSIFICATION OF MALIGNANT LARYNGEAL TUMORS

Based on location:

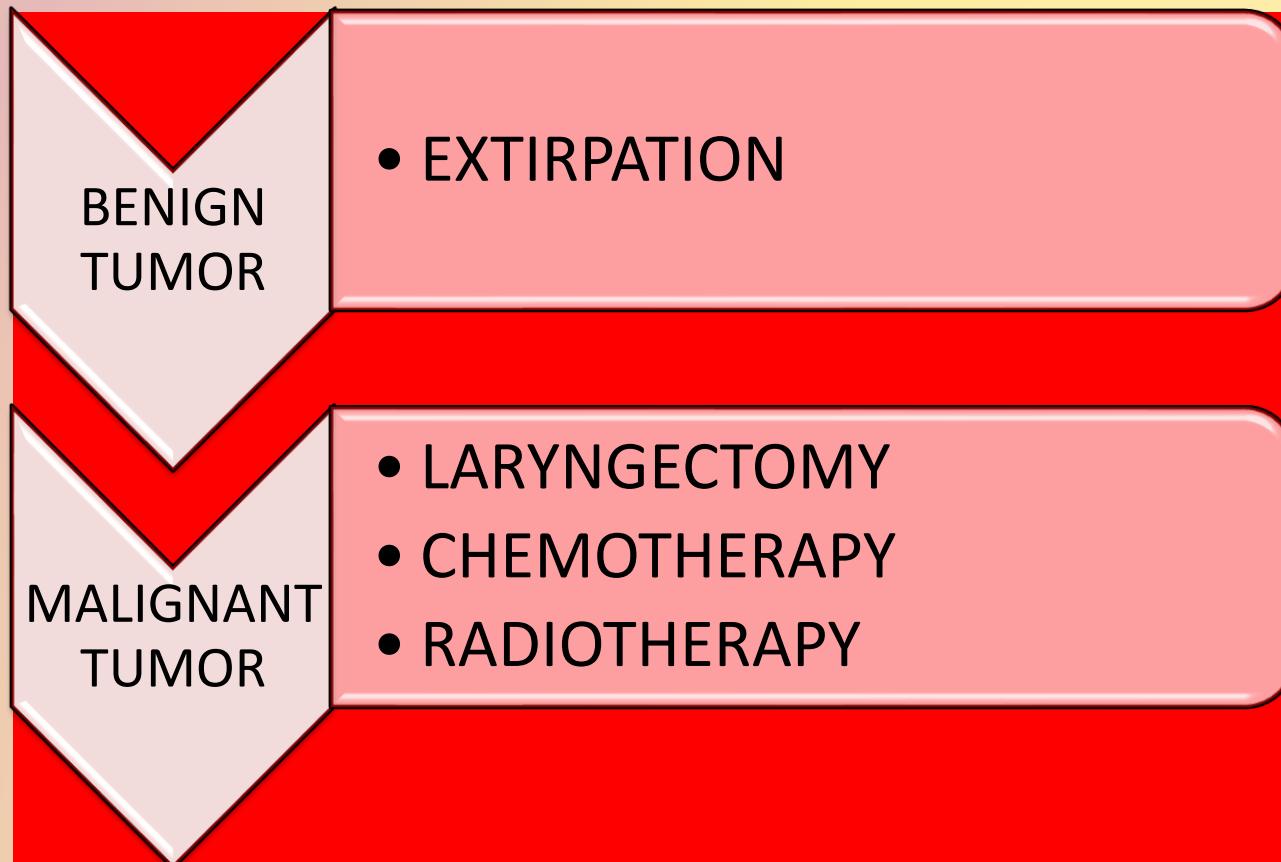
Supraglottic → surface of epiglottis larynx, folds of ariepiglottis, vestibular plica, ventriculus laryngis and vestibulus

Glottic → plica vocalis, commissura anterior, commissura posterior

Subglottic → subglottic wall from the upper to the lower cricoid cartilage



MANAGEMENT



OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS)



OSA associated with excessive daytime sleepiness is commonly called OSAS

Highly prevalent in the general population, and occurs at all ages.

Characterized by collapse of upper airways during sleep.

A large neck circumference has been associated with an increased risk of OSA.

A photograph of a middle-aged man sleeping in a bed. He is wearing a blue t-shirt and a CPAP (Continuous Positive Airway Pressure) mask over his nose and mouth. The mask is connected by a tube to a machine. He is lying on his back with his hands resting on a white pillow. The background consists of white bed sheets.

CLASSIFICATION

According to International Classification of Sleep Disorders, which are included Sleep Related Breathing Disorders :

1. **Obstructive Sleep Apnea Syndrome**
2. Central Sleep Apnea Syndromes,
3. Sleep Related Hypoventilation Disorders
4. Sleep Related Hypoxemia Disorders.

Etiology

Adult	Child
Anatomic abnormalities <ul style="list-style-type: none">▪ Collapse of the lateral pharyngeal wall composed of m. palatoglossus, m. palatopharyngeus, m. styloglossus, m. stylohyoid, m. stylopharyngeus, and m. hyoglossus)▪ Obesity, BMI > 30 kg / m²▪ Narrow oropharynx (short mandibular or retraction, protruding tongue, short neck, neck diameter > 43 cm)▪ Tonsillar hypertrophy	Adenoid
Genetic <ul style="list-style-type: none">▪ Intrinsic factors in the process of ventilation or craniofacial structures▪ Abnormalities of neuromuscular control function▪ In the pharyngeal dilator muscle plays a role in the collapse of the airways. Ventilatory control defects in the brain cause failure or delay in the pharyngeal dilator muscle reflex, when the patient experiences a period of apnea hipopnea.	Tonsillar hypertrophy
Other risk factors <ul style="list-style-type: none">▪ Aging process▪ Post-menopausal▪ Alcohol consumption▪ Use of sedative drugs	Craniofacial abnormalities: <ul style="list-style-type: none">▪ Micrognathia▪ Retrognathia▪ Hypotension or hypertension (Down's syndrome, Cerebral Palsy, muscular dystrophy)

Risk Factor

Age

- ↑age, ↑ the risk of OSAS occurrence



Gender

- Men and Women



Obesity

- Narrowing of the upper respiratory tract due to accumulation of fat tissue around the respiratory tract



Genetic

- High OSAS prevalence among family members



Menopause

- Central obesity and increased adiposity around the airway
- Toned muscles like geniglossus, primary pharyngeal dilator ↓
- Low estrogen and progestin levels



Risk Factor

Nasal Obstruction

- Nasal obstruction - limited airflow



Craniofacial Anatomy

- The hyoid bone is inferior, the posterior and maxillary placement is posterior, the tongue and soft palate are enlarged, and the area of the alveolopharyngeal cross section is smaller.



Smoking

- Inflammatory effects → affect the increase in airway collapse



Alcohol

- ↓selective genioglossal muscle activity, ↓ventilatory response to hypercapnia and hypoxia, ↑upper airway resistance, dan ↑ tendency of unstable upper airways to collapse



Large Neck Size

- Men and women with large neck sizes: 17 inches or more for men and 16 inches or more for women



Clinical Manifestations

Nighttime symptoms

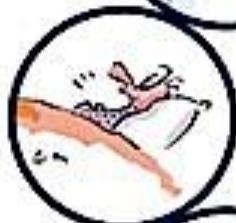
Loud persistent snoring



Witnessed pauses
in breathing



Choking or
gasping for air



Restless sleep



Frequent visits to
the bathroom



Daytime symptoms

Early morning headaches



Daytime sleepiness



Poor concentration



Irritability



Falling asleep during
routine activities

ANAMNESIS

Epworth Sleepiness Scale (ESS)

Situation	Chance of dozing (0–3)			
Sitting and reading	0	1	2	3
Watching television	0	1	2	3
Sitting inactive in a public place—for example, a theater or meeting	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after lunch (when you've had no alcohol)	0	1	2	3
In a car, while stopped in traffic	0	1	2	3
Total Score				

0 = would never doze 1 = slight chance of dozing 2 = moderate chance of dozing 3 = high chance of dozing

Johns MW. Sleep. 1991;14:540.

PHYSICAL EXAMINATION

- **Nose:** Septal deviation, adenoid hypertrophy, nasal tumor or polyp, turbinate hypertrophy.
- **Oropharynx:** Large soft palate, palatine tonsillar hypertrophy, macroglossia, thickening of the posterior pharyngeal wall.
- **Hypopharynx:** Collapse lateral pharyngeal wall, hypopharyngeal tumor, lingual tonsillar hypertrophy, retrognathia and micrognathia.
- **Larynx:** Paralysis of vocal cords, laryngeal tumors.
- **Neck:** Measure neck circumference.

ADDITIONAL EXAMINATION

Flexible Nasolaryngoscopy

- Muller Maneuver

Imaging

- Somnوفluoroscopy
- Cephalometry
- CT
- MRI

Polysomnogram

ADDITIONAL EXAMINATION

Polisomnografi (PSG)

- Gold standard
- Sleep time

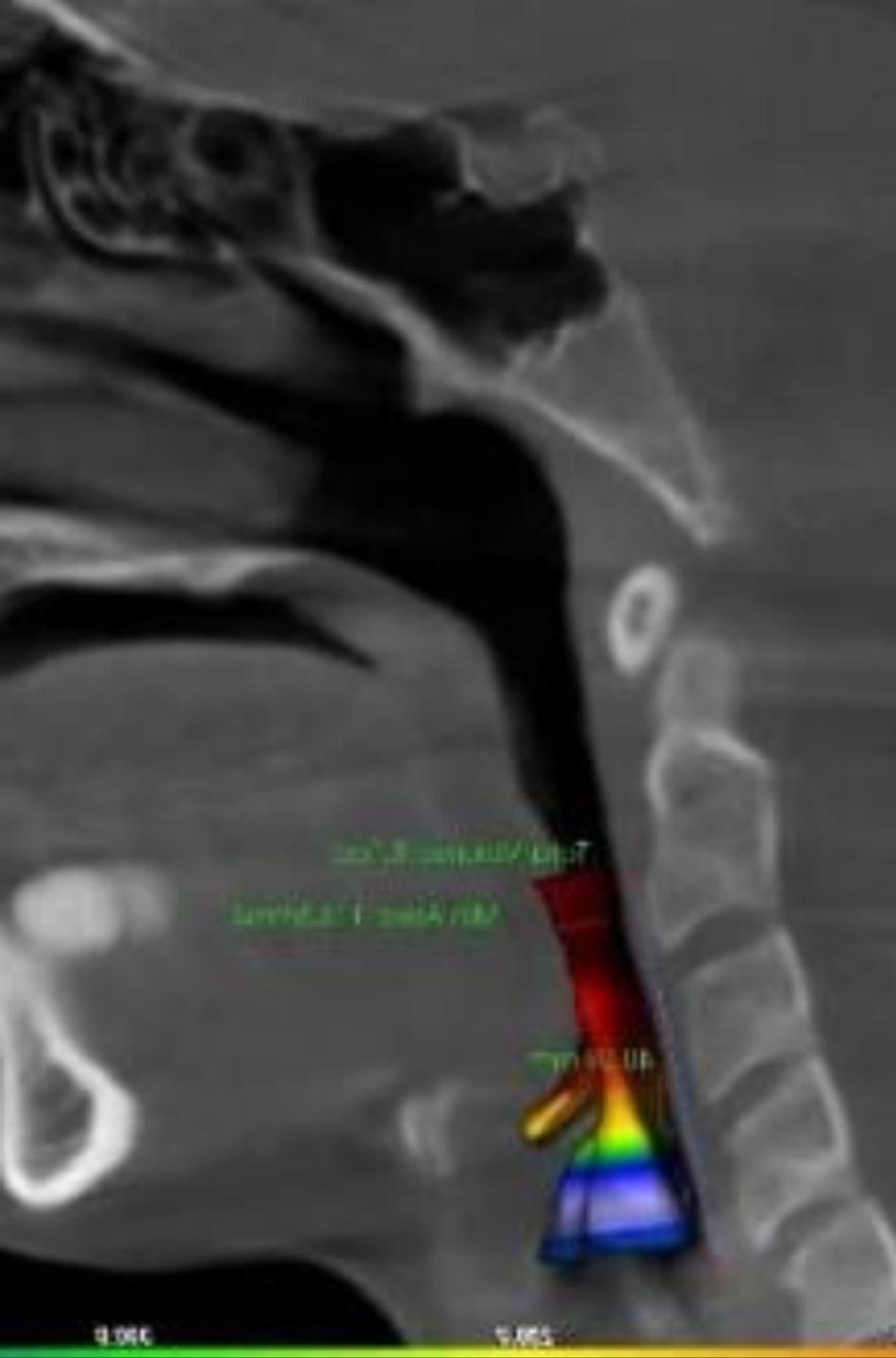
Table 1: Classification of the severity of OSA based apnea-hypopnea indeks(AHI).

MILD	MODDERATE	SEVERE
AHI 5-14	AHI 15-29	AHI ≥ 30

Table 2: Criteria of Polysomnographic for OSA in children and adults

Criteria	Adult	Children (1-12 tahun)
Index apnea-hypopnea	> 5	> 1
Minimum Oxygen saturation (%)	< 85	< 92

RADIOGRAPHIC EXAMINATION



The main purpose of radiographic examination is to identify the location and severity of upper airway collapse, especially the hypopharynx.

Upper airway radiography included lateral cephalometric radiography, computer tomography and magnetic resonance imaging.

Management



Conservative

- Lose weight
- Lifestyle changes
- Oral Appliance
- CPAP (Continuous Positive Airway Pressure)

Operative

- Tonsillectomy and adenoidectomy
- UPPP (Uvulopalatofaringoplasty)
- Nasal surgery: Septoplasty, FESS, turbinate reduction
- Maxillomandibular osteotomy
- Tongue surgery: Lingual tonsilectomy, Laser midline glossectomy

Complication

Cardiac arrhythmias

Stroke

Congestive heart failure

Hypertension

Peripheral edema

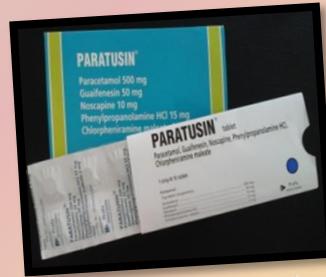
Concentration is disturbed

Sleep disorders

Traffic accident

Quality of life decreases

DRUG OF CHOICE



PARATUSIN[®]
Tablet



PARATUSIN[®]
Syrup

Komposisi :

Noscapine 10 mg, Chlorpheniramine Maleate 2 mg, Glyceryl Guaiacolate 50 mg, Paracetamol 500 mg, Phenylpropanolamin HCl 15 mg.

Dosis :

Dewasa : 1 tablet, 3 x sehari
Anak-anak 6-12 tahun : $\frac{1}{2}$ tablet, 3 x sehari

Komposisi :

Noscapine 10 mg, Chlorpheniramine Maleate 0.5 mg, Glyceryl Guaiacolate 25 mg, Paracetamol 125 mg, Succus Liquid 125 mg, Pseudoephedrine Hcl 7,5 mg.

Dosis :

Anak-anak 2-5 th : 1 sendok takar (5 ml), 3 x sehari
Anak-anak 6-12 th: 2 sendok takar (10 ml), 3 x sehari
Dewasa : 4 sendok takar (20 ml), 3 x sehari

Analgesic &
Antipyretic

Expectorant

Antitussive

Nasal
Decongestant

Anti
Histamine



Komposisi:

Tiap kapsul mengandung:

Ibuprofen	200 mg
Paracetamol	325 mg

Dosis:

Dewasa : 1 Kapsul, 3–4 kali sehari

Diminum sesudah makan atau menurut petunjuk dokter

Komposisi:

Tiap tablet mengandung:

Paracetamol	600 mg
-------------	--------

Dosis:

Dewasa : 1 Tablet, 3–4 kali sehari

Anak : $\frac{1}{4}$ – $\frac{1}{2}$ Tablet, 3–4 kali sehari

Analgesic

Antipyretic





Komposisi:

Setiap 5 ml (1 sendok takar) mengandung:

Glyceryl Guaiacolate 50 mg

Chlorpheniramine Maleate 1 mg

Dosis:

Anak 2–6 tahun:

1 sendok takar (5 ml), 3–4 kali sehari

Anak 7–12 tahun:

1½ sendok takar (7.5 ml), 3–4 kali sehari

Dewasa : 3 sendok takar (15 ml), 3–4 kali sehari

Komposisi:

Tiap tablet mengandung:

Phenylpropanolamine HCL 15 mg

Chlorpheniramine Maleate 2 mg

Dosis:

Dewasa : 1 tablet, 3–4 kali sehari

EXPECTORANT

**ANTI
HISTAMINE**

**NASAL
DECONGESTANT**



THANK YOU