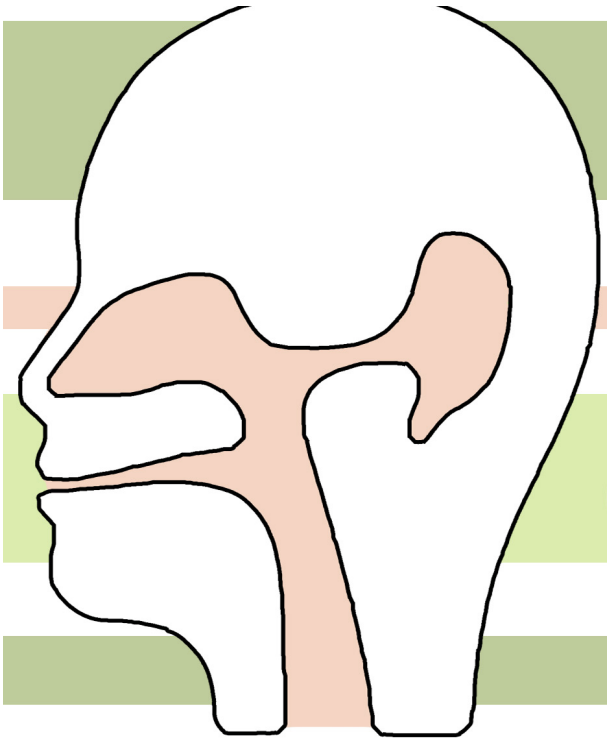


EAR, NOSE AND THROAT

(14) Airway Obstruction I

Leader: Maha Allhaidan

Done by: Razan Alshatwi

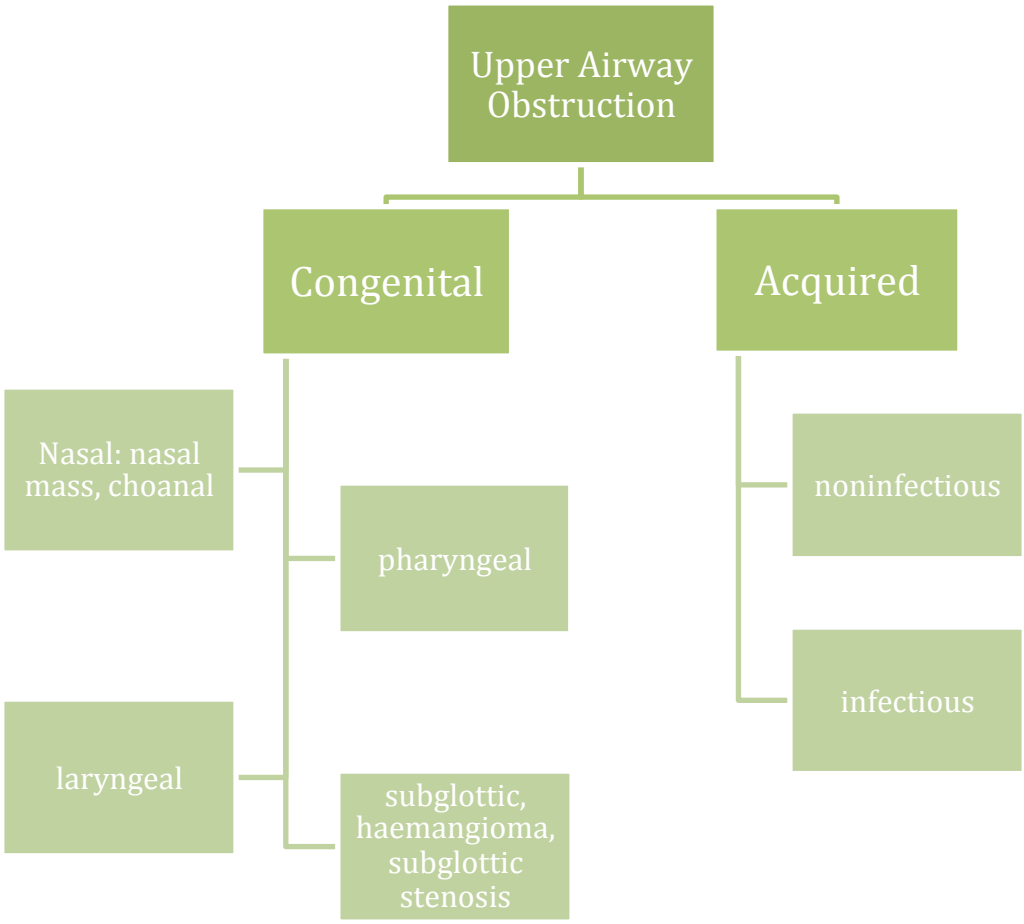
Revised by: Lulu AlObaid

Doctor's note Team's note Not important Important 431 teamwork

(431 teamwork do not highlight it in yellow, but put it in a yellow "box")

Objectives:

- **To recognize assessment and management of common airway obstruction diseases, include ability to obtain patients' history, perform comprehensive physical and mental status assessment, interprets findings**
- **To know how to handle common airway emergencies.**
- **To be aware of common airway obstruction operations**



Airway Obstruction

Airway Obstruction I

- Causes of airway obstruction (congenital and acquired)
- Signs and symptoms

Airway Obstruction II

- Investigation of airway obstruction
- Radiology illustration
- Medical and surgical treatment
- Operations (indication, procedure and complication) tracheostomy, cricothyroidectormy, intubation, choanal atresia repair etc.

The Upper airway extended from the nares and lip to the subglottic area. Upper airway obstruction:

- ❑ Congenital
- ❑ Acquired

Congenital upper Airway Obstruction

From birth to the first few weeks
Congenital upper-airway obstruction

- Nasal obstruction
- Nasal masses
- Choanal atresis and stenosis
- Pyriform aperture stenosis
- Pharyngeal
- Craniofacial anomalies
- Laryngeal
- Laryngomalcia
- Vocal cord paralysis
- Subglottic haemangioma
- Subglottic stenosis
- Laryngeal web
- Laryngeal lymphangioma
- Saccular cyst

Case: 3 years old child who has stridor for 3 weeks, what is stridor?

Stridor: is a high-pitched wheezing sound resulting from turbulent airflow in the upper airway. Stridor is a physical sign, which is produced by a narrowed or obstructed airway path.

Types of stridor?

- **Inspiratory stridor**: supraglottic, glottis (the area between the two vocal cords) obstruction
- **Expiratory stridor:** trachea (lower) (in the intrathoracic trachea)
- **Biphasic stridor:** subglottic obstruction (below the vocal cord or upper trachea)

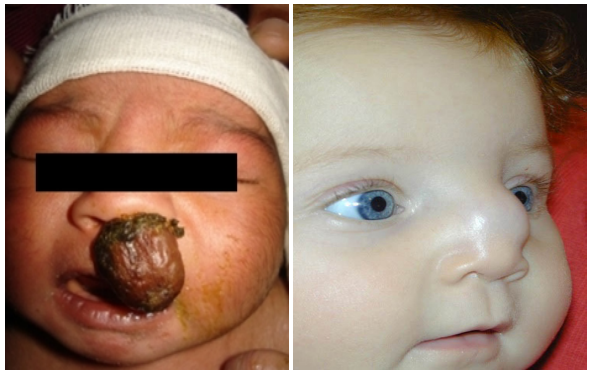
Nasal obstruction

Neonates in the first 3 months are obligatory nasal breathers
Cyanosed neonates with nasal obstruction will improve with crying, because when they are crying they will breath through their mouths.

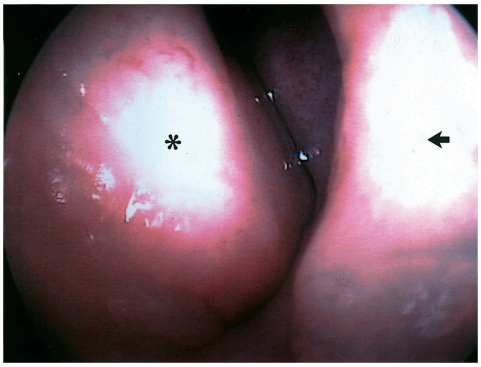
In neonates cyanosis improves with crying and worsens on feeding (cyclic cyanosis)

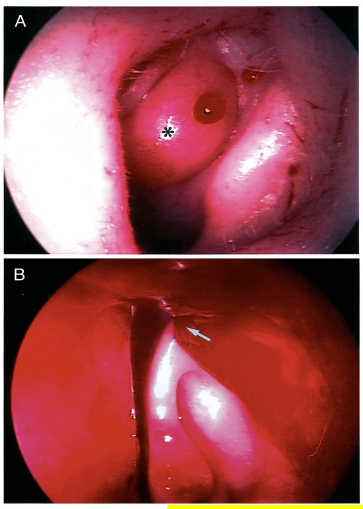
Cystic	Solid
Meningoencephalocele	Haemangioma
Meningocele	Neurofibroma
Dermoid cyst	Glioma
Epidermoid cyst	Lymphangioma
	Neuroblastoma
	Craniopharyngioma
	Rhabdomyosarcoma
	Chordoma

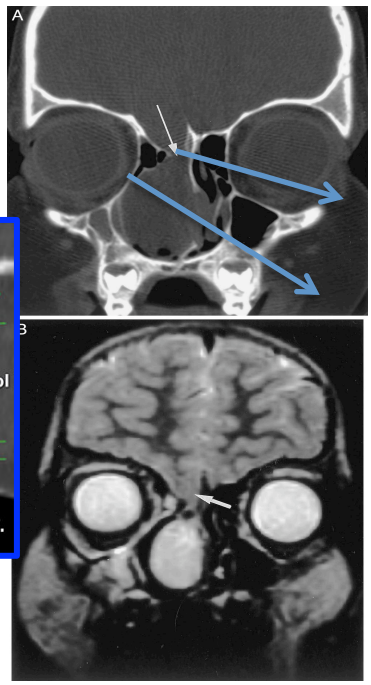
In OSCE you would describe site, size,..etc.
DDX: Meningoancephalocele; Dermoid cyst and Epidermoid cyst.
For diagnosis do imaging then scope.



When you scope and see any mass you shouldn't grasp because it could be meningoencephalocele attached to the brain. So in pediatrics it's important to do CT and MRI.
Grasping the mass risks the development of meningitis



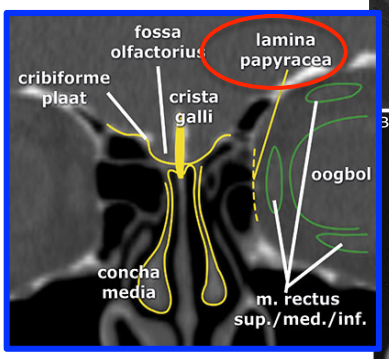




Orbit

Lamina papyracea

A: coronal CT scans showing homogenous mass in the right nostrils (arrow).
B: MRI shows communication (homogenous= all the same color)



(Extra)

IF you see a brain connection do an MRI.
(Homogenous opacification of sinus= fluid, polyp)
(Heterogeneous with spiking = fungal "calcium and minerals" or malignancy).

-MRI is good for soft tissue and neurological tissue gives more details
-Remember in imaging: Bone: white, Soft tissue: grey, Air: black
-4 sinuses: above the eye frontal, below the eye maxillary, between the eyes ethmoid and behind the eye sphenoid. So when you see the CT scan and you don't see the eyes it's sphenoid NOT nasopharynx
-Lamina papyracea is a thin bone plate between the orbit and ethmoid.
-On CT scan you should look for the extension of the disease and the complication on orbit or brain. Also look for anatomical variations
-Rx: functional endoscopic sinus surgery (FESS) NOT fibrotic
Endoscopic Evaluation of Swallowing (FEES)

In vocal cord polyp if you write polypectomy zero! the correct answer: Microlaryngoscopy polyp excision.

Choanal atresia

- ✓ Lack of patency of posterior nasal aperture
- ✓ Bilateral atresia presents soon after birth with sever respiratory distress (Top emergency Rx: oral tube)
- ✓ Unilateral atresia may undiagnosed until later in childhood (rhinorrhea) (diagnosis at 1-2 year with one side nasal discharge)

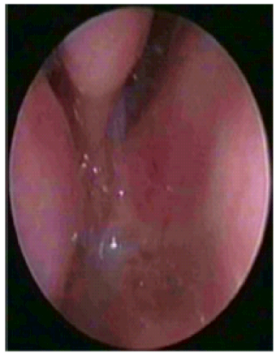
The commonest cause for unilateral obstruction is foreign body (purulent, foul smelling discharge).

Types

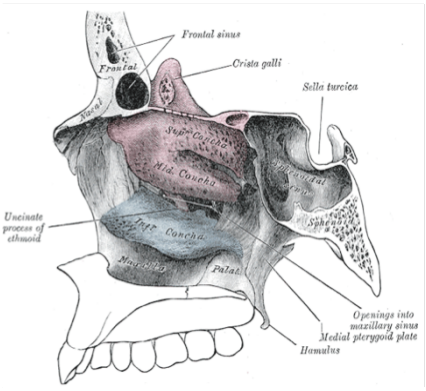
- ❑ Membranous 10%
- ❑ Bony
- ❑ Mixed

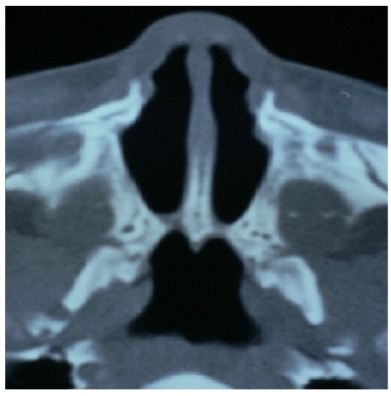
DX:

- Cyanosis improved with crying
- Inability to pass size 6 French catheter (In small hospital where they don't have scope)



Do CT to differentiate between the types





Axial CT that shows bilateral membranous choanal atresia
Membranous= grey.
Bone= white

Axial CT
Mixed
choanal
atresia

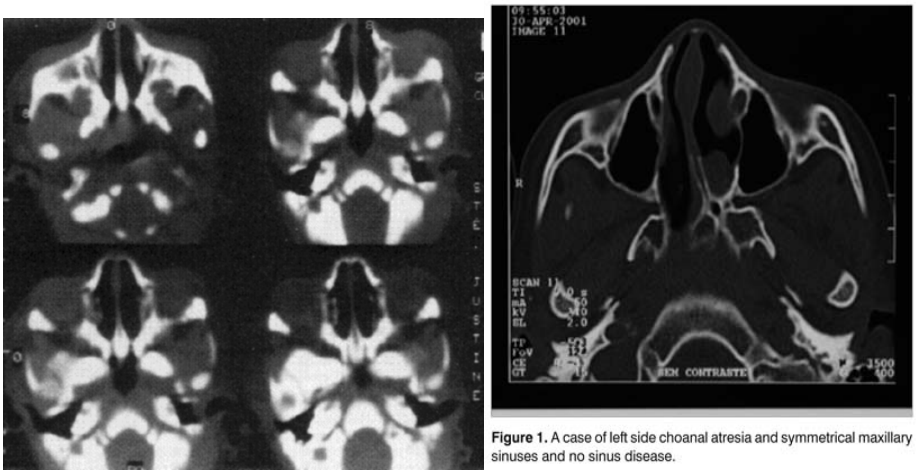
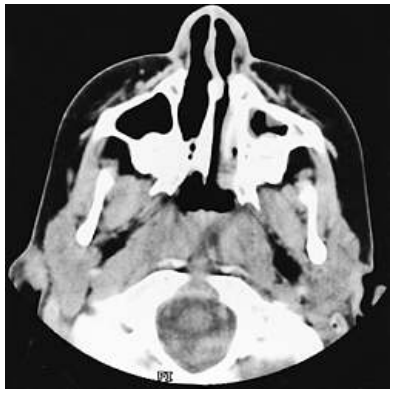


Figure 1. A case of left side choanal atresia and symmetrical maxillary sinuses and no sinus disease.

70% of choanal atrasia associated with CHARGE syndrome:

- C coloboma
- H heart disease
- A atrasia
- R retarded growth
- G genital hypoplasia
- E ear deformity

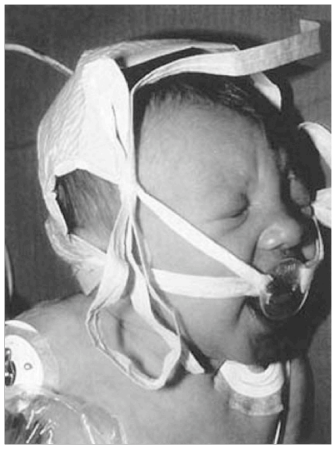


Axial unilateral
Bony choanal atresia

Treatment :

- ✓ Emergency treatment is by insertion of oral tube
- ✓ Surgical treatment is by either transnasal or transpalatalchoanalatrasia repair

In our hospital go through the scope and use the drill to puncture and widen the area and apply mitomycin to prevent pre stenosis

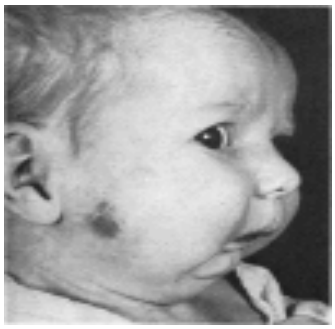


Pharyngeal obstruction

Craniofacial anomalies:

Pierre –Robin syndrome:

Glossoptosis



Airway obstruction caused by backflows displacement of the tongue base),

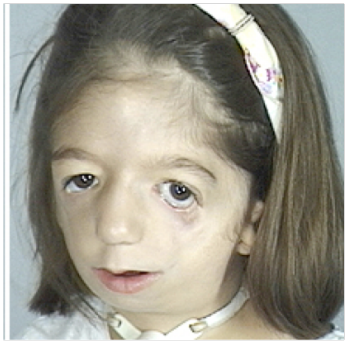
micrognatheia

Small lower mandible, causes narrow airway

Cleft palate

Treacher- Collins syndrome:

Mandibuofacia; dystosis



Disorder of bone development, affecting ossification

Narrow nose high arched palate

These patients have retrognathia, tongue is big, cleft palate and they might have pharyngeal obstruction and need tracheostomy

Laryngeal

Laryngomalacia:

The most common cause of congenital airway obstruction.

The most common cause of stridor in infancy (2nd is Bilateral vocal cold paralysis and 3rd subglottic stenosis)

What is stridor?

Audible sound produce during breathing due to air- flow change within the larynx

- ❑ Inspiratory
- ❑ Expiratory
- ❑ Biphasic

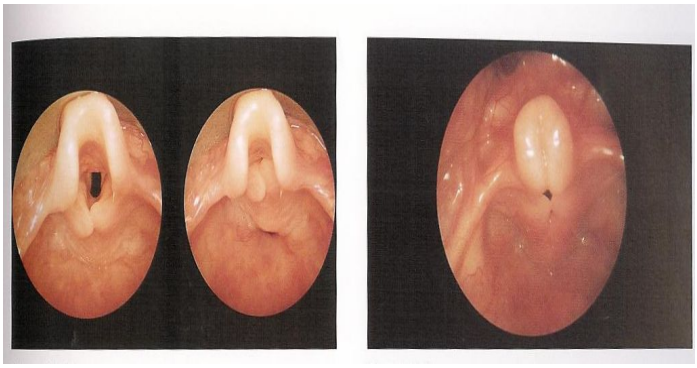
In laryngomalacia, the epiglottis or the arytenoids that are soft and floppy. This floppy tissue gets pulled into the airway during inspiration, causing temporary partial blockage of the airway. This tissue is pushed back out when the infant exhales, opening the airway again.

Snoring: is low pitch sound caused by tissue vibration of the nasopharynx pharynx and soft plate due to obstruction above the larynx

Symptoms

- Stridor in the first weeks of life
- Inspiratory phase
- Worse with crying, feeding and respiratory tract infection
- Improved in prone position
- **DX**: flexible fibrotic endoscopy

While the child is awake to visualize the pattern of breathing



- **Endoscopic finding:**
- Tall, omega shape epiglottis arytenoid mucosa (epiglottis is collapsing)
- Inward forward movement of (sucked)
- Short aryepiglottic fold

Treatment :

Any airway abnormality we need to evaluate how bad it's affecting the child's feeding and measuring the child on growth chart

Mild cases :(no cyanosis not affecting the child growth)

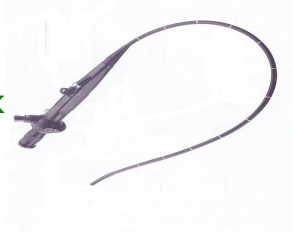
- Observation (it can improve with time by) 12-18 months in 90% of cases

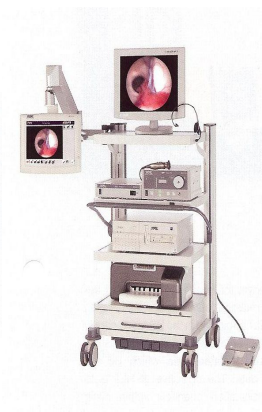
Sever cases: if the mother complains of bad oral intake, cyanotic child

- Supraglottoplasty (cut of the aryepiglottic fold and trimming of arytenoid mucosa)
- Tracheostomy

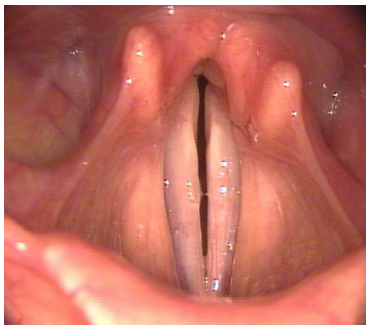
Flexible fiberoptic endoscopy
Indication: examine nose, nasopharynx Larynx and hypopharynx

Biopsy





Vocal Cord Paralysis



All the muscles all supplied by recurrent laryngeal nerve exp. Cricothyoid muscle.
Diagnose by fiberoptic endoscopy.
Vocal cord not abducting
Do CT brain to exclude Arnold Chiari Syndrome.
Look back to the history to see if the child was delivered by forceps and had a vagal compression
Child has weak cry (weeping)
Can be unilateral or bilateral, congenital or acquired
Congenital form may associated with abnormality of the central nervous system (Arnold Chiari syndrome) or cardiovascular anomalies
Symptoms:
High pitch inspiratory stridor
Treatment:

- ✓ **Tracheostomy in sever cases** (e.g. affect the growth)
- ✓ **Spontaneous recovery** occurs in half patients (Congenital have a chance of spontaneous recovery within 5 years)

Surgical intervention postponed until the patient become old

- ✓ **Vocal cord lateralization,**

arytoidectomy and laser cordotomy

Subglottic Haemangioma

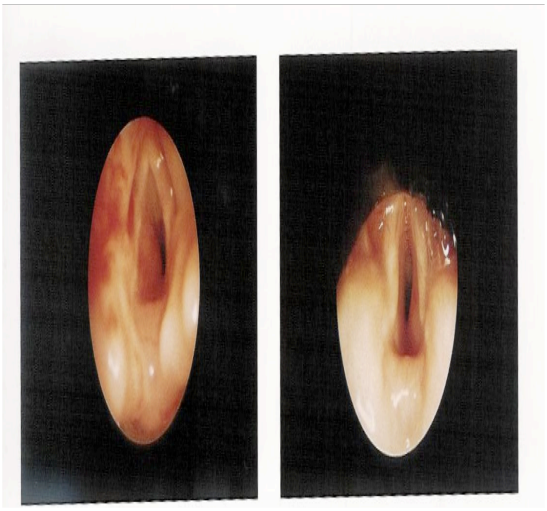
- Congenital vascular lesion

Not present at birth but grow rapidly over the first few months of life
Symptoms:

- Biphasic stridor
- Tend to involute slowly after one year
- 50% of the patients have cutaneous haemangioma in the head and neck

Treatment:

- Systemic steroid, interlesional steroid, **Propranolol,** laser ablation tracheostomy



Congenital Subglottic Stenosis

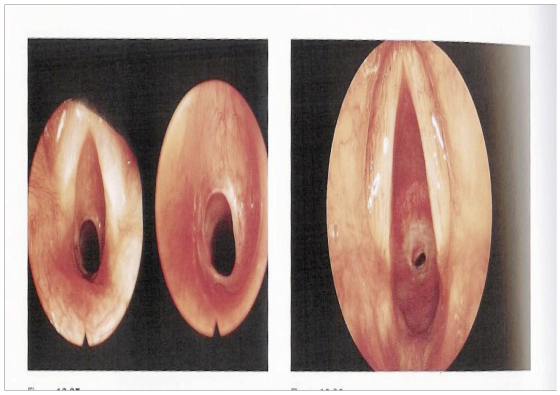
Subglottic area is the narrowest area in the airway
Stenosis if the diameter less than 4 mm in term infant

Symptoms depend on the degree of stenosis

- ❑ Biphasic stridor
- ❑ Recurrent croup

Diagnosis:

Bronchoscopy, plain x-ray, HKV



- The maximum percentage of airway obstruction is determined and assigned a grade:
- Grade I <50% obstruction
- Grade II 51-70% obstruction
- Grade III 71-99% obstruction
- Grade IV no detectable lumen

Treatment

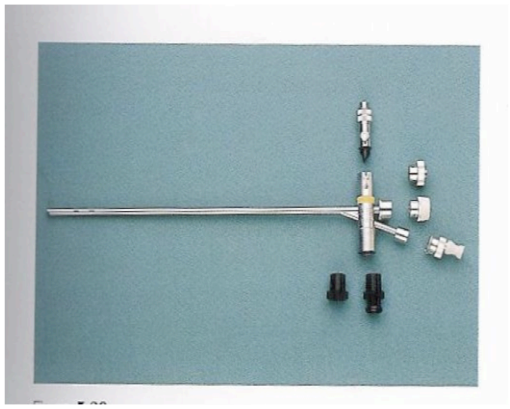
Depend on the degree of stenosis

Grades 1 and 2:

- Tracheostomy
- Laser excision
- Balloon dilation

Grades 3 and 4:

- Laryngotrachealreconstruction(LTR)
- Criocotrachealresection(CTR)



Indication for bronchoscopy: Examination of the bronchus, forging body removal and biopsy

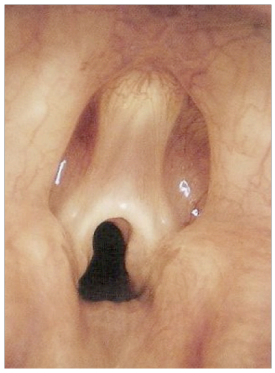
Laryngeal web

Small web just has dysphonia

- Weak cry
- Stridor

Treatment:

- Laser excisions
- Tracheostomy

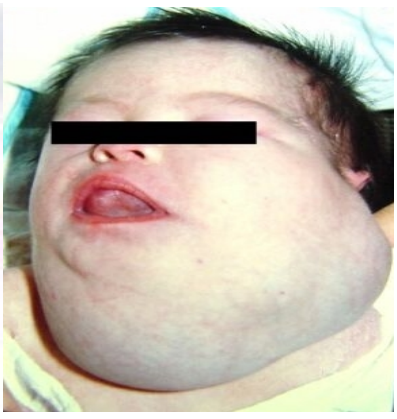


Extratracheal Compression

- **Cystic hygroma**

  Difficult to intubate sometimes to maintain the airway by oxygenate through the blood.

  Born with it diagnosed by antenatal US and emergency debunking surgery after delivery



Mass compressing the floor of the mouth, tongue.

Definition: lymphatic malformation arising from vestigial lymph channels of neck
Clinical features:

- Usually present by age 2
- Thin walled cyst extending from floor of mouth to mediastinum, in posterior triangle or supraclavicular area
- Painless, soft, compressible
- Infection causes a sudden increase in size

Diagnoses: intranatally by ultrasound
Treatment: surgical excision (debulking) if it fails to regress- difficult dissection duo to numerous cyst extensions cystic hygroma is consisting of lobulated masses when they open one another one appear

Acquired upper airway obstruction

Acquired upper airway obstructions are more common than congenital type.
Subglottic area is the narrowest area

Causes:
Infectious

- ◆ Peritonsillar abscess
- ◆ Retropharyngeal abscess
- ◆ Epiglottis
- ◆ Croup
- ◆ Bacterial tracheitis

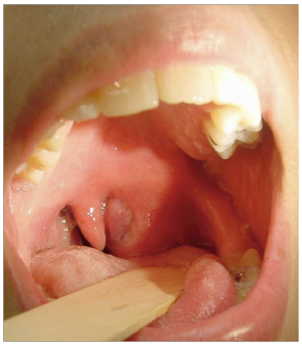
Noninfectious

- ✧ FB aspiration
- ✧ Acquired vocal cord paralysis
- ✧ Acquired subglottic stenosis
- ✧ Adenotonsillar enlargement
- ✧ Respiratory papillomatosis
- ✧ Malignancy
- ✧ Angioedema
- ✧ Caustic ingestion
- ✧ Trauma
- ✧ Laryngospasm

Peritonsillar abscess

- Common deep infection in late childhood
- **Symptoms**: low grade fever sever sore throat, muffled voice, drooling, trismus

Bulging pushing the tonsil to the other side



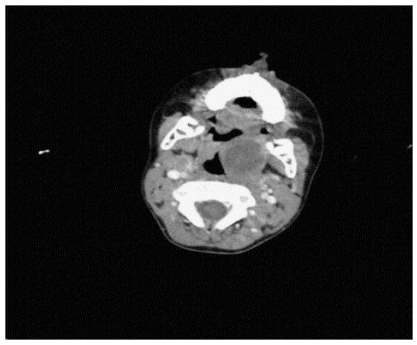
Case: child had tonsillitis and treated with antibiotic for 3 days then stopped, after 2 days he started getting worse drooling of saliva, can't open the mouth (trismus) and hot potato voice? **Peritonsillar abscess (quinsy) (one of the indication of tonsillectomy)**

Diagnosis:

- Clinical diagnosis
- CT scan

Treatment:

- ❑ Aspiration
- ❑ Excision and drainage
- ❑ Later tonsillectomy
- ❑ IV ABX



Axial CT shows a mass compressing the airway

Retropharyngeal abscess

Symptoms:

- Fever, cervical adenopathy, stridor torticollis, drooling

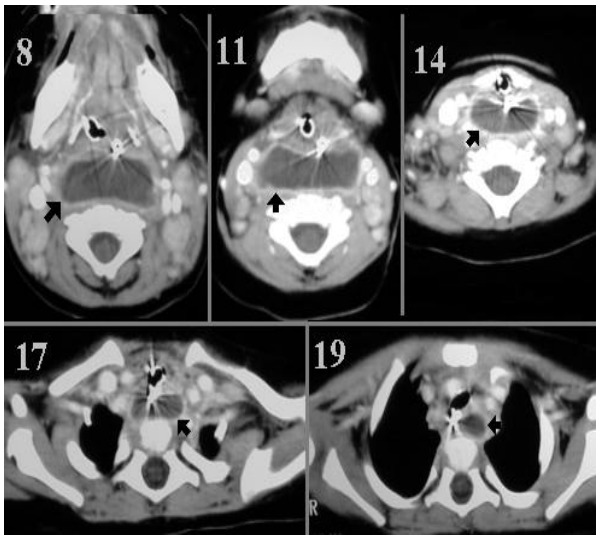
Causes:

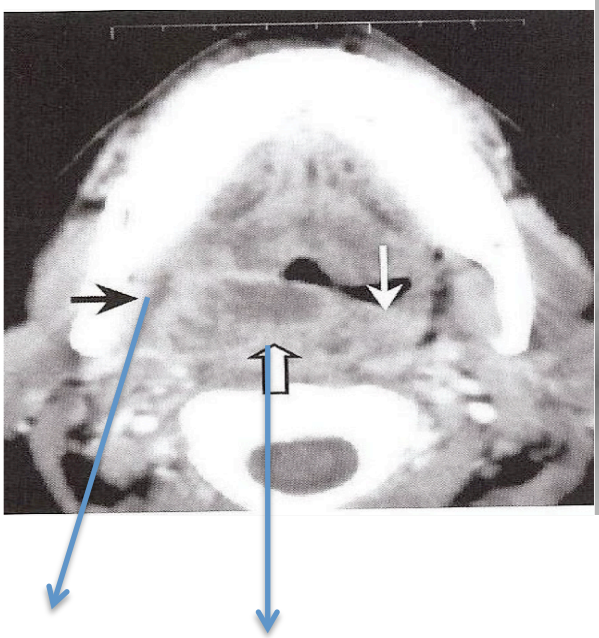
- Progressive pharyngitis S.aureus, Haemophilus, group A beta haemolyticsterptococcus, bacteroides

Treatment:

Intraoperative to reduce risk of swallowing and aspiration

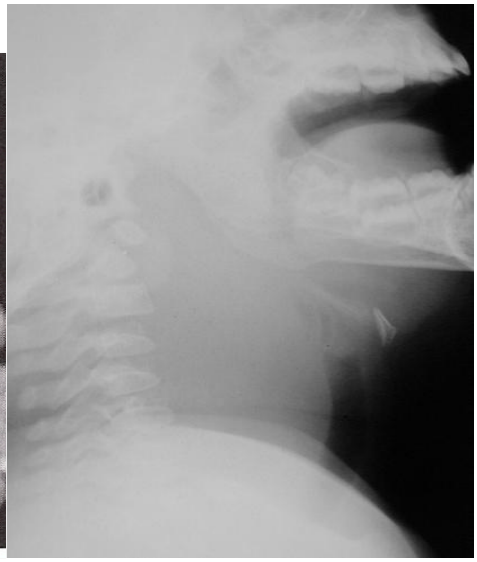
- ❖ Transoral excision and drainage
- ❖ IV ABX
- ❖ INTUBATION
- ❖ Tracheotomy





Parapharyngeal ab

Retropharyngeal ab



Lateral x-ray shows the diameter of the soft tissue is more than the diameter of the vertebrae (Retropharyngeal abscess)
X-ray is not preferred

Summary

The Upper airway extended from the nares and lip to the subglottic area.
Airway obstruction causes congenital and acquired

Congenital upper Airway Obstruction Nasal, pharyngeal and laryngeal.

- Nasal: nasal mass, choanal stenosis and stenosis
- Laryngeal: laryngeal web, laryngomalacia, vocal cord paralysis, subglottic haemangioma and congenital subglottic stenosis
- Pharyngeal: Pierre –Robin syndrome and Treacher- Collins syndrome

Acquired upper airway obstruction

- Infectious
- Non infectious

MCQ's:

A 12-year-old girl is complaining of left unilateral nasal obstruction worse on expiration for 5 months. Examination of the nose showed a single pale grayish glistening pedicled mass in the posterior part of the left nasal cavity. A CT showed pacification of the left nasal cavity, maxillary sinus and the nasopharynx.
What is the most likely diagnosis?

A. Antro-choanal polyp
B. Inferior turbinate enlargement
C. Mucocele

Answer: A