

Respiratory system

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CHOANAL ATRESIA

CA is the **most common** congenital anomaly of the nose. It is either unilateral or bilateral; the septum is either bony, membranous, or mixed. Half of cases have other congenital anomalies

- **Unilateral CA** may be **asymptomatic** for a prolonged period until 1st attack of **RTI** when unilateral nasal discharge

- **Bilateral CA** is usually **symptomatic at birth**. Infants who are able to breathe through their mouths, will experience difficulty & cyanosis **during sucking or feeding**;

. **Inv.** CA may be suspected by simple measures e.g. **inability to pass a firm catheter** through each nostril 3–4 cm into the nasopharynx, and

It can be confirmed by **fiberoptic Rhinoscopy** or **CT** of head.

Rx. • **Unilateral** obstruction can be treated by surgery several years later.

Bilateral obstruction should be treated **promptly** by keeping the mouth open through establishing an **airway**, which can be done • by the "feeding nipple" through making a large holes at its tip, then the infant can be fed by gavage. **Intubation** or **tracheostomy** may be required if these measures are failed till operative management (which should be followed by stent insertion in the nose).

EPISTAXIS

The most common site of bleeding is the **Kiesselbach plexus**, an area in the anterior septum. The thin mucosa at this area and its anterior location makes it prone to exposure to trauma and dry air.

Et. It commonly due to digital trauma, FB, inflammations (e.g. upper RTI, sinusitis, allergic rhinitis, and GERD), smoke, dry air, chronic use of nasal steroid sprays, hypertension, or family hx of childhood epistaxis.

Severe bleeding may be associated with local lesions e.g. juvenile nasal angiofibromas

. **Bleeding disorders** may be presented as epistaxis e.g. thrombocytopenia, clotting factors deficiency, VWD, or drugs

C.M. Nose-bleeds usually occur without warning from one nostril or both. The blood may be swallowed and become apparent only when the child vomits or passes blood in the stools.

Rx. Most Epistaxis stops spontaneously within a few minutes. However, the following steps should be followed to stop bleeding :- 1. **Compress** the nares; keep the child quiet in upright position with head tilted forward.

2. Apply **cold** compresses on the nose.

3. Apply **oxymetazoline** or **epinephrine** locally

4. Put anterior **nasal pack**, if the bleeding is posterior, put another pack posteriorly.

5. Severe bleeding may require admission for **blood transfusion** and for

otolaryngologic evaluation to exclude local lesions by nasal endoscopy, CT or MRI with surgical intervention if needed.

Hematological evaluation may also be required to exclude bleeding tendency.

Pv. After control of bleeding, if the bleeding site is identified, it can be obliterated by **cautery with silver nitrate**

COMMON COLD (Rhinitis, Rhinosinusitis)

Et. **Rhinoviruses** are the most common pathogens, followed by **Coronaviruses** with symptoms are usually restricted to the upper respiratory tract. **Other respiratory viruses** include RSV, , Influenza, Parainfluenza, Adenoviruses, and Enteroviruses.

. **C.M.** The onset is typically occurs after **1–3 days** as **sore or “scratchy”throat**, followed by **nasal obstruction and** rhinorrhea. In infants, fever and nasal discharge may predominate; but fever is uncommon in older children.

Cough may be present due to irritation of the URT by postnasal drip. Abnormal middle ear pressure is common during the course of a cold

. **Cx.**

• **Otitis**

• **Sinusitis**

• **Exacerbation of asthma**

Rx.

• **Symptomatic Rx** include:- ✓ **Maintain adequate oral hydration** ✓ **Zinc.**

✓ **Acetaminophen** or **NSAIs** (except aspirin) for fever & sore throat.

- ✓ **First generation antihistamines** for rhinorrhea due to its anticholinergic effects;
- ✓ **Adrenergic agents** (topical or oral) for nasal obstruction e.g. xylometazoline, oxymetazoline, or phenylephrine, but they not recommended in children <6 yr; as well as prolonged use of these drugs may → *Rhinitis Medicamentosa* which is a sensation of nasal obstruction when the drug is discontinued due to apparent rebound effect. Aromatic vapors (e.g. menthol) & saline nasal drops can improve nasal symptoms.
- ✓ For cough give **First-generation antihistamine, Honey** (for children >1 yr), or sugar-containing cough lozenges. A combination of camphor, menthol & eucalyptus oil may relieve nocturnal cough.
- **Antiviral Rx** may be required for some respiratory viruses but should be started as early as possible (within 48 hr) e.g. ribavirin for RSV, oseltamivir or zanamivir for Influenza virus; whereas Rhino- & Coronaviruses require only symptomatic therapy.

ACUTE PHARYNGITIS

Et. Viral infections are the **most common** cause of pharyngitis e.g. adenoviruses, coronaviruses, enteroviruses, rhinoviruses, RSV, EBV, HSV& metapneumovirus. **Most common bacterial infection is the group A β -hemolytic streptococcus (GABHS)** & less commonly group C streptococcus, *Mycoplasma pneumoniae*, and *Corynebacterium diphtheriae*.

. **Path.** Colonization of the pharynx by GABHS can result in either **acute infection** or **asymptomatic carriage**.

C.M. • **Streptococcal Pharyngitis** is uncommon before **2–3 yr** of age, peak in the early school years. The I.P. is 2–5 days. **Hx.** Onset of is often **rapid** with prominent **sore throat & fever**; headache, abdominal pain, & vomiting are common. **Ex.** The pharynx is **red**, and the **tonsils are enlarged** and classically covered with a yellow, blood-tinged exudate. There may be **petechiae**

. The anterior **cervical LNs** are usually enlarged and tender

Scarlet Fever may develop in some patients and characterized by **circumoral pallor, strawberry tongue, and red, finely papular rash**

that feels like sandpaper.

. • **Viral Pharyngitis**; there is significant overlap with the bacterial pharyngitis; however it has more **gradual** onset and manifestations include: **rhinorrhea, coryza, hoarseness, conjunctivitis, cough, and diarrhea.** **Additional manifestations** which are specific for

each virus include: **Adenovirus** may be associated with concurrent conjunctivitis and fever

Inv.

- **GABHS** can be diagnosed by serology (e.g. ASO titer); Rapid Antigen-Detection Tests (RADTs) (both are rapid & specific); or throat culture;

- . • Viral agents can be diagnosed by serology or PCR.

Rx.

- **Symptomatic Rx** include: oral antipyretic/analgesic agent (e.g. acetaminophen or ibuprofen) relief.

- **Streptococcal pharyngitis** mostly will resolve within few days if untreated, but early antibiotic Rx hastens clinical recovery by 12–24 hr. The primary benefit of treatment is to **prevent acute rheumatic fever**, which is almost completely successful if antibiotic therapy is instituted within 9 days of illness.

Antibiotic Rx should be started immediately (without culture) **in the following situations:** symptomatic pharyngitis, positive rapid streptococcal antigen test, clinical Dx of scarlet fever, household contact with documented streptococcal pharyngitis, past hx of acute rheumatic fever, or recent hx of acute rheumatic fever in family member.

All strains of GABHS are still susceptible to penicillins, so oral Rx is either by; Penicillin Vor Amoxicillin. 1st generation cephalosporins are also very effective.

Patients who are **allergic** to β -lactam antibiotics, give either a **macrolide** e.g. Erythromycin or **Clindamycin**,

- . **All the above antibiotics should be given for 10 days.** Follow-up cultures are unnecessary unless symptoms recur. **Azithromycin** also can be given once daily for 5 days

- **Recurrent streptococcal pharyngitis** may represent relapse with an identical strain due to inadequate duration of therapy. To ensure compliance give **Benzathine penicillin as single IM injection**. Recurrences also may be caused by a different strain resulting from new exposures or may represent pharyngitis of another cause accompanied by streptococcal carriage. **Clindamycin orally** is the most effective Rx for **eradicating streptococcal carriage** or Amoxicillin-clavulanate for 10 days.

Prolonged pharyngitis (>1–2 wk) suggests another disorders e.g. infectious mononucleosis, neutropenia, recurrent fever syndromes...etc.

TONSILLITIS AND ADENOIDS

Waldeyer ring consists of lymphoid tissue that surrounds the opening of the oral and nasal cavities into the pharynx. It is most immunologically active between 4-10 yr of age (greatest between 3-6 yr), then ↓ gradually after puberty

Et. Most episodes of acute pharyngotonsillitis are caused by **viruses**. **GABHS** is the most common cause of bacterial infection in the pharynx. **Hx.** Symptoms of **GABHS** infection include: **odynophagia, dysphagia, sore throat, referred otalgia, malaise, headache, fever, chills, & muscular aches.**

Ex. Dry tongue, erythematous enlarged tonsils, tonsillar or pharyngeal exudate, palatine petechiae, & enlarged cervical LNs.

Cx. These are **similar** to those of acute pharyngitis (but the most common suppurative Cx is the peritonsillar cellulitis/abscess).

Tonsils

and adenoid are a major cause of **upper airway obstruction** in children. **Day-time symptoms** include upper airway resistance syndrome e.g. chronic mouth breathing, nasal obstruction, hyponasal speech, hyposmia, decreased appetite, poor school performance, poor growth, and rarely symptoms of right-sided HF!. **Night-time symptoms** include sleep-disordered breathing e.g. obstructive sleep apnea/hypopnea, loud snoring, choking, gasping, restless sleep, abnormal sleep positions, sleep talking, somnambulism (sleep walking), night terrors, diaphoresis, and enuresis. Other signs that can contribute to airway obstruction include the presence of craniofacial synd or hypotonia. Chronic airway obstruction may → **Adenoid facies.**

Large tonsils are typically seen on examination. The size of the adenoid can be demonstrated by **lateral neck X-ray** or **flexible endoscope.**

. • **Rx of acute pharyngo-tonsillitis is similar** to those discussed in acute pharyngitis (*see above*).

• **Tonsillectomy +/- Adenoidectomy** is indicated for recurrent pharyngotonsillitis despite adequate medical Rx.

Indications for surgery generally include: ≥ 7 (documented) episodes in the previous year, ≥ 5 episodes in each of the previous 2 yr, or ≥ 3 episodes in each of the previous 3 yr. It also indicated in cases of severe upper airway obstruction. • **Adenoidectomy alone** is curative for those with upper airway obstruction, as well as it may be indicated in chronic adenoiditis which resulting in chronic nasal or sinus infection or recurrent AOM.

Peritonsillar Cellulitis/Abscess Et. It mainly caused by **GABHS & anaerobes** due to bacterial invasion through the capsule of tonsil. **C.M.** It typically occurs in **adolescent** with recent hx of acute pharyngo-tonsillitis that result in sore throat, fever, trismus, dysphagia and referred

otalgia. Exam show **asymmetric tonsillar bulge** with displacement of the uvula; it can be confirmed by CT scan. **Rx.** Antibiotics with needle aspiration, incision and drainage, or by tonsillectomy.

Retropharyngeal & Parapharyngeal (Lateral) Abscess

Et. common causes may include: penetrating trauma to the oropharynx, dental infection, and vertebral osteomyelitis. **Common organisms** include: GABHS, oropharyngeal anaerobic bacteria, *Staph. aureus*; other less common bacteria include: *H. influenzae*, *Klebsiella*,

• **Retropharyngeal Abscess** occurs most commonly in children **<4 yr**

(because retropharyngeal nodes involute after 5 yr of age). It manifested as fever, irritability, decreased oral intake, drooling, muffled voice, stridor, and respiratory distress. There also may be neck stiffness, torticollis, and refusal to move the neck. Examination reveals bulging of the posterior pharyngeal wall with cervical LAP.

• **Parapharyngeal Abscess** is commonly presents as fever, dysphagia, and a prominent bulge of the lateral pharyngeal wall, sometimes with medial displacement of the tonsil. **Inv.** • **X-ray** of extended neck during expiration may show ↑ width or air-fluid level in the retropharyngeal space. • **CT scan** with enhancement can identify both retro- or parapharyngeal

abscesses. • **Incision for drainage** and culture of the abscessed node provides the definitive Dx. **Rx. IV antibiotics** e.g. 3rd-generation cephalosporins combined with ampicillin-sulbactam or clindamycin (to provide anaerobic coverage) +/- **surgical drainage.**

ALLERGIC RHINITIS Epid. AR is a **major chronic respiratory problem** among children due to its high prevalence, up to **20-40%** in some urban societies;

Risk factors for AR include: family hx of atopy*, infants delivered by C/S, infants whose mothers smoke heavily, heavy exposure to indoor allergens, and serum IgE > 100 IU/mL before 6 yr. **Note:**

*Atopy includes one or more of the following conditions: AR, allergic

conjunctivitis, atopic dermatitis, food allergy, and asthma. Factor that **protect** against AR and atopy: prolonged breast-feeding,

Et. Inhalant allergens are the main cause of all forms of rhinitis which can

be divided into 3 types:-

1. **Seasonal (intermittent) AR** (20%) follows a well-defined course of cyclical exacerbation mostly due to **outdoor allergens** e.g. airborne pollens which available from spring to late summer.

2. **Perennial (persistent) AR** (40%) causes year-round symptoms; it is most often associated with the **indoor allergens** e.g. house dust mites, cockroaches, and animal danders (especially cat, dog, mice). 3. **Mixed**, i.e. perennial with seasonal exacerbations (40%). Each of the above type can be mild, moderate, or severe

C.M. Typical Symptoms include: **intermittent nasal congestion & itching, sneezing, clear rhinorrhea, and conjunctival irritation.**

These

symptoms are commonly mistaken as common cold. Nasal itching brings on grimacing, twitching, and picking of the nose that may result in epistaxis Patients may lose their senses of smell and taste. Some experience headaches, wheezing, and coughing. Nasal congestion is often more severe at night, causing mouth-breathing and snoring, interfering with sleep, and inciting irritability.

Physical exam may reveal abnormalities of facial development, dental malocclusion, and the “**allergic gape**” due to continuous open-mouth breathing, chapped lips; “**allergic shiners**” is a dark circles under the

eyes. Conjunctival edema, itching, tearing, and hyperemia are frequent. Nasal exam by speculum usually reveal **edematous, boggy, and bluish mucus membranes with little or no erythema**; clear nasal secretions, and swollen turbinates that may block the nasal airway.

Inv. • Allergy skin test provides the best method for detection of allergen-specific IgE.

. • **Serum immunoassays of IgE**

• **Nasal smear** for the presence of eosinophils supports the Dx.

Rx. Safe and effective prevention or relief of symptoms is the goal of treatment. ❖ **Specific measures to reduce indoor allergen exposure** includes: **sealing** the patient's mattress, pillow, and covers in allergen-proof encasings, **washing** of bed linen and blankets every week in hot water,

removal of pets from the house.

❖ **Mild, intermittent symptoms of AR** can be relieved by the following medications:- • **Antihistamines** orally can relieve sneezing and rhinorrhea. *First generation antihistamines* include: Diphenhydramine, Chlorpheniramine ...etc. *Second-generation antihistamines* are preferred

as they cause less sedation; they include: Cetirizine & Desloratadine (approved for children >6 mo), Loratadine (>2 yr), Levocetirizine & Fexofenadine (>6 yr). Azelastine (>5 yr) is topically active antihistamine available as nasal spray.

• **Adrenergic agonists** are decongestants for symptomatic relief of nasal congestion; they include: Oxymetazoline or Phenylephrine as nasal drops or spray; however they should not be used for > 5 days and not repeated > once/month (due to rhinitis medicamentosa causing severe rebound nasal congestion). Pseudoephedrine is an oral vasoconstrictor but known to cause irritability and insomnia and may be associated with infant mortality

. • **Anticholinergics** e.g. Ipratropium bromide nasal spray is effective for treatment of serous rhinorrhea.

• **Sodium cromoglycate & ketotifen** inhibits mast cell degranulation but it requires frequent administration.

• **Leukotriene-modifying agents** have a modest effect on rhinorrhea and nasal blockage.

• **Nasal saline irrigation** is a good adjunctive option with all other treatment of allergic rhinitis.

❖ **Patients with more persistent, severe symptoms** require treatment with **intranasal corticosteroids** which are the most effective therapy

. ❖ **More severely affected patients** may benefit from combination of **antihistamines & intranasal corticosteroids**.

❖ **Specific allergen immunotherapy** administered by subcutaneous injection should be considered for children in whom IgE-mediated allergic **symptoms cannot be adequately controlled** by avoidance and Medications

. **Pg.** The reported rates of **remission of AR** among children are between **10 - 23%**. Treatment with "non-sedating" antihistamines and intranasal corticosteroids has significantly improves health-related quality of life in all patients with AR.