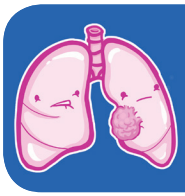

# NOTES
## UPPER RESPIRATORY TRACT

## GENERALLY, WHAT IS IT?

### PATHOLOGY & CAUSES

- Upper-airway infection (e.g. nasal cavity, pharynx, larynx) with pathogenic microbes

### RISK FACTORS

- Compromised immunity; genetic, congenital malformations; concomitant infection

### COMPLICATIONS

- Airway obstruction, infection spread, sepsis

### SIGNS & SYMPTOMS

- Stridor; fever (if bacterial infection); discharge; difficulty swallowing

### DIAGNOSIS

#### LAB RESULTS

- Cultures, complete blood count (CBC)
  - Bacterial involvement

#### OTHER DIAGNOSTICS

- Clinical presentation, physical exam

### TREATMENT

#### MEDICATIONS

- Antimicrobials

#### SURGERY

- Surgical interventions

#### OTHER INTERVENTIONS

- Respiratory support, intubation (if severe respiratory obstruction)

# BACTERIAL EPIGLOTTITIS

osms.it/bacterial-epiglottitis

## PATHOLOGY & CAUSES

- Inflammation of epiglottis, nearby supraglottic structures
- Fluid, inflammatory-cell accumulation → rapid, progressive swelling of epiglottis, adjacent structures (supraglottic larynx) → airway narrows, ball-valve curling → airway obstruction

### CAUSES

- Bacteria from posterior nasopharynx, *Haemophilus influenzae* (most common in children), *Streptococcus pneumoniae*, *Staphylococcus aureus*

### RISK FACTORS

- Unimmunized status
- Mucosal trauma
  - E.g. burns, caustic substance/foreign body ingestion
- Most common in children 6–12 years old
- Comorbidities (adults)
  - E.g. diabetes mellitus, substance abuse, BMI > 25

### COMPLICATIONS

- Airway obstruction
- Oropharyngeal secretion aspiration
- Cardiopulmonary arrest
- High mortality rate

## SIGNS & SYMPTOMS

- *Children:* abrupt "3Ds" onset: dysphagia, drooling, distress
- *Respiratory:* stridor, retractions, tachypnea, cyanosis
- *Behavioral:* individual refuses to lie down; assumes tripod posture
- *Voice:* aphonia, muffled
- *Other:* sore throat, fever, odynophagia, anterior neck tenderness, anxiety

## DIAGNOSIS

### DIAGNOSTIC IMAGING

#### Laryngoscopy

- Swollen, red epiglottis

#### X-ray

- Shadow of enlarged epiglottis ("thumb" sign); ballooning of hypopharynx

### LAB RESULTS

- *CBC:* ↑ white blood cells (WBCs)
- ↑ C-reactive protein (CRP), positive throat culture

## TREATMENT

### MEDICATIONS

- Empiric antimicrobial therapy
  - E.g. third generation cephalosporin for *Haemophilus influenzae* colonization

### OTHER INTERVENTIONS

- Airway management with humidified supplemental oxygen

#### Prevention

- *Haemophilus Influenzae* Type b (Hib) vaccine

# LARYNGITIS

osms.it/laryngitis

## PATHOLOGY & CAUSES

- Inflammation of larynx
  - *Acute:* < three weeks
  - *Chronic:* > three weeks

### CAUSES

#### Acute

- Viral
  - Rhinovirus, influenza virus, parainfluenza, adenovirus
- Bacterial
  - *Moraxella catarrhalis, H. influenzae, S. pneumoniae*
- Fungal
  - *Candida* in immunosuppressed
- Trauma, nerve damage

#### Chronic

- Acid reflux, smoke exposure, allergies, rheumatoid arthritis, autoimmune disease

## SIGNS & SYMPTOMS

- Flu-like
  - Fever, cough, malaise, enlarged lymph nodes
- Stridor, hoarseness, pain, odynophagia, lump in throat

## DIAGNOSIS

### DIAGNOSTIC IMAGING

#### Laryngoscopy

- Swollen, red vocal folds; biopsy

### LAB RESULTS

- Blood culture

## TREATMENT

### MEDICATIONS

- Simple analgesics
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- If bacterial infection, antibiotics

### OTHER INTERVENTIONS

- Voice rest

# NASAL POLYPS

osms.it/nasal-polyps

## PATHOLOGY & CAUSES

- Overgrowths of epithelial tissue lining nasal cavity, paranasal sinuses
- Most commonly formed in maxillary/ethmoid sinus
- Results in airflow obstruction, mucus drainage blockage

### CAUSES

- Unknown; associated with long-term inflammatory sinus conditions
  - Seasonal allergies, frequent asthma exacerbations, chronic sinusitis, aspirin sensitivity

### RISK FACTORS

- Cystic fibrosis, primary ciliary dyskinesia

### COMPLICATIONS

- Mucus drainage obstruction; sinusitis → recurrent infections

## SIGNS & SYMPTOMS

- May be asymptomatic
- Bacterial infection
  - Blocked mucus drainage
  - Fever, headache
- Obstructed air flow
  - ↓ sense of smell, snorting, sleep apnea, cyanosis (in infants)

## DIAGNOSIS

### DIAGNOSTIC IMAGING

#### Endoscopy

- Direct visualization of nasal polyp

#### CT scan

- Hyperdense outpouching in nasal cavity

## TREATMENT

### MEDICATIONS

#### Topical steroids

- Nasal spray to shrink polyp; ↓ inflammation, swelling

#### Nasal saline lavage

- Underlying allergy treatment

### SURGERY

- Endoscopic sinus surgery if unresponsive to steroids

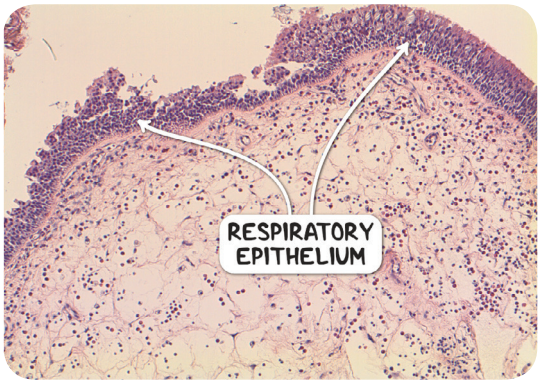


**Figure 133.1** The histological appearance of a nasal polyp. There is loose, myxoid stroma lined by respiratory epithelium.

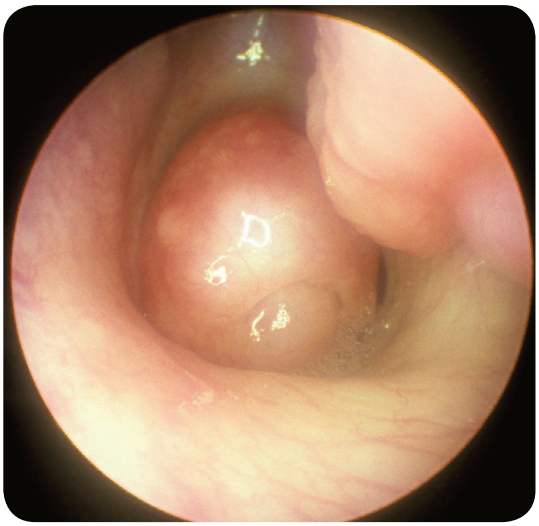

**Figure 133.2** A trans-nasal view of a polyp in the posterior nasal passage.

# RETROPHARYNGEAL & PERITONSILLAR ABSCESS

osms.it/rp-and-pt-abscess

## PATHOLOGY & CAUSES

- Abscesses of the upper respiratory tract

## TYPES

### Retropharyngeal abscess

- Abscess formation in retropharyngeal space
  - Between buccopharyngeal fascia, alar fascia
- Bacteria of nasopharynx enter weakened mucosa → white blood cells (WBCs) follow, create pus → mass grows, pushes into airway

### Peritonsillar abscess

- Pus in potential space between pharyngeal muscles, palatine tonsils

## CAUSES

### Retropharyngeal abscess

- Bacterial
  - *S. aureus*, group A beta-hemolytic bacteria, *H. parainfluenzae*
- Trauma, upper respiratory tract infections

### Peritonsillar abscess

- *Streptococcus pyogenes* (most common) → acute tonsillitis
- *Staphylococcus*, *Haemophilus*, anaerobes of mouth flora (less common)

## COMPLICATIONS

### Retropharyngeal abscess

- Spread beyond retropharyngeal space, mediastinitis, pericarditis; pharyngitis, airway obstruction; sepsis

### Peritonsillar abscess

- Retropharyngeal abscess, cellulitis of head and neck, sepsis

## SIGNS & SYMPTOMS

- Fever, lethargy, swelling, sore throat

### Retropharyngeal abscess

- Neck pain/stiffness, pharyngeal obstruction, difficulty swallowing, dyspnea, cough, stridor

### Peritonsillar abscess

- Asymmetric tonsillar swelling with uvular displacement; lymph node enlargement
- Muffled voice, trismus, sleep disturbance (difficult breathing), snoring, halitosis

## DIAGNOSIS

### DIAGNOSTIC IMAGING

#### Contrast CT scan

- Tissue swelling

#### Ultrasound

- Differentiate Peritonsillar abscess from Cellulitis

### LAB RESULTS

- Systemic spread in CBC, throat culture, blood culture

### OTHER DIAGNOSTICS

#### Clinical presentation

- Swollen pharyngeal space tissues
- Redness, asymmetry

## TREATMENT

### MEDICATIONS

- IV antibiotics

### SURGERY

- Surgical drainage of abscess
- Peritonsillar abscess
  - If airway obstruction, immediate tonsillectomy/incision, drainage

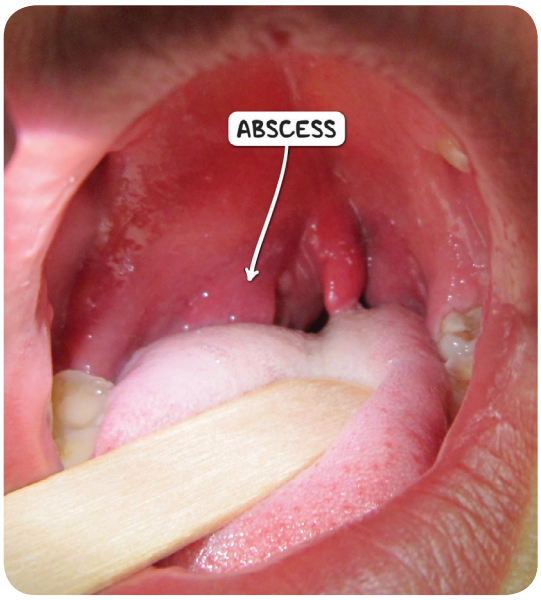


**Figure 133.3** Clinical appearance of a right sided peritonsillar abscess which shows swelling of the palatopharyngeal arch.

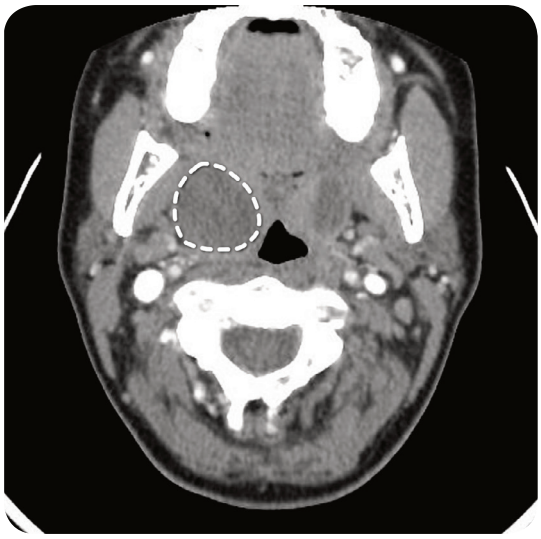

**Figure 133.4** A CT scan of the head in the axial plane demonstrating a peritonsillar abscess.

# SINUSITIS

osms.it/sinusitis

## PATHOLOGY & CAUSES

- Inflammation of sinuses, usually due to infection

### CAUSES

- Influenza, parainfluenza, rhinoviruses, adenoviruses; bacteria of nasopharynx

### RISK FACTORS

- Upper respiratory tract infections, allergies, teeth infections (spread to maxillary sinus), tumors, adenitis, nasotracheal/nasogastric tubes, genetic disorders (Kartagener, cystic fibrosis), deformation of bone

### COMPLICATIONS

- Meningitis, cavernous sinus thrombosis, orbital/periorbital cellulitis, abscesses

## SIGNS & SYMPTOMS

- Bacterial
  - Fever, headache, immediately previous upper respiratory infection, feeling of draining fluid, pain when leaning forward, voice change, last > 10 days
- Viral
  - Self-limiting, painful sinuses (esp. leaning forward), discharge, last < 10 days

## DIAGNOSIS

### DIAGNOSTIC IMAGING

- Rare

#### CT scan

- Screen for complications

### LAB RESULTS

- CBC, leukocytes often normal
- Swabs, cannulation contraindicated due to high likelihood of sample contamination

## TREATMENT

### MEDICATIONS

#### Antibiotics

- If bacterial
- First line treatment, penicillin (amoxicillin with clavulanic acid); second line, fluoroquinolones

#### Corticosteroids (topical/systemic)

- Alleviate allergies

### OTHER INTERVENTIONS

#### Steam treatments

- Dislodge secretions

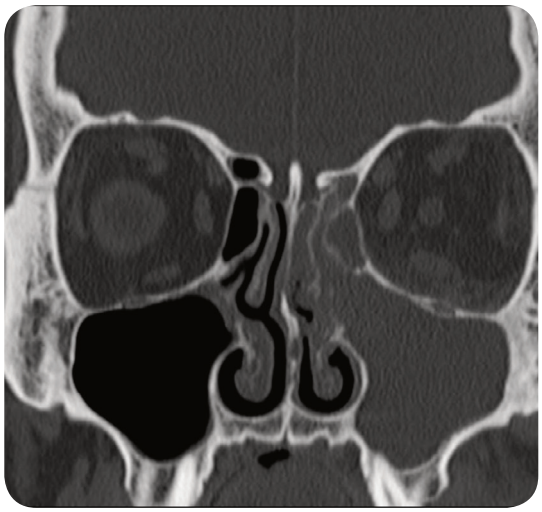

**Figure 133.5** A CT scan of the head in the coronal plane demonstrating left maxillary sinusitis.

# UPPER RESPIRATORY TRACT INFECTION

osms.it/upper-resp-tract-infection

## PATHOLOGY & CAUSES

### Pharyngitis

- Clinical syndrome characterized by sore throat, cervical lymphadenopathy; sore throat worsens with swallowing; typically accompanied by reactive enlargement of tonsils
- Inflammation of nasopharyngeal mucosa with reactive inflammation of lymph nodes, tonsils

### The common cold

- Mild self-limiting viral infection characterized by nasal congestion, rhinorrhea, sore throat, nonproductive cough, low grade fever
- Most common upper respiratory tract infection
- Hand contact/inhalation of airborne droplets from infected individual → viral inoculation → deposition on nasal mucosa → viral replication → cytokines release from infected cells → immune response initiates → inflammation, congestion of nasal cavity mucous membranes
- Resolves within one week, symptoms last up to 10–14 days; esp. in young children < six
- No cross immunity between serotypes
  - Possible reinfection with milder symptoms, shorter duration

## CAUSES

### Pharyngitis

- Infectious
  - *Most common pathogens:* respiratory viruses (rhinovirus, echovirus, adenovirus, coronavirus), Group A *Streptococcus pyogenes* (GAS)
  - *Less common pathogens:* bacteria (*Staphylococcus aureus*; Group C, G *Streptococcus; Arcanobacterium haemolyticum; Fusobacterium necrophorum; Mycoplasma pneumoniae; Chlamydia pneumoniae; Corynebacterium diphtheriae; Neisseria gonorrhoeae; Treponema pallidum*); viruses (respiratory syncytial viruses; influenza A, B; HIV; Epstein–Barr virus; cytomegalovirus; herpes simplex virus; parainfluenza; enteroviruses)
- Noninfectious
  - Allergic rhinitis
  - Irritative pharyngitis (due to dry air, esp. in winter)
  - Medications (e.g. angiotensin-converting enzyme inhibitors)
  - Kawasaki disease
  - Periodic fever, aphthous stomatitis, pharyngitis, adenitis (PFAPA) syndrome

### The common cold

- Viruses
  - *Most common:* rhinoviruses (50% of all cases)
  - Coronaviruses, parainfluenza viruses, RSV, influenza, adenoviruses, coxsackie viruses

## RISK FACTORS

### The common cold

- Age, usually children < six; malnutrition; underlying diseases; immunodeficiency disorders; smoking; stress; sleep disturbances; weather, high prevalence in fall, winter

## COMPLICATIONS

### Pharyngitis

- Severe pharyngeal inflammation, abscess formation, tonsillar hypertrophy → upper

airway obstruction
- Post streptococcal
  - *Suppurative (spread of infection beyond pharynx):* otitis media; peritonsillar cellulitis/abscess; retropharyngeal abscess; sinusitis; meningitis; bacteremia; necrotizing fasciitis; jugular vein septic thrombophlebitis
  - *Non suppurative (immune mediated):* acute rheumatic fever, which can progress to rheumatic heart disease; post streptococcal glomerulonephritis; reactive arthritis; scarlet fever (delayed skin reactivity to erythrogenic toxin produced by GAS; requires prior exposure to GAS; characteristic scarlet rash, white with red enlarged papillae aka "strawberry tongue"); streptococcal toxic shock syndrome; pediatric autoimmune neuropsychiatric disorder associated with streptococcus (PANDAS)
- *Lemierre syndrome:* suppurative thrombophlebitis of jugular vein caused by Fusobacterium necrophorum

### The common cold
- Secondary bacterial infection
  - Acute otitis media, sinusitis, pneumonia
- Asthma exacerbation

## SIGNS & SYMPTOMS

### Pharyngitis
- Reddening; edema of pharyngeal mucosa; sore throat, worsens when swallowing
- Neck pain/swelling due to reactive lymphadenopathy
  - Not prominent in viral pharyngitis
  - Prominent, tender, anterior cervical lymphadenopathy in bacterial pharyngitis
- Constitutional symptoms
  - Fever (low grade in viral pharyngitis, high grade in bacterial pharyngitis)
  - Headache, fatigue, malaise
- Swollen, reddened tonsils with white spots of exudate from tonsillar crypts
- Suggestive of
  - *Viral pharyngitis:* cough, nasal congestion, conjunctivitis, coryza, oral ulcer, viral exanthem
  - *Bacterial pharyngitis:* sudden onset of symptoms, high grade fever, tonsillopharyngeal edema, tonsillar exudates, painful cervical lymphadenopathy
- Symptoms resolve within 3–5 days in viral pharyngitis; 5–7 days in bacterial pharyngitis

### The common cold
- Immune response to infection
- Nasal features
  - Congestion; clear, purulent, yellow/green discharge; sneezing; erythema, nasal mucosa swelling
- Nonproductive cough
- Sore throat
- Low grade fever
  - Predominant in young children; uncommon in older children, adults
- Headache, malaise, abnormal middle ear pressure, conjunctivitis

## DIAGNOSIS

### LAB RESULTS

### Pharyngitis
- If suggestive of GAS pharyngitis (AKA strep throat)
  - *Rapid strep test (RST):* detects GAS antigens on swab sample of tonsils, posterior pharynx
  - *Throat culture:* more accurate than RST, takes 24 hours. If RST negative, but clinical suspicion of GAS pharyngitis; beta hemolytic, bacitracin sensitive, pyrrolidonyl arylamidase (PYR) positive colonies
  - *Polymerase chain reaction (PCR)-based assays:* more sensitive, rarely available
  - *Serological tests:* (antistreptococcal antibodies: anti-streptolysin (ASO), anti-hyaluronidase, anti-streptokinase, anti-nicotinamide adenine dinucleotidase, anti-DNase; ↑ titres suggestive of recent GAS infection; useful for detecting post streptococcal complications

## OTHER DIAGNOSTICS

### Pharyngitis

- Oropharyngeal examination
- *Centor criteria:* predict possibility of GAS pharyngitis
  - *1 point each:* fever, tonsillar exudates, tender anterior cervical lymphadenopathy, absence of cough, age < 15; subtract 1 point if age > 44
  - *-1, 0, 1:* no testing
  - *2, 3:* testing required
  - *4, 5:* empirical antibiotic treatment

### The common cold

- Clinical presentation
- Re-evaluation if symptoms worsen/exceed expected recovery time

# TREATMENT

## MEDICATIONS

### Pharyngitis

- Antipyretics/analgesics
  - Aspirin, acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs); for fever, pain control
- Salt water gargling
- *GAS pharyngitis:* antibiotics to prevent complications, reduce symptoms, prevent transmission
  - *First line treatment:* penicillin (penicillin V/amoxicillin)
  - *Alternatives:* cephalosporins, clindamycin, macrolides
  - *If recurrent/persistent:* repeat 10 day course of antibiotics

### The common cold

- Topical saline/nasal suction/combination of nasal decongestant with antihistamines
- Antipyretics/analgesics
- Dextromethorphan/codeine to suppress cough

## SURGERY

### Pharyngitis

- Tonsillectomy
  - Recurrent infections
  - Chronic tonsillitis unresponsive to antibiotics
  - Tonsil enlargement causing airway obstruction
  - Complications of pharyngotonsillitis
  - PFAPA syndrome

## OTHER INTERVENTIONS

### Pharyngitis

- Viral pharyngitis often self-limited
- Symptomatic
  - Rest
  - Adequate fluids to loosen secretions, prevent airway obstruction

### The common cold

- Symptomatic
  - Rest
  - Adequate fluids