



# EAR, NOSE AND THROAT

## [#22] Pharynx II

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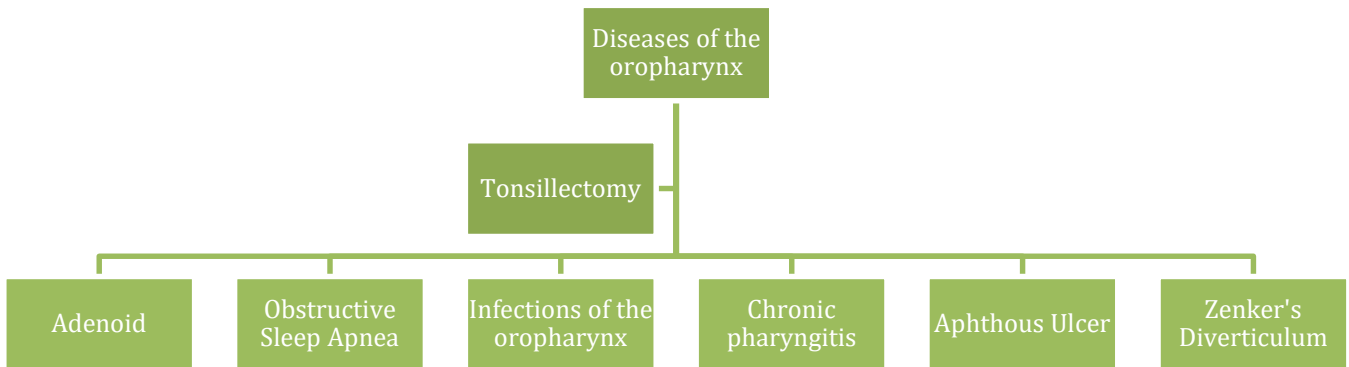
**Revised by: Norah Alnegheimish**

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 pharyngeal diseases, including the ability to obtain patients' history, perform comprehensive physical and mental status assessment and interpret findings.
- To know how to handle common pharyngeal emergencies.
- To be aware of common pharyngeal operations.



# Adenoid

- Hypertrophy of the nasopharyngeal tonsils -due to infections and other causes- which can cause symptoms of airway obstruction.
- Most commonly between the age of 3-7 years.
- **Pathological types:**
  - 1) Inflammatory
  - 2) Tuberculosis
- **Clinical features:**

Mouth breathing, snoring, hyponasality (loss of normal resonance associated with a clear nasopharynx), adenoid face (long, open-mouthed, dumb-looking face of children with adenoid hypertrophy), nasal discharge and Eustachian tube obstruction.
- **Main Adverse effects:**

Nasal obstruction, pharyngitis (due to dry mouth), otitis media, rhinosinusitis, recurrent upper respiratory tract infections, and obstructive sleep apnea.
- **Diagnosis:**
  - 1) X-ray. *(should be done with the neck extended in order to fully visualize the adenoid)*
  - 2) Flexible fiberoptic. *(now used instead of x-ray)*
- Using fiberoptic, adenoid hypertrophy is graded based on the degree of obstruction.
  - Grade 1 → <25% obstruction
  - Grade 2 → 25-50% obstruction
  - Grade 3 → 50-75% obstruction
  - Grade 4 → 75-100% (complete obstruction)



Adenoid Facies

## 430 teamwork

### Treatment of adenoid:

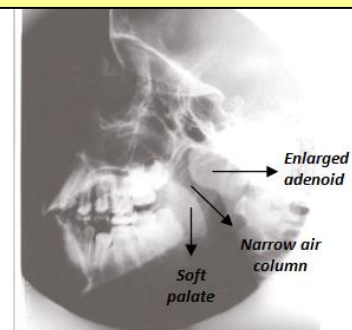
- If small adenoid → conservative steroidal nasal spray.
- Surgical → adenoidectomy. *Indications: recurrent/ persistent otitis media, recurrent/chronic sinusitis, and obstructive sleep apnea.*
- Adenoids are removed by inserting a catheter through the throat to retract the soft palate and visualize the adenoid. Then, the enlarged adenoid is removed using a curette or suction diathermy (heat).



Flexible fiberoptic



Fiberoptic inserted through the nose reveals a grade 3 adenoid (75% obstruction).



Lateral x-ray shows enlarged adenoid with narrowing of air column.

# Sleep apnea

- Snoring is a sign of partial obstruction of the upper airway during sleep.
- Snoring is always present during **obstructive** sleep apnea.
- **Sleep apnea:**
  - Cessation of airflow at the mouth and nostrils lasting 10 seconds for at least 30 apneic episodes.
- **Types:**
  - 1) Central sleep apnea: Failure of respiratory drive from the brain.
  - 2) Obstructive sleep apnea (OSA): Due to anatomical narrowing of the upper airway. *“For example: deviated nasal septum, large inferior turbinate, polyp, adenoid, large tongue, large tonsils and retrognathia (posterior positioning of the maxilla or mandible)”*.
  - 3) Mixed.
- **Stages of sleep (skipped by the doctor):**
  - Slow wave sleep:
    - Brain waves are slow in deep restful sleep.
    - There’s a decrease in vascular tone and respiratory rate and basal metabolic rate.
  - Rapid eye movement:
    - Brain quite active.
    - Active dreaming.
- **Pathophysiology of OSA:**
  - During REM or deep sleep, obstruction occurs resulting in decrease arterial oxygen and increased arterial carbon dioxide pressure.
  - Nocturnal desaturation arouses patient and causes increase pulmonary and systemic arterial pressure.
  - Leads to hypersomnolence (excessive sleeping or sleepiness).
  - Predisposes to hypertension and stroke.
- **Predisposing Factors:**

Obesity, nasal or pharyngeal obstruction by tonsils or adenoids in children, increasing age, alcohol, and smoking.
- **Investigations:**
  - **Sleep study:**

EEG, EKG, EOG, pulse oximeter, respiration rate, muscle movement, nasal and oral air flow and frequency of apneic episodes and according to that → the treatment method is chosen.

**Electrooculogram (EOG):** A recording of the movements of the eyes. If rapid eye movements are detected during sleep, the subject is in REM sleep.
- **Treatment:**
  - **Nonsurgical:**

- Behavior modification: **weight reduction and avoid alcohol at night.**
- Medical treatment.
- **For uncomplicated snoring, various devices improve the caliber of the nasal airway or splint the jaw forward to improve the pharyngeal airway.**
- CPAP (continuous positive airway pressure).
- **Surgical:**
  - UPPP (Uvulopalatopharyngoplasty) → a procedure that is done when the soft palate is redundant or if big tonsils or adenoids are present.

### 430 teamwork

#### **Types of sleep apnea:**

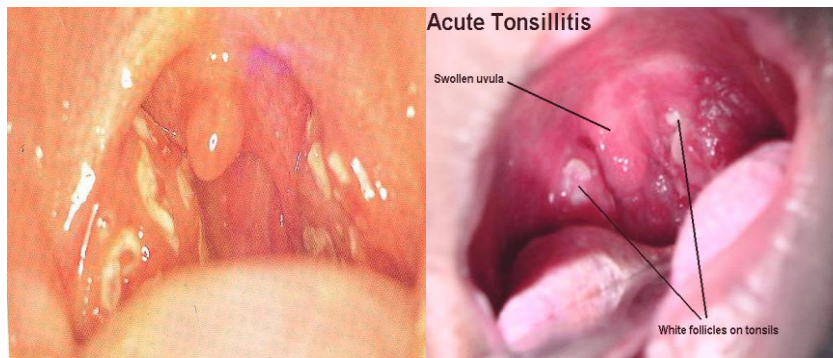
- *Central sleep apnea → absent chest movement and should be treated by a neurologist.*
- *Obstructive sleep apnea → the chest is moving.*

## Acute infection of the oropharynx

### 1) Acute tonsillitis:

- **Causes:** **viral (most common cause)**, bacterial (**group A  $\beta$ -hemolytic streptococcus**, moraxella, H. influenza, bacteroides).
- **Signs & symptoms:** fever, sore throat, pain on swallowing (odynophagia), jaw stiffness (trismus), halitosis (bad breath).
- **Phases:** erythema, exudative, follicular tonsillitis.
- **Complications:**  
Peritonsillar abscess (Quinsy), parapharyngeal or retropharyngeal abscess, **otitis media**, rheumatic fever, glomerulonephritis, **scarlet fever**. **The last three are associated with group A streptococcus (GAS).**
- **Rx:**
  - Oral antibiotics (**pencillin**), bed rest, hydration, analgesia.
  - **If the symptoms are severe → admit the patient and give IV fluids, IV antibiotics and analgesia.**
- The Centor criteria (not accurate) to diagnose and treat GAS pharyngitis. These include the following (A score of 0-1 makes GAS infection unlikely; a score of 4 makes it likely):
  - Fever
  - Anterior cervical lymphadenopathy

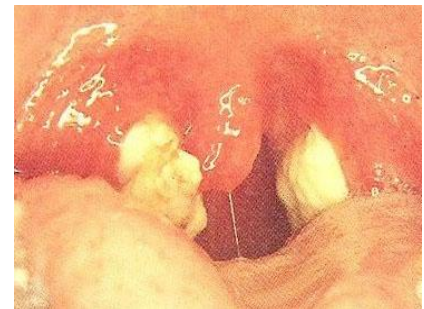
- Tonsillar exudate
- Absence of cough



*Acute follicular tonsillitis*

## 2) Infectious mononucleosis:

- **Pathogen:** Epstein barr virus. Adolescents are especially susceptible (kissing disease).
- **Signs & symptoms:** membrane on tonsils (membranous tonsillitis), fever, bilateral lymphadenopathy, malaise, exudative tonsillitis, hepatosplenomegaly. Patients who are treated with ampicillin or amoxicillin may develop a characteristic rash.
- **DX:**
  - Monosopt test, paul bunnell test (heterophil antibodies in serum).
  - 80% mononuclear and 10% atypical lymphocytes on smear.
  - CBC shows a higher count of lymphocytes than neutrophils.
- **Complications:** involvement of cranial nerves, meningitis, autoimmune hemolytic anemia, splenic rupture (activity restriction may be necessary to prevent splenic rupture in patients with splenic enlargement).
- **RX:** hydration, analgesia and oral hygiene.
- **Differential diagnosis:** Diphtheria (grey membranes on tonsils).



*Membranous tonsillitis*

## 3) Scarlet fever:

- Endotoxin produced by type A  $\beta$ -hemolytic streptococcus (wrong). The rash of scarlet fever is caused by the streptococcal pyrogenic exotoxins (ie, SPE A, B, C, and F).
- **Signs & symptoms:**

Scarlet fever (known as scarlatina in older literature references) is a syndrome characterized by exudative **pharyngitis, fever, and bright-red exanthema (rash)**.

Red pharynx, **strawberry tongue**, perioral skin erythema and desquamation, dysphagia, malaise, severe cervical lymphadenopathy.

- **DX:** Dick test.
- **RX:** Antibiotic. **Penicillin or amoxicillin**.



*Strawberry tongue*

#### 4) Diphtheria:

- *Corynebacterium diphtheriae*.
- **Signs and symptoms:** sore throat, fever, green plaques friable membrane. **Characterized by a grey membrane (difficult to remove) on tonsils, fauces, and uvula, which bleeds on scraping.**
- **DX:** culture.
- **Complications:** **myocarditis**, nephritis, airway obstruction, death.
- **RX:** Antibiotics (**penicillin or erythromycin**), antitoxin. **Diphtheria antitoxin is a horse-derived hyperimmune antiserum that neutralizes circulating toxin prior to its entry into the cells**



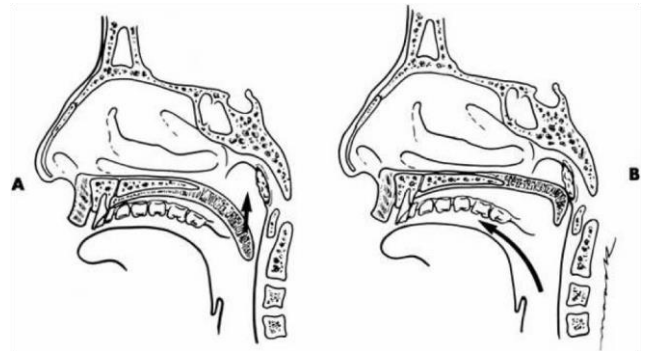
#### 5) Vincent's angina:

- Acute ulcerative lesion.
- Gram negative fusiform bacillus and a spirillum with anaerobes.
- **Signs and symptoms:** Sudden in onset, pain, fever, cervical adenitis, the base of the deep ulcers bleed when the membranous slough is removed, the symptoms subside in 4-7 days.
- **RX:** metronidazole (flagyl), antiseptic, mouthwash.

#### 6) Bifid uvula:

### 430 teamwork

- *Signs & symptoms: snoring and mouth breathing.*
- *Sometimes, the adenoid helps close the soft palate. So, before deciding on removing the whole adenoid (adenoidectomy), the doctor should examine the uvula to make sure it's not short or bifid and palpate the soft palate to check for submucosal cleft. If any of the three conditions mentioned are there, it is contraindicated to do an adenoidectomy.*



- *The picture on the left shows a bifid uvula and soft palate.*
- *In this case, only the upper part of the adenoid is removed (partial adenoidectomy), while the lower part is kept; to bridge the gap between the soft palate and pharynx in order to prevent velopharyngeal insufficiency and hypernasality.*
- *Velopharyngeal insufficiency (VPI) is a disorder resulting in the improper closing of the velopharyngeal sphincter (soft palate muscle in the mouth) during speech, allowing air to escape through the nose instead of the mouth.*
- *If the velopharynx is not closed, snort sounds may be produced through the nose or you may hear air coming out of the nose during speech.*
- *Improper function of this structure also produces a nasal tone in the voice (hypernasality).*



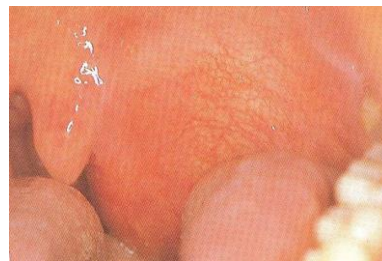
## 7) Moniliasis:

- White patches caused by candida albicans fungus.
- In bronchial asthma patients (using inhaled steroids) or immunocompromised patients like patients on renal dialysis.
- RX: nystatin.



## 8) Peritonsillar abscess (quinsy):

- An abscess between the tonsil capsule and the adjacent lateral pharyngeal wall.
- **Signs & symptoms:** fever, otalgia odynophagia, uvular deviation, **trismus** (stiff jaw), **drooling** of saliva, **hot potato voice**. The patient, already suffering from tonsillitis, becomes more ill, has a peak of temperature and develops severe dysphagia with referred otalgia. On examination, a most striking and constant feature is **trismus**.
- **Complications:** para and retropharyngeal abscess, aspiration pneumonia.
- **Rx:**
  - Incision and drainage.
  - Aspiration.
  - IV antibiotics.

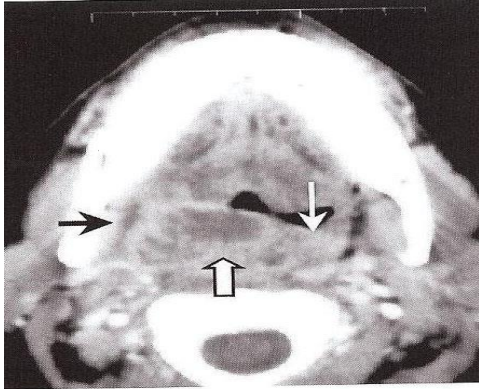


## 9) Parapharyngeal abscess:

- **Source of the infection:** odontogenic, **tonsils or pharynx**, parotid.
- **Signs & symptoms:** trismus, fever, muffled voice, intraoral bulge.
- **Complications:** aspiration, cranial nerve palsy, airway compromise, septic thrombophlebitis **of internal jugular**, carotid blowout, endocarditis.
- **RX:** external drainage, IV antibiotics, airway management.

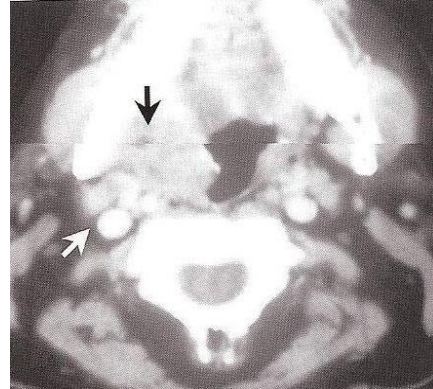
## 10) Retropharyngeal abscess:

- More common in **children**.
- **Signs & symptoms:** odynophagia, hot potato voice, **drooling**, **stiff neck**, **fever**, **stridor**.
- **Complications:** **mediastinitis**, **airway obstruction**, respiratory distress, abscess rupture.
- **RX:** internal drainage and IV antibiotics.



### 430 teamwork

- CT shows both retro- and parapharyngeal abscesses that are compressing the airway (the back area in the center)
- The patient is barely breathing and might need a tracheostomy.



### 430 teamwork

- CT scan with contrast shows an abscess in the parapharyngeal space (dangerous space).
- If the abscess ruptures → aspiration and airway obstruction.

## 11) Ludwig's angina:

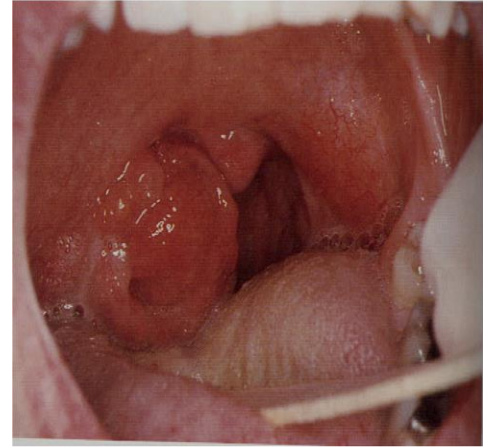
- Bilateral cellulitis of submandibular and sublingual spaces. "usually a complication of untreated dental abscess".
- **Signs & symptoms:** wooden floor of the mouth, neck swelling and indurations, drooling, the abscess pushes the tongue upwards → blocks airway → respiratory distress, swollen tongue, dysphagia, and trismus.
- **Complications:** airway distress, sepsis.
- **RX:** tracheostomy, external drainage and IV antibiotics.



# Tonsillectomy

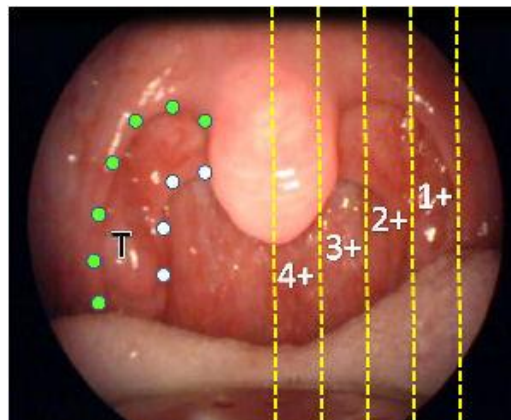


**Grade 4 tonsillar enlargement "kissing tonsils"**



**Unilateral tonsillar enlargement**

- Tonsillar hypertrophy grading:
  - Grade 0 → Tonsils are found confined to the space between the anterior and posterior pillars
  - Grade 1 → Tonsils are enlarged and is just seen coming out of the anterior pillar. (cover 25% of the space between the pillars)
  - Grade 2 → The enlarged tonsil reaches to about half the distance of uvula. (cover 50% of the space between the pillars)
  - Grade 3 → The enlarged tonsil comes into contact with the uvula. (cover 75% of the space between the pillars)
  - Grade 4 → The enlargement of tonsil is so much that both tonsils lie virtually in contact with each other i.e. kissing tonsils.



- **Indications:**
  - 1) **Recurrent tonsillitis: 6 attacks or more during 1 year (in lecture notes, it's 5) , or 4 attacks per year for 2 years, or 3 attacks per year for 3 years.**
  - 2) **Hypertrophied tonsils causing airway obstruction.**
  - 3) **Unilateral tonsillar enlargement: tonsillar enlargement suspicious of malignancy (firm unilateral enlargement in an adult smoker).**
  - 4) **Peritonsillar abscess (Quinsy) → treated by incision and drainage → wait for 6 weeks then book the patient for tonsillectomy.**

- **Complications of adenoidectomy and tonsillectomy:**

**1) Hemorrhage (most common complication)**

- **Primary hemorrhage:**
  - Bleeding occurring during the surgery.
  - Causes: bleeding tendency, acute infections, and bad technique.
  - Management: general supportive measures, diathermy, ligature or stitches, packing.
- **Reactionary hemorrhage:**
  - Bleeding occurring within the first 24 hours postoperative period.
  - Causes: bleeding tendency, slipped ligature.
  - Diagnosis: rising pulse & dropping blood pressure, rattle breathing, blood trickling from the mouth, frequent swallowing, examination.
  - Treatment: general supportive measures, take patient back to OR, control like reactionary hemorrhage.
- **Secondary hemorrhage:**
  - Occur 5-10 days postoperatively.
  - Due to **infection: post-op sloughy material forms in the tonsillar fossa, which may be infected resulting in secondary haemorrhage.**
  - Treated by antibiotics.
  - May need diathermy or packing.



*Post-tonsillectomy: white slough in the tonsillar fossa. It is normal to have white/yellow exudate which persists for up to 2 weeks post tonsillectomy*

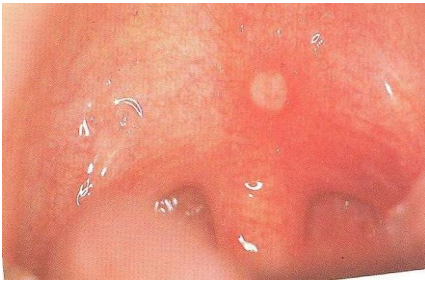
- 2) **Respiratory obstruction (because of uvular edema, hematoma, aspirated material).**
- 3) **Injury to near-by structures.**
- 4) **Pulmonary and distant infections.**

## Chronic pharyngitis:

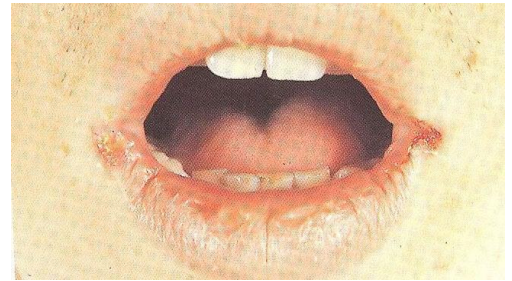
- **Pathogenesis:** postnasal drip, irritants (dust, dry heat, smoking, alcohol), reflux esophagitis, chronic mouth breathing, allergy, granulomatous disease, connective tissue disease, malignancy.
- **Signs & symptoms:** constant mouth clearing, dry throat, pharyngeal crusting, thick granular wall.
- **RX:** Treat underlying cause.

## Aphthous ulcer:

- Usually due to stress, stays for a few days and spontaneously resolves.



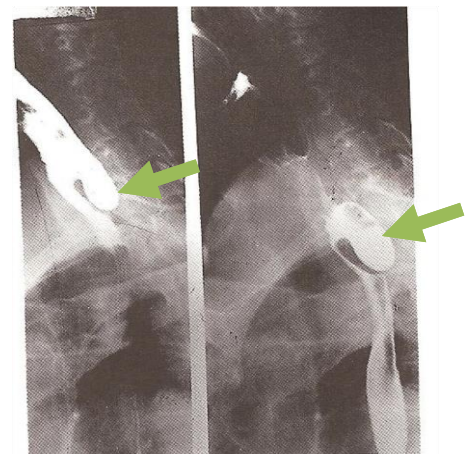
*Aphthous ulcers*



*Angular stomatitis → need to rule out anemia*

## Zenker's diverticulum:

- Herniation of the mucosa at **killian's triangle** due to increased intraluminal pressure.
- **Signs & symptoms:** dysphagia, regurgitation of undigested food and aspiration.
- **DX:** barium swallow.
- **RX:** Cricopharyngeal myotomy, diverticulectomy.



## Summary

- Adenoid presents with mouth breathing, snoring, hyponasality, and nasal discharge. Complications Nasal obstruction, pharyngitis (due to dry mouth), otitis media, rhinosinusitis, recurrent upper respiratory tract infections, and obstructive sleep apnea.  
Diagnosis: Flexible fiberoptic
- Snoring is a sign of partial obstruction of the upper airway during sleep and it is always present in obstructive sleep apnea. OSA may be treated by non surgical behavior modification (CPAP,..) or surgical methods.
- Acute tonsillitis may be viral (most common cause) or bacterial (group A  $\beta$ -hemolytic streptococcus).
- Infectious mononucleosis (EBV) is characterized by fever, pharyngitis, and lymphadenopathy. Adolescents are especially susceptible (kissing disease).
- Diphtheria: the 'bull neck' and 'wash-leather' grey-green membrane covering the tonsils are characteristic of the acute presentation
- Scarlet fever is due to SPE and is characterized by fever, pharyngitis, and bright red exanthema.
- Peritonsillar abscess (quinsy): The patient suffers from fever, referred otalgia odynophagia, trismus (stiff jaw), drooling of saliva, and hot potato voice.
- Retropharyngeal abscess is more common in children. They suffer from fever, sore throat, drooling, stridor, and neck stiffness.
- Ludwig's angina is usually the complication of untreated dental abscess. The abscess pushes the tongue upwards and blocks airway.
- Tonsillectomy Indications:
  1. Recurrent tonsillitis: 6 attacks or more during 1 year (in lecture notes, it's 5) , or 4 attacks per year for 2 years, or 3 attacks per year for 3 years.
  2. Hypertrophied tonsils causing airway obstruction.
  3. Suspicious of malignancy (firm unilateral enlargement in an adult smoker).
  4. Peritonsillar abscess (Quinsy)

## MCQ's :

- 1) Which of the following conditions is least likely to occur as a consequence of streptococcal infection?
- A. Scarlet fever
  - B. Endocarditis
  - C. Rheumatic fever
  - D. Glomerulonephritis
  - E. Haemolytic uraemic syndrome
- 2) A sales executive, recently returned to the UK from Ukraine, is referred to the local infectious diseases unit by his general practitioner with a sore throat of unusual appearance. On arrival, he is tachycardic with a heart rate of 110 bpm, and has a mild pyrexia of 37.7°C. There is a slight blood-stained discharge at the nasal orifices. His neck is visibly swollen. Examination of the mouth reveals a greyish-green membrane overlying the tonsils, which does not come off with gentle scraping with the tongue depressor. What is the likely diagnosis?
- A. Streptococcal throat infection
  - B. Diphtheria
  - C. Oral candidiasis
  - D. Mumps
  - E. Tonsillar carcinoma
- 3) A 14-year-old boy, living in London, is brought to the hospital accident and emergency department by his mother with a 6-day history of malaise, fever and sore throat. He gives no history of recent foreign travel. His temperature is 38°C. On examination, you note that he has an inflamed pharynx, cervical lymphadenopathy, a tender enlarged liver and a palpable spleen. What is the most likely diagnosis?
- A. Infectious mononucleosis
  - B. Malaria
  - C. Influenza
  - D. Mumps
  - E. Listeriosis

### Explanations:

- 1) Scarlet fever most often results from uncomplicated streptococcal pharyngitis or tonsillitis. Various streptococcal species, including the viridans group, may be responsible for endocarditis. In rheumatic fever, antibodies generated in response to infection with certain strains of group A streptococci cross-react with cardiac myosin and sacrolemmal membrane proteins, leading to inflammation in the endocardium, myocardium and pericardium. An immune-mediated reaction following streptococcal infection may also lead to glomerulonephritis but haemolytic uraemic syndrome is a consequence of infection with certain strains of *Escherichia coli*, most notably *E. coli* O157.
- 2) Although diphtheria was eradicated from the developed world in the mid-20th century, it remains an important source of illness in the developing world, and recent years have seen the occurrence of outbreaks in South-east Asia and parts of the former USSR. The 'bull neck' and 'wash-leather' grey-green membrane covering the tonsils are characteristic of the acute presentation. Treatment is threefold, including administration of diphtheria antitoxin, antibiotics (penicillin or erythromycin) and isolation. A streptococcal sore throat will characteristically look red and raw; oral candidiasis is whitish in appearance, and has a predilection for the tongue rather than the tonsils; mumps usually affects a younger age group and may cause a swollen neck, but not the other findings; tonsillar cancer is exceedingly rare and does not really fit with this acute presentation.
- 3) The symptoms, clinical findings, lack of travel history and age group all point towards a diagnosis of infectious mononucleosis, caused by the Epstein-Barr virus.

### References in this lecture:

Lecture notes, Medscape, and uptodate.