Notes compiled for Pediatrics

Ear, Nose & Throat

(Med I, Block 3, ET)

Contents

Class number	Class Name	Type	Department	Instructor
ET006	Embryology of the Head and Neck	L	AN	Dr. M Torchia
ET009	General ENT I - Pharyngitis	L	ET	Dr. D Sutherland
ET010	General ENT II - Airway	L	ET	Dr. D Leitao
ET012	Ear II - Disaeses of External and Middle Ear	L	ET	Dr. L Garber
ET013	Nose	L	ET	Dr. Leitao
ET016	ENT tutorial	T5	ET	Dr. D Sutherland

Development of the Head and Neck – ET006, Block 3

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Objectives:

1. Explain branchial apparatus, pharyngeal arch, pharyngeal pouch, and pharyngeal groove (cleft)
2. Describe the adult derivatives of the pharyngeal arches, pouches, and grooves
3. Describe the development of the tongue, including its innervation
4. Describe the origin and development of the thyroid gland
5. Discuss the development of the face and the palate
6. Explain the embryological basis of: ectopic thyroid gland, branchial cysts, clefts of the lip and palate, thyroglossal duct cyst and sinus

Lecture Notes:

1. Recall the layers of the trilaminar embryo:
    - ectoderm (outside)
    - mesoderm
    - endoderm (inside)

2. During weeks 5-8 inclusive (embryo period), the structures of the head and neck are developed.

3. Tissue prominences (Pharyngeal Arches) develop in the location of the primordial neck. This development results from the infiltration of neural crest cells from the head into the mesodermal tissue of the neck. (Note: in embryology the terms **Branchial** and **Pharyngeal** are use somewhat interchangeably however pharyngeal is the preferred term. Branchial = gill, pharyngeal = throat.)

4. The processes involved in the formation of the pharyngeal arches and their products are (as always) **proliferation** and selective control of the initiating factor (neural crest cells) into specified locations (Hox genes), followed by **differentiation** of the mesoderm (Hox genes) into tissue types (e.g. nerves, ligament, bone, etc.) followed by **morphogenesis** into specific structures (e.g. facial nerve, stylohyoid ligament, stapes). The exquisite control of these mechanisms is not yet completely understood.

5. These pharyngeal **arches** (numbered 1,2,3,4 (-6) are separated from each other by an internal (endodermal) **pouch** and an external (ectodermal) **groove**. The arches, grooves, and pouches have distinct roles although not each results in the formation of an adult structure.

6. The **arches** supply the cranial nerves, cartilage and bone, muscles, and ligaments to structures in the head and neck (see Table 10-1, pg 221)

7. The **1st pharyngeal groove** forms the **external acoustic canal**. Surrounding tissue hillocks (6) form the auricle. Remaining grooves are obliterated by **overgrowth of 2nd arch** during neck development.

8. Clinical correlates:

   a. ***Branchial cyst*** *– painless enlarging neck mass, anterior triangle, typically anterior border SCM, remnant of* ***pharyngeal grooves***
   b. *Accessory auricles.*
   c. ***Branchial Sinus*** *(blind tunnel) and* ***Branchial Fistula*** *(connecting duct structure – 2nd to the tonsillar fossa, 3rd to the piriform sinus) to small opening at external anterior boarder of SCM with mucus discharge.*

9. The **derivatives** of the pharyngeal **pouches** are:
   a. 1st – tympanic cavity and auditory tube; with 1st branchial groove becomes the tympanic membrane
   b. 2nd – tonsillar fossa
   c. 3rd – inferior parathyroid gland, thymus
   d. 4th – superior parathyroid gland

10. Development of the **tongue**
   a. Origins lay in arches 1-4 therefore innervation is complex
   b. Landmarks
      i. Median sulcus – fusion of L/R distal tongue buds (1st arch)
      ii. Distal suclus (circumvallate papillae) – 1st arch/2nd arch
      iii. Foramen cecum – see Point # 11 below

11. Development of the **thyroid**
   a. **Endoderm** (1st - 2nd arch) proliferates (**thyroid diverticulum**)
   b. **Invagination** of tissue leads to formation of **thyroglossal duct (remnant is foramen cecum)**
   c. Path of tissue is first to anterior hyoid then cricoid
   d. Duct obliterates; thyroid C cells derived from 4th pouch

12. Clinical Correlates
   a. ***Thyroglossal duct cyst*** *(sinus, fistula) – midline neck mass*
   b. ***Ectopic thyroid*** *– located along path of descent (base of tongue)*

13. Development of face
    a. Key Landmarks
        i. **Frontal prominence**
        ii. **Nasal prominences** – medial and lateral
        iii. **Maxillary and mandibular prominences –** 1st arch
        iv. **Philtrum** – fusion of the L/R medial nasal prominences
        v. **Nasolacrimal duct** – furrow at the junction of the frontal and maxillary prominence

14. Clinical Correlates
    *a. **Cleft lip** – incomplete fusion of medial nasal prominence and maxillary prominence (unilateral 1:1000 M>F)*

15. Development of the palate
    a. Key landmarks
        i. **Primary palate** – anterior maxillary and nasal prominences
        ii. **Secondary palate** – lateral palatine processes from lateral maxillary prominences (soft palate by 11th week)
        iii. (Nasal Septum)

16. Clinical Correlates
    *a. **Cleft palate** – incomplete formation/fusion of palatine processes*

Sample Exam Question:

Which would be a likely diagnosis for a 3 month old child presenting with a mucous secreting lesion on the posterior border of the sternocleidomastoid?

1. 1st branchial groove cyst
2. thyroglossal duct cyst
3. 2nd branchial groove cyst
4. 2nd branchial groove sinus
5. none of the above

The nasolacrimal duct is formed by the fusion of the:

1. left and right frontonasal prominences
2. lateral nasal prominence and the maxillary prominence
3. frontonasal prominence and the maxillary prominence
4. median nasal prominence and the maxillary prominence
5. the nasal and otic placodes

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ET 009: GENERAL ENT I - Pharyngitis

Objectives

The student will:

1. Know the etiology, presentation and management of pharyngitis, acute tonsillitis and peritonsillar abscess
2. Know the indications for tonsillectomy and adenoidectomy
3. Know the risks of tonsillectomy and adenoidectomy
4. Be aware of deep neck space infections, their presentation and management

Reference

Hall & Colman – Diseases of Ear, Nose and Throat, 15th ed, Chapter 26 & 27, pg 177-186, 139 - 140

GENERAL ENT I - NOTES

Waldeyer's ring of lymphoid tissue consists of the adenoids, palatine tonsils (pharyngeal tonsils or "tonsils") and the lingual tonsils (located at the tongue base).

Palatine tonsils: lymphoid tissue with prominent germinal centers. They sit in the tonsillar fossa bordered by three muscles and separated from the lateral pharyngeal wall by connective tissue.

- palatoglossus – anterior tonsillar pillar
- palatopharyngeus – posterior tonsillar pillar
- superior constrictor – lateral border of tonsillar fossa

Blood supply

- arterial – branches from ascending palatine, descending palatine, facial, lingual, and ascending pharyngeal arteries
- venous – venous plexus drains into lingual and pharyngeal veins → interior jugular vein

Nerve supply (sensory)

- glossopharyngeal nerve branches – (IX)
- lesser palatine (V) (sensory fibers from (VII) via pterygopalatine ganglion)
- tympanic branch of (IX) – the reason for referred ear pain (referred otalgia)

Pharyngitis

Definition: inflammation of pharynx
- prevalent in winter months – overcrowding (?)
- most caused by viruses (rhinoviruses, enteroviruses, adenoviruses)

Clinical Features

- sore throat and dysphagia – less severe
- afebrile, not toxic or "ill", associated s/s of URTI
- cervical lymphadenopathy, if present – small, mildly tender
- pharynx – erythematous soft palate, pharynx, tonsils
- tonsils not enlarged, no pus/exudate

Investigations - throat swab, monospot (if concerned re diagnosis)

Treatment

- symptomatic
- analgesics, saline gargle, soft diet, ample fluid intake
- no role for antibiotics for treatment of viral pharyngitis / URTI
- self limited infection – resolves with time
- cold remedy preparations are a billion dollar industry!!!

Acute Tonsillitis (acute pharyngotonsillitis)

- inflammation of the tonsils
- etiology – viral or bacterial infection
- bacterial infection – Group A- β hemolytic streptococcus, Group G streptococcus, pneumococci, staphylococci, haemophilus influenza , M. catarrhalis

Clinical Features

- very sore throat
- odynophagia (pain with swallowing)
- fever, malaise
- referred otalgia (ear pain)
- tonsils ± uvula , ± soft palate → edematous, erythematous
- pus or membrane on surface of tonsils
- cervical adenopathy

Investigations – CBC, throat swab, monospot

Treatment

- fluids, analgesics, antipyretics
- antibiotics if throat swab positive or clinical presentation severe or persisting
- antibiotics may reduce the length of time of illness

- antibiotics are used mainly to avoid the sequela of rheumatic fever following Group A-β hemolytic strep infection
- antibiotics do not alter post-streptococcal glomerulonephritis
- first line antibiotics- Penicillin or Amoxicillin x 10 days – (erythromycin if penicillin allergic)
- 10 – 18% treatment failure rate (penicillinase production by oral anaerobes)

Infectious Mononucleosis

- Epstein Barr Virus (EBV)
- systemic illness
- severe tonsillitis – grey membrane covers tonsils
- massive adenopathy (classically posterior triangle of neck)
- odynophagia, malaise, fever
- hepatosplenomegaly
- spread by droplet transmission (saliva exposure)

Diagnosis – atypical lymphocytes in the blood, monospot test – detects heterophil antibodies

Treatment

- symptomatic
- short-course high dose steroids for markedly ill individuals or massive tonsillar hypertrophy
- antibioitics only if 2◦ bacterial infection supervenes

Amoxicillin causes characteristic rash in patients with mononucleosis

Complications of tonsillitis

- **Peritonsillar abscess (quinsy)**

- infection passes through tonsil capsule into peritonsillar tissue causing cellulitis, then abscess
- bacteriology – mixed, aerobes and anaerobes

  Clinical Features
  - severe sore throat and otalgia (unilateral)
  - trismus *(inability to open mouth)
  - bulging soft palate, uvula displaced to opposite side

  Treatment
  - cellulitis treated with antibiotics
  - abscess requires incision and drainage (done in clinical setting)

- **Sepsis**

- **Sequela of beta-hemolytic strep infection**
- scarlet fever, rheumatic fever, glomerulonephritis

- **Scarlet Fever**
- secondary to acute streptococcal infection with endotoxin production
- rash, severe lymphadenopathy, bright red tonsils, strawberry tongue
- treatment – IV penicillin

- **Suppurative Cervical Adenitis**
- rare
- central liquification of lymph node
- erythema, warm to touch, tender, fever
- treatment – incision and drainage, antibiotics

Deep Neck Space Infection

The fascial planes in the head and neck form potential spaces that can become involved in bacterial infection creating collections (abscesses). The fascial planes play a role in both confining and providing potential routes of spread of these infections. These infections typically develop as a result of tonsillitis, dental infection or salivary gland infection. Bacteriology of the abscess fluid reveals mixed aerobes and anaerobes. These patients are usually severely ill and may develop upper airway obstruction due to laryngeal edema. Airway obstruction can progress rapidly (within a few hours). Treatment requires I & D and IV antibiotics with special attention to management of the airway.

- **Retropharyngeal Abscess**
- commonly the result of a suppurating lymph node
- infection can tract down into the chest causing mediastinitis

- **Lateral Pharyngeal Abscess (parapharyngeal)**
- diffuse unilateral neck swelling and oropharyngeal findings
- fluctuance may be absent due to deep nature of abscess

- **Ludwig's Angina**
- acute cellulitis / abscess of submandibular, submental and sublingual spaces

Diptheria

- rare due to immunization programs
- corynebacterium diphtheriae
- gray membrane – tonsils, palate, tongue – attempted removal causes bleeding
- "bull neck" appearance due to adenopathy
- may lead to airway obstruction or cadiotoxicity

Treatment

- antitoxin and systemic penicillin

Tonsillectomy - Indications

Absolute Indications

- acute airway obstruction
- excisional biopsy for suspected malignancy (squamous cell carcinoma/ lymphoma)

Relative Indications

- Recurrent Acute Tonsillitis (adults and children)

  - 7 episodes within 1 year
  - 4 -5 episodes per year x2 years
  - 3 episodes per year x3 years

  Episodes should be well documented and have one or more of the following:
    - positive throat culture for group A strep
    - elevated temperature (≥ 38.3 ◦ C)
    - cervical adenopathy
    - requiring significant time off work/school

- Chronic Tonsillitis (adults)

    - less severe sore throat > 6 mo, associated cervical adenopathy
    - no response to antibiotics
    - associated halitosis / debris in tonsillar crypts

  - Adenoid and Tonsillar Hypertrophy (children)

    - malocclusion 2 ◦ to chronic mouth breathing
    - sleep disordered breathing in children (there is no role of tonsillectomy in the treatment of obstructive sleep apnea in adults)

Risks of Tonsillectomy

- bleeding (2-4%) - primary – within 24 hours
  - secondary or delayed – (7 to 14 days post-op)
  - usually minor, can be severe resulting in transfusion and rarely death
- airway obstruction – swelling, clot
- risk of anesthesia
- infection – local

Approximately 2000 tonsillectomies done in Manitoba per year (compared to 1970 – 6500 tonsillectomies done)

Indications for Adenoidectomy (pediatric)

Adenoid hypertrophy

- nasal obstruction resulting in chronic mouth breathing and malocclusion
- nasal obstruction resulting in sleep disordered breathing
- role in otitis media – serving as a reservoir for infection rather than causing obstruction. Adenoidectomy considered as adjunctive treatment in patients undergoing repeat insertion of t-tubes for recurrent AOM or OME

Risks of Adenoidectomy

- bleeding
- risk of anesthesia
- velopharyngeal insufficiency (i.e. incomplete closure by palate during drinking / eating / speech)
- cleft palate and submucous cleft palate (bifid uvula, notching of hard palate) are contraindications to adenoidectomy

Med I - General ENT II - AIRWAY

Objectives

The student will know:

- **The anatomy of the larynx and trachea**
- **Indications for tracheostomy**
- **Risks of tracheostomy**
- **Causes of sleep apnea in children**

Laryngeal Anatomy – see anatomy notes ET002

- **Strap Muscles**
- **Framework**
  - **hyoid bone**
  - **thyroid cartilage**
  - **cricoid cartilage**
  - **trachea**

Blood Supply

- **arterial**
- **venous**

Innervation

- **(sensory and motor)**
- **superior laryngeal nerve**
- **inferior (recurrent) laryngeal nerv**

Terminology

- **Tracheotomy vs tracheostomy**
  "tome" – greek – to cut
  "stoma" – greek – to finish with mouth or opening to skin
- **Terms are used interchangeably**

Indications for tracheotomy

- **Upper airway obstruction**
- **Respiratory insufficiency / Prolonged intubation**
- **Retained secretions / Pulmonary toilet**

(access for suctioning trachea)

Cricothyroidotomy - Emergency Surgical Airway

- **Procedure of choice when total airway obstruction is present**
- **Opening into airway at cricothyroid membrane**
- **Potential for laryngeal injury is high**
- **Requires re-evaluation once pt is stable**

Tracheostomy

Whenever possible tracheostomy should be performed in the

operating room or similar environment under controlled conditions.

Complications of Tracheotomy –

Intra-operative Complications

- **Bleeding**
- **Surgical trauma**
- **Loss of Airway / Airway obstruction**
- **Apnea**
- **Subcutaneous emphysema**
- **Pneumothorax / Pneumomediastinum**
- **Death**

Post-op Complications

Early:

- **Bleeding**
- **Decannulation**

(displaced or blocked tube)

- **Infection**

Late:

- **Bleeding**
- **Infection**
- **Granulation tissue**
- **Tracheomalacia**
- Tracheostenosis
- Tracheoesophageal fistula
- Psychological issues

Do Not Change a Fresh Tracheostomy Tube for 72 Hours Unless Absolutely Necessary

Possible reasons to need to change a tracheostomy tube prior to 72 hours:

- **Displaced tracheostomy tube**
- **Blockage of tracheostomy tube**
- **Cuff leak**
- **Different type of tube required**

DON'T MAKE A STABLE SITUATION AN UNSTABLE ONE !!!

Pediatric Airway

- **Subglottic Stenosis - congenital**

  - aquired
- **Laryngomalacia**
- **Foreign bodies - bronchial**

  - esophageal

  - laryngeal
- **Infection - Acute Supraglottitis**

  - bacterial (Haemophilus Influenzae)

  - Croup - viral
- **Tumors - Respiratory Papillomatosis**

  - Hemangioma
  - **Lymphangioma**

Sleep Apnea

- **Severe Chronic Upper Airway Obstruction can result in sleep apnea or cor pulmonale**
- **Hypoxia, CO2 retention**
- **Pulmonary hypertension**

- **Right heart failure**
- **Death**

Sleep Apnea

- Central
- Obstructive
- Mixed

Pediatric Obstructive Sleep Apnea

- **Adenotonsillar Hypertrophy**
- **Obesity**
- **Craniofacial abnormalities**
- **Neuromuscular disease**

- **Acute onset or rapidly progressive – be suspicious of underlying serious pathology**

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ET 012: Ear II – Diseases of the External and Middle Ear

Objectives

1) Be familiar with the etiology, clinical presentation, diagnosis and treatment of diseases of the external ear including:
   - cerumen impaction
   - otitis externa
   - exostoses
   - malignant (necrotizing) otitis externa

2) Be familiar with the etiology, clinical presentation, diagnosis and treatment of diseases of the middle ear including:
   - acute otitis media
   - otitis media with effusion
   - mastoiditis
   - chronic suppurative otitis media
   - cholesteatoma
   - otosclerosis

3) Be familiar with the indications for myringotomy and tympanostomy tube placement

Reference: Hall & Colman: Diseases of the Ear, Nose and Throat (Ch. 4 & 5, pp 29-58)

Definitions / Abbreviations

TM - tympanic membrane
OM - otitis media – inflammation of the middle ear
OE - otitis externa – inflammation of the external ear (ie. ear canal)
AOM - acute otitis media – acute inflammation of the middle ear
OME - otitis media with effusion – presence of fluid in the middle ear without signs or symptoms of infection
CSOM - chronic suppurative otitis media - chronic / recurrent infection of the middle ear associated with a persistent TM perforation
Myringitis - inflammation of the tympanic membrane
Myringotomy - an incision in the tympanic membrane
Tympanostomy tube(t-tube / ventilation tube) – a tube placed in the TM to ventilate the middle ear
Cholesteatoma - a cyst composed of keratinizing squamous epithelium in an abnormal place (eg. middle ear, mastoid, temporal bone)

External Ear Diseases / Problems

Cerumen Impaction

- ears are naturally self-cleaning
- cerumen is protective to the ear canal skin

Symptoms
- hearing loss
- pain (otalgia)
- aural fullness

Treatment
- debridement
- } - dependent on experience
- syringing
- ceruminolytics – olive oil, glycerine

Note: cerumen removal is indicated only if EAC is completely occluded, with associated pain or decreased hearing

Syringing - contraindicated in previous ear surgery, TM perforation, t-tube, only hearing ear

Complications of syringing

- trauma (EAC, TM, ME)
- otitis externa
- TM perforation
- Vertigo

Exostoses

- Definition – benign boney outgrowth
- Etiology - ?repeated cold water exposure
- Usually an incidental finding
- If large can be symptomatic (cerumen impaction, OE) and surgical excision can be performed

Otitis Externa - inflammation of external auditory canal

Etiology - infectious - bacterial (> 90 %) – pseudomonas aeruginosa, staphylococcus aureus
- fungal (<10 %) – aspergillus, candida

Risk Factors - swimming, EAC cleaning (Q-tips), local dermatitis, ear canal occlusion (hearing aid use)

Clinical Features

- otorrhea
- pain (aggravated by movement of pinna or pressure on tragus)
- conductive hearing loss (secondary to EAC swelling and/or debris causing obstruction)

Treatment

- clean ear under magnification
- swab for C & S

Bacterial
- antibacterial ear drop with or without steroid component – (ie. Gentamicin, Ciprofloxacin, Garasone, Ciprodex)
- do not use aminoglycosides if the TM is perforated (risk of ototoxicity)
- placement of gauze wick if EAC is edematous

Fungal
- debridement
- topical antifungals (ie. Lococorten-Vioform, Gentian violet / mycostatin powder)

Chronic Otitis Externa

- pruritis without obvious infection
- use topical corticosteroid alone

Malignant (Necrotizing) Otitis Externa

Osteomyelitis of the temporal bone that occurs in immunocompromised patients or diabetics. It is caused by pseudomonas infection. Patients have severe pain. Classic finding is granulation tissue along the floor of the ear canal. Patients require hospital admission, IV antibiotics, CT scan, debridement / surgery. It can be fatal.

Middle Ear Diseases

Acute Otitis Media (AOM)

- most common between 18 mo – 6 yr old
- 60 – 70 % of children have 1 episode of AOM by 3 years of age
- More common in winter months

Predisposing Factors

- Eustachian tube dysfunction / obstruction
  - swelling of mucosa – URTI, allergies, allergic rhinitis
  - obstruction – tumor, barotraumas
  - palatal dysfunction – cleft palate (even after repair)
  - abnormal eustachian tube position (Down's syndrome, achondroplasia)

- Cilia dysfunction – Kartagener's Syndrome

- Immunosuppression

Risk Factors
- second-hand smoke
- bottle feeding
- daycare
- race

Pathogenesis

Eustachian tube obstruction → air absorbed in middle ear → negative ME pressure → mucosal edema with exudate → infection of exudate

Etiology

S. pneumoniae 35% - Anaerobes / Gram neg. – newborns and infants
H. influenzae 25%
M. catarrhalis 10% - Viral
S. aureus / S. pyogens

Clinical Features
- otalgia, fever, HL (conductive)
- otorrhea if TM perforates
- irritable, poor sleep, ear-tugging, diarrhea, vomiting, poor appetite

Otoscopy of TM
- hyperemia
- bulging
- loss of landmarks – malleus handle and short process not visible

Treatment

Symptomatic – analgesic / antipyretic (acetaminophen)

Antibiotics hasten resolution – give 10 day course

- 1st Line – Amoxicillin – 40 mg / kg / day
  - macrolide, trimethoprim – sulphamethoxazole

- 2nd Line (for Amoxicillin failures)
  - double dose of Amoxicillin (80 mg / kg / day)
  - Amoxicillin – clavulinic acid
  - cephalosporins

AOM deemed unresponsive if signs / symptoms and otoscopic findings persisted beyond 48 hours of antibiotic treatment.

There is no role for decongestants / antihistamines in the treatment of AOM

Prevention
- Parental education re risk factors
- Pneumococcal, Haemophilus and influenza vaccines

Complications of AOM

- TM perforation
- persistent effusion
- chronic suppurative otitis media
- ossicular necrosis
- mastoiditis
- labyrinthitis
- facial nerve paralysis
- sigmoid sinus thrombophlebitis
- meningitis
- brain abscess

Otitis Media with Effusion (OME)

- presence of middle ear fluid without signs or symptoms of infection
- the effusion (fluid) may be mucoid (thick, gluey) or serous (thin, watery)
- occurs frequently after AOM in children
    - 40% have effusion at 1 month after episode of AOM
    - 20 % have effusion at 2 months
    - 10 % have effusion at > 3 months

Clinical Features

- ear fullness
- hearing loss
- may have otalgia (less severe than AOM)
- otoscopy of TM
    - TM dull, discolored (amber with serous effusion), dull grey with "glue ear" (ie mucoid effusion), decreased TM mobility
- air-fluid level
- air bubbles
- TM retraction

*** The most reliable otoscopic finding in OME is immobility or decreased mobility of TM on pneumotoscopy**

Treatment

- observe – 90% resolve in 3 months
- if persists > 3 months consider:
    - audiogram
    - course of antibiotics
    - tympanostomy tubes to equalize pressure, drain ear, improve hearing
    - no role for antihistamines, decongestants, or prophylactic antibiotics

Complications of OME

- hearing loss → speech delay and learning problems
- ossicular erosion
- TM retraction, atelectases, ossicular fixation
- cholesteatoma

Indications for Surgery in Recurrent AOM / OME

Myringotomy and Tympanostomy Tube

- recurrent AOM - > 6 episodes in 1 year
  > 3-4 episodes per year for 2 years
- persistent effusion (OME) for > 3 months
- bilateral OME with conductive HL ≥ 20 dB
- atelectasis or retraction pocket of TM
- complications of AOM
- craniofacial anomalies predisposing to AOM / OME (ex. cleft palate, Down's syndrome)
  (Note: dysfunction of tensor veli palatini persists even after cleft palate repair – often the middle ear problems persist after cleft palate repair)

* Note: An adult with a unilateral serous otitis without a preceding history of URTI should be investigated for nasopharyngeal cancer.

Role of Adenoidectomy for Recurrent AOM / OME

- Possible indication for adenoidectomy in some children requiring repeat myringotomy and t-tubes
  (The theory is that the adenoids act as a reservoir for bacteria, not that the adenoids are causing eustachian tube obstruction due to their size)

Complications of Tympanostomy Tubes

(t-tubes are expected to be naturally extruded from TM in 9 – 12 months)

- otorrhea
- persistent perforation
- blocked tube
- early or failed extrusion
- anesthetic required for insertion in children

Note:

- When t-tube is present water cannot be allowed to get into the ear as it will cause an otitis media with drainage (otorrhea) through the t-tube

.

* Otitis media with drainage through a t-tube (ie. otorrhea) is treated with topical (aural) antibiotics – EAR DROPS!!! Oral antibiotics (by mouth) are ineffective and unnecessary.

Mastoiditis

Def- infection of mastoid air cells with boney erosion, usually following untreated / inadequately treated AOM

Etiology - same organisms that cause AOM

Clinical Features

- mastoid tip tenderness
- protruding ear
- otorrhea, pain
- fever, hearing loss

Imaging – CT scan findings of opacified mastoid air cells and erosion of normal boney septae between air cells

Treatment

- IV antibiotics and myringotomy ± t-tube
- ± surgery - Mastoidectomy

Surgery Indicated in

- failure of medical treatment
- intracranial complications
- persistent otorrhea

Chronic Suppurative Otitis Media (CSOM)

- chronic / recurrent infections of the middle ear associated with a persistent TM perforation

Clinical Features
- Hx of ear problems and infections
- Otorrhea, usually painless
- Conductive hearing loss
- TM perforation
- Discharge in ME / EAC

Treatment
- aural suction cleaning
- otic drops (antibiotic drops for pseudomonas / Staph / Strep, + steroid **(not oral antibiotics)**
- surgery – tympanoplasty (repair of TM perforation)
- mastoidectomy

Note: New onset of pain in a chronic or intermittently draining ear is very concerning. It may herald an impending complication, possibly an intracranial complication.

Cholesteatoma

- a cyst of keratinizing squamous epithelium in an abnormal place
- may be congenital or acquired

Congenital – (rare)
- usually discovered in childhood – white pearl behind intact TM or presents as conductive hearing loss
- not associated with otitis media

Acquired
- occurs as the result of OM and chronic eustachian tube dysfunction
- commonly associated with retraction pocket in pars flaccida or marginal perforation of TM
- the epidermoid cyst erodes surrounding bone

Clinical Features

- history of ear infections, ear surgery
- hearing loss, otorrhea, otalgia, aural fullness
- TM retraction pocket, keratin debris, TM perforation
- granulation tissue ± polyp on otoscopy
- hearing loss may be conductive, sensorineural or mixed

Complications of Cholesteatoma

Local

- ossicular erosion → conductive HL
- inner ear erosion → SNHL, vertigo
- facial nerve paralysis
- mastoiditis, petrositis

Intracranial

- meningitis
- brain abscess
- sigmoid sinus thrombosis

Treatment of Cholesteatoma

- **Surgery** - mastoidectomy
- Conservative non-surgical treatment – local debridement (only in patients unfit for surgery / very limited disease)

Otosclerosis

- fusion of footplate to the oval window
  (footplate cannot vibrate → conductive hearing loss)

Etiology

- genetic – autosomal dominant, variable penetrance (~ 40 %)
- female > males, HL typically progresses during pregnancy

Clinical Features

- progressive conductive HL beginning in early adulthood
- may develop SNHL if cochlea becomes involved
- TM and middle ear normal (may have pink discoloration over footplate – Schwartz's sign)
- Characteristic dip at 2,000 Hz on audiogram (Carhart's notch)

Treatment

- observe
- hearing aid
- surgery – stapedectomy with prosthesis

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ET 013 : NOSE

Objectives

- Be familiar with various types of rhinitis (infectious, allergic, vasomotor, granulomatous)
- Know the difference between rhinitis and sinusitis
- Be familiar with the clinical presentation, diagnosis, management and complications of sinusitis

Reference:

Hall & Colman: Diseases of the Ear, Nose and Throat (pp 82, 89-93, 100-101, 107-108, 111-113, 114-115)

Nose: Rhinitis/Sinusitis

Rhinitis may be classified as infectious, inflammatory, allergic or vasomotor. Involvement of the sinus cavities along with the nasal cavity is termed rhinosinusitis. Rhinosinusitis may be caused by viruses, bacteria or fungi. It can be classified as acute, subacute, or chronic.

Acute sinusitis is usually secondary to rhinitis (such as that caused by the common cold or influenza), of dental origin or from infected material directly entering the sinus. Symptoms include pain, nasal obstruction and nasal discharge. Clinical signs include fever, tenderness and mucopus in the nasal cavity. Treatment is primary medical (decongestants and antibiotics) although occasionally surgical drainage is necessary. Complications may involve local structures, the orbit or intracranial structures.

Allergic rhinitis displays the clinical triad of nasal congestion, rhinorrhea and sneezing. The response is IgE mediated and requires immunologic sensitization to an allergen. The disorder tends to cluster with other allergic disorders and has a strong family tendency.

Wegener's Granulomatosis is a multi-system disease primarily involving the upper respiratory, pulmonary and renal systems. The ENT region is often involved. Etiology is uncertain, but may be autoimmune in nature. Patients test positive for anti-neutrophil cytoplasmic antibodies (c-ANCA). Treatment is with systemic steroids and cyclophoshamide.

NOSE AND SINUSES

Darren Leitao, MD FRCSC
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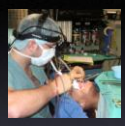
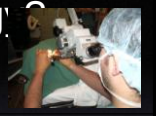
What is Otolaryngology?





Ears, Nose, Throat...
Head and Neck surgeons
Pediatric surgeons
Skull Base surgeons

head and neck oncology
otologic surgery
endoscopic sinus surgery
airway surgery
facial cosmetic surgery

Goals for today:

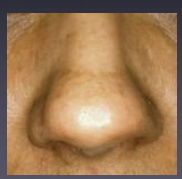
- Learn the common problems affecting the nose
- learn a differential diagnosis for these
- know the basics of treatment

In Summary...

1. most common cause of nasal obstruction is VIRAL RHINITIS
2. unilateral purulent discharge in a child = FOREIGN BODY until proven otherwise
3. 90% of epistaxis is from the ANTERIOR SEPTUM
4. NASAL POLYPS = THINK ALLERGIES/ CYSTIC FIBROSIS/ ASA SENSITIVITY
5. ACUTE SINUSITIS = AMOXICILLIN FIRST

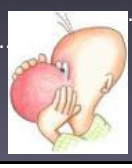
THE NOSE:

- WHAT IS IT?
- WHERE IS IT?
- WHAT DOES IT DO?



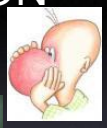
A GOOD NOSE...

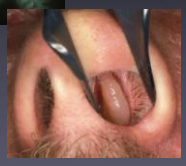
BREATHES...	...OBSTRUCTION
DOESN'T GET INFECTED...	..RHINOSINUSITIS
DOESN'T BLEED...	...EPISTAXIS
LETS YOU SMELL...	...ANOSMIA
STAYS DRY...	..RHINORRHEA
LOOKS PRETTY...	...DEFORMITY



OBSTRUCTION

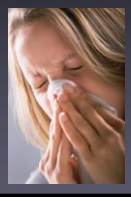
- EDEMA / SWOLLEN (TURBINATES)
- DEVIATED SEPTUM
- FOREIGN BODY
- BENIGN TUMORS
- MALIGNANT TUMORS





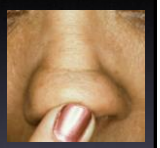
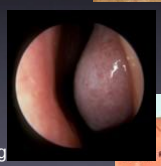
RHINITIS

- VIRAL: "COLD"
  - rhinovirus
  - **hallmark: clear rhinorrhea**
  - 7-10 days
  - self-resolves



ALLERGIC RHINITIS

- sneezing/itchy watery eyes
- family history +
- common allergens:
  - dust (mite)
  - pollens
  - molds
  - dander
- Testing:
  - RAST – blood testing against allergens
  - Skin prick testing


Non-Allergic Rhinitis

- rhinitis medicomentosa
  - excessive topical decongestant use
  - "rebound"
- vasomotor rhinitis
  - temp/ smoke/ perfumes/ hormones are triggers
- other inflammatory conditions
  - Wegener's granulomatosis – systemic vasolytic process? – typically present with other symptoms
  - sarcoidosis

what can you do for RHINITIS?

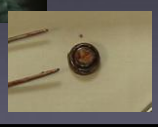
viral	symptom control	"Benyllin"
allergic non-allergic	avoidance	
	intranasal steroids	fluticasone Flonase; mometasone Nasonex
	antihistamines	loratidine Claritin; desloratidine Aerius; fexofenadine Reactine
	anticholinergics	ipratroprium "Atrovent"
rhinitis medicomentosa	avoidance	STOP alpha-adrenergics
	intranasal steroids	

SURGERY: INFERIOR TURBINATE REDUCTIONS

FOREIGN BODIES

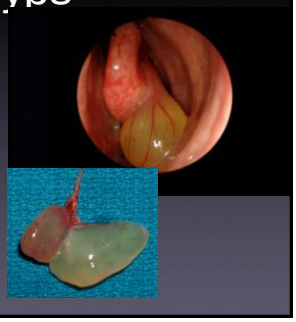
Wise man says..."Unilateral nasal discharge in a child is a FOREIGN BODY until proven otherwise"

- Couch foam
- tissue
- popcorn
- Rocks
- beads
- WATCH BATTERY
- MAGNET
- URGENT REMOVAL

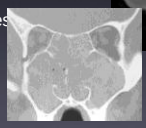
Benign Tumors: Nasal Polyps

- associated with:
  - Allergies
  - Cystic fibrosis
  - Asprin sensitivity triad
    - Asthma, polyps, asprin hypersensitivity
- clear, edematous
- mucosal structure
  - "peeled grape"
- can cause chronic sinusitis



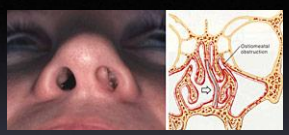
Nasal Polyps:

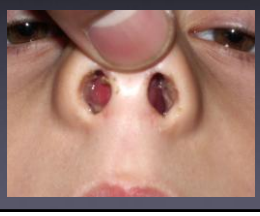
- allergy testing
- sweat chloride test (if indicated- children)
- CT Scan paranasal sinuses
- STEROIDS:
  - intranasal
  - PO burst if severe
- SURGERY: ENDOSCOPIC SINUS SURGERY



NASAL SEPTUM

- DEVIATED SEPTUM
- SEPTAL HEMATOMA
- VISUAL DIAGNOSIS
- SYMPTOMS:
- chronic obstruction
- recurrent sinusitis
- recurrent epistaxis
- treatment: SURGERY





EPISTAXIS

WHERE DOES IT BLEED FROM ?

Kiesselbach's Plexus

Anastemosis of blod vessels
Suceptible to drying and trauma
Anterior and posterior ethmoid arteries
Spehnopalatine arteries
Originate from the orbit

EPISTAXIS

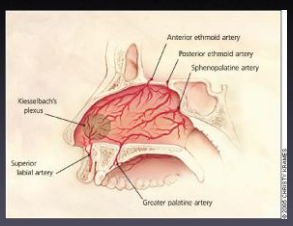
Wise man says..."Most nosebleeds are ANTERIOR (90%)" Wise man also says..."Most common cause of anterior epistaxis is... DIGITAL TRAUMA"

- LOCAL
  - TRAUMA
  - RHINITIS
  - TUMOR
  - COCAINE
  - OTRIVIN

SYSTEMIC
- •ANTICOAGULANTS
- •BLEEDING DISORDERS
- •HEMOPHILIA/ VWD
- •RENAL DISEASE
- •LIVER FAILURE
- •HHT

EPISTAXIS: ...basics

- ABC's
- O2/ IV/ Monitor
- assess blood loss
- determine SITE of bleeding

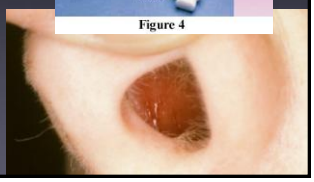


ANTERIOR EPISTAXIS

MANAGEMENT:

- PRESSURE
  - External or internal
- LUBRICANTS
- SALINE SPRAYS
- LOCAL CAUTERY
  - SILVER NITRATE
  - Only works on mucosal surfaces
- PACKING

Figure 4



pearls for packing a nose...

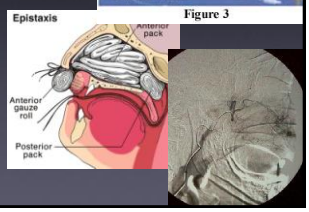
- EQUIPMENT- GET A HEADLIGHT!!
  - nasal speculum, bayonette forceps
- pack DEEP >7 cm, layered gauze strip
- MINIMUM 6 FEET IN ONE NOSTRIL
- STAY ALONG THE SEPTUM and go all the way to the back

EPISTAXIS

10% of cases are POSTERIOR EPISTAXIS

- ***PROFUSE*** bleeding from mouth and nose
- doesn't stop with anterior packing
- Risk factors:
  - older population
- Treatment:
  - posterior pack
  - Embolization – by interventional radiologist
  - SURGERY

Figure 3

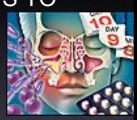


SINUSITIS for medical students

Darren J. Leitao, MD FRCSC
Dept. of Otolaryngology
University of Manitoba

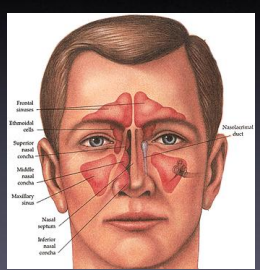
EPIDEMIOLOGY OF "SINUSITIS"

- "TOP TEN" OF REASONS FOR VISITS TO PHYSICIAN'S OFFICE
- 1995: 25 MILLION VISITS
- ALMOST 25% OF ANTI-MICROBIAL PRESCRIPTIONS FOR RESPIRATORY TRACT INFECTIONS
- MULTIPLE DISCIPLINES: PEDIATRICS, INFECTIOUS DISEASE, FAMILY PRACTICE, OTOLARYNGOLOGY, ALLERGY, NEUROLOGY



ANATOMY:

- FRONTAL
- MAXILLARY
- ETHMOID
  - ANT, POST
- SPHENOID
  - only unpaired sinus



ANATOMY:

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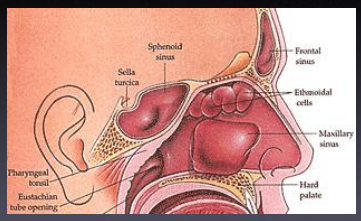
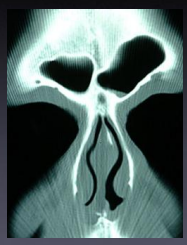
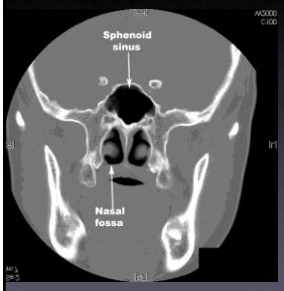
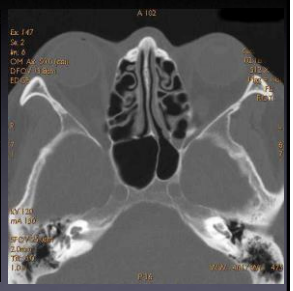


IN REAL LIFE...



In real life...





DEFINITIONS:

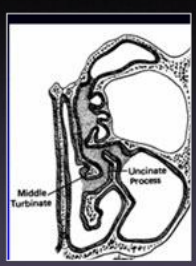
- **RHINOSINUSITIS:**
  - "...the condition manifested by an inflammatory response involving the following:
    - the mucous membranes of the nasal cavity and paranasal sinuses,
    - fluids within these cavities,
    - and/or underlying bone." - rarely

DEFINITIONS: TIME COURSE

ACUTE	**< 4 WEEKS**
CHRONIC	**> 3 MONTHS**
RECURRENT ACUTE	**≥ 4 EPISODES/ YEAR**

PATHOPHYSIOLOGY:

- **OSTIOMEATAL COMPLEX**
  - MIDDLE MEATUS:
    - MIDDLE TURBINATE
    - UNCINATE PROCESS
    - ETHMOID BULLAE



TYPICAL STORY...

- **URTI SYMPTOMS**..."a COLD!"
  - FEVER, RUNNY NOSE, NASAL CONGESTION
  - FATIGUE, UNWELL
- **HEADACHE, PRESSURE SYMPTOMS**
- **FACIAL PAINS**
- **WORSENING OVER 3-5 DAYS**
- **PROLONGED COURSE > 7-10 DAYS**

PHYSICAL EXAM:

- FULL HEAD AND NECK EXAM
  - "EARS, NOSE, THROAT"
  - EYE: PROPTOSIS/
  - DIPLOPIA
  - CRANIAL NERVES
  - DENTAL
  - NEURO

FACIAL EDEMA/CONGESTION
PURULENT DISCHARGE
DENTAL CARIES
NASAL POLYPS

OR... YOU MAY SEE NOTHING!

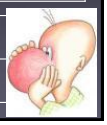
DIAGNOSIS:

- SYMPTOM SCORES
- TIME COURSE
- IMAGING:
  - SINUS X-RAYS: **helpful only if history and physical inconclusive**
  - SINUS CT SCAN: VIRAL, BACTERIAL LOOK SAME
  - SINUS MRI: SAME PROBLEM

MAJOR SYMPTOMS	MINOR SYMPTOMS
PURULENT NASAL DISCHARGE NASAL OBSTRUCTION FACIAL CONGESTION FACIAL PAIN/PRESSURE HYPOSMIA/ANOSMIA FEVER	HEADACHE OTALGIA/AURAL FULLNESS HALITOSIS DENTAL PAIN COUGH FEVER FATIGUE

2 MAJOR CRITERIA

I MAJOR AND 2 MINOR CRITERIA



CLASSIFICATION: ETIOLOGY

VIRAL	< 7 DAYS "RHINITIS"
BACTERIAL	**>7-10 DAYS**
FUNGAL	ATOPIC IMMUNOCOMPROMISED

BACTERIOLOGY: ACUTE

STREPTOCOCCUS PNEUMONIAE	34%
PENICILLIN-RESISTANT	15%
HEMOPHILUS INFLUENZAE (NON-TYPEABLE)	35%
BETA-LACTAMASE PRODUCING	40%
MORAXELLA CATARHALIS	2%
OTHERS	

BACTERIOLOGY: CHRONIC

- STAPH AUREUS
- PSEUDOMONAS AERUGINOSA
- ANAEROBES
- FUNGUS
- NON-INFECTIOUS

TREATMENT FOR ACUTE SINUSITIS

ANTIMICROBIAL	ADJUNCTIVE

CANADIAN GUIDELINES

FIRST LINE	PENICILLIN	AMOXICILLIN 500 MG TID
SECOND LINE	MACROLIDES	CLARITHROMYCIN
	ORAL B-LACTAMS	AMOX/CLAV
	CEPHALOSPORINS	CEFUROXIME
	FLUOROQUINOLONES	GATI LEVO MOXI

DURATION = 10-14 DAYS

CANADIAN GUIDELINES

- **INDICATIONS FOR STARTING WITH SECOND-LINE ABX:**

1. ALLERGY TO BETA-LACTAMS
2. FRONTAL/SPHENOID SINUSITIS – start more aggressively because of potential cranial complications
3. ABX IN PAST 3 MONTHS
4. CHRONIC UNDERLYING DISEASE/ IMMUNOSUPPRESSED
5. SYMPTOMS > 1 MONTH
6. PRESUMED RESISTANCE

SECOND LINE AGENTS

- MACROLIDES
  - essentially INEFFECTIVE against Hemophilus
  - macrolide-resistant pneumococci COMMONLY DETECTED
- FLUOROQUINOLONES
- HIGH DOSE AMOXICILLIN/CLAVULANATE

ADJUNCTIVE TREATMENTS

- INTRANASAL STEROIDS
- ORAL / TOPICAL DECONGESTANTS
- SALINE IRRIGATIONS

- ANTIHISTAMINES
  - NOT RECOMMENDED

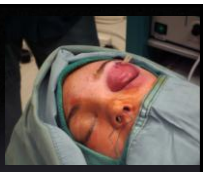
COMPLICATIONS

- **BRAIN**
  - MENINGITIS
  - ABSCESS: EPIDURAL/CEREBRAL
- **EYE**
  - ORBITAL CELLULITIS
  - SUBPERIOSTEAL ABSCESS/ ORBITAL ABSCESS
  - CAVERNOUS SINUS THROMBOSIS
  - BLINDNESS

Indications for SURGERY

- **ACUTE:**
  - **complications** of acute sinusitis
  - **frontal sinusitis**- failure to resolve in 48 hours
  - **immunocompromised**- need for cultures

SINUS SURGERY



- create drainage pathways
- obtain cultures
- EXTERNAL
- ENDOSCOPIC

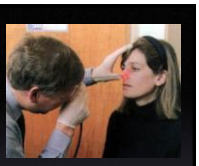
CHRONIC RHINOSINUSITIS:

- **GREATER THAN 3 MONTHS**
- inflammatory
- infection: minor role
  - staph aureus, GNB, anaerobes
  - fungus- allergy?

CHRONIC RHINOSINUSITIS DIFFERENTIAL DIAGNOSIS:

- MIGRAINES
- VISUAL PROBLEMS
- DENTAL ISSUES
- ALLERGIES

WORK-UP



- history and physical exam
  - nasal endoscopy
- evaluation of risk factors
- maximal medical therapy
- imaging

RISK FACTORS

MUCOSAL	ANATOMIC
viral rhinitis allergic rhinitis mucosal abnormalities immotile cilia syndromes cystic fibrosis smoking immune deficiency	deviated nasal septum nasal polyps nasal trauma nasal packing mechanical ventilation nasal tubes dental infections

CHRONIC RHINOSINUSITIS:

- INTRANASAL STEROIDS
- LONG COURSE SECOND LINE ANTIBIOTICS: 4-8 WEEKS
- CT SCAN POST-TREATMENT
  - IRREVERSIBLE MUCOSAL CHANGES
  - BONY ANATOMICAL PATHOLOGY
- ENDOSCOPIC SINUS SURGERY
- IF NO IMPROVEMENT AND CT SCAN REVEALING

SUMMARY:

- Rhinosinusitis is of major importance to healthcare
- ostiomeatal complex
- CLINICAL DIAGNOSIS
- COMPLICATIONS = EYE AND BRAIN
- RISK FACTORS: MUCOSAL, ANATOMICAL
- THINK CAREFULLY ABOUT ANTIBIOTIC CHOICES

SOURCES

- Desrosiers, M. Acute Bacterial Sinusitis: Approaches to Better Selection of Antimicrobials. 2005
- Wright, E. Infectious Adult Rhinosinusitis. J. Otol. Vol 34, Suppl 1, June 2005.
- Piccirillo, J. Acute Bacterial Sinusitis. NEJM 2004; 351:902-10
- Scheid, D. Acute Bacterial Sinusitis in Adults. Am Fam Physician 2004;70: 1685-92, 1697-1712.

University of Manitoba
Otolaryngology
MED1 / ET16(T) 2006-2007

ET 16: ENT Tutorial

Grp I
Grp II
Grp III
Grp IV
Grp V

Case 1: 32 year old male presents with right-sided hearing loss

Case 2: 65 year old male presents with a right neck mass

Case 3: 4 year old child brought in by parents with the complaint of loud snoring

Case 4: 22 year old male with a draining right ear

Students are to review cases and be prepared to discuss them. Review the ENT series of lectures. Instructors will be prepared to act as a resource during the tutorial.