Pharmacology of Ear, Nose & Throat Conditions

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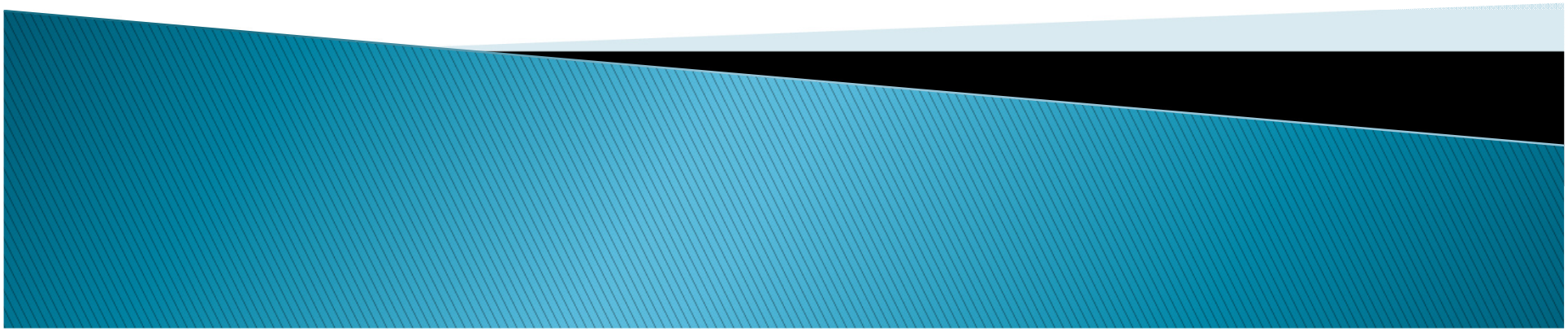


Viral Rhinitis: The common Cold

Organisms:

- Rhino virusses
- Adeno virusses

Symptoms:

- Headache
- Nasal congestion
- Watery rhinorrhoea
- Sneezing
- Scratchy throat

Examination:

- Reddened, oedematous mucosa
- Watery discharge
- If purulent = bacterial infection

Rx:

- Decongestants- PO or Nasal Sprays:
- Oxymetazoline(Iliadin); Phenylephrine(Naphensyl);
- Naphazoline(Antistin-Privine); Dimethindene(Vibrocil)

Allergic Rhinitis ‘ Hay Fever’

Symptoms: Perennial or Seasonal

Nasal:

- Itching & tickling & sneezing
- Rhinorrhoea
- **Congestion**

Eye irritation:

- pruritis,erythema & excessive tearing

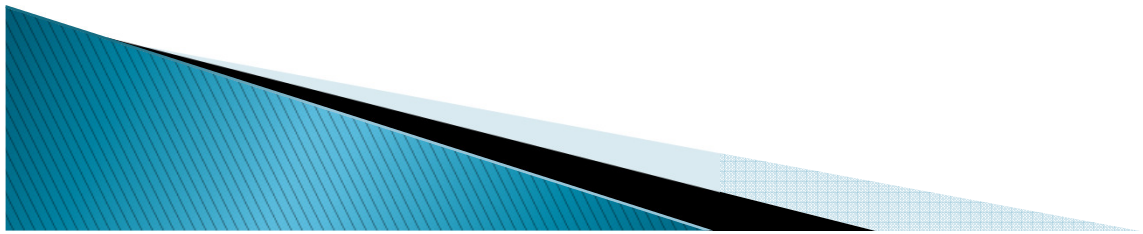
Signs

- ” Allergic salute”
- Facial grimacing & twitching
- Traverse nasal crease
- Pale, bluish turbinates ± crusting

Causes: Numerous allergens:

- Pollens-spring; grass in summer;
- ragweed- autum; dust & mites-all year round.

Attempt to maintain an allergy-free environment!



Allergic Rhinitis(contd)

Differential Diagnosis:

- Vasomotor Rhinitis – caused by hyperactivity of the vidian nerve-in the elderly

Examination:

- Mucosa of the turbinates is usually pale orviolaceous – venous engorgement.
- Nasal polyps may be present.

Investigations:

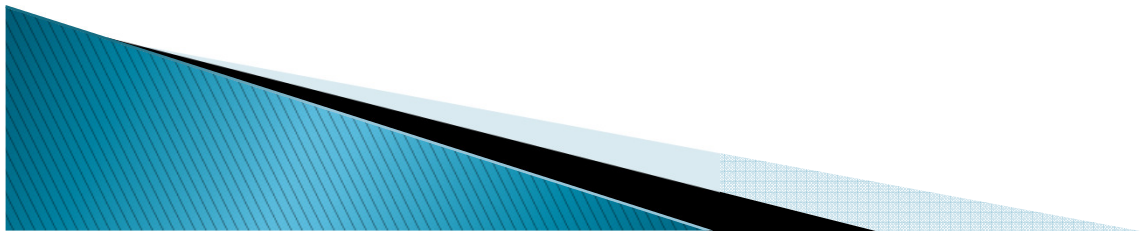
  - Allergy tests – skin prick tests
  - WBC – Nasal smear: Eosinophilia
  - Serum IgE (RAST)

Treatment

- Antihistamines (1st and 2nd generation)
  - **Nasal Sprays**:Levocabastine(Sinumax)/Azelastine(Rhinolast.
- Decongestants- stimulate vasoconstriction by activating α-adrenergic receptors e.g. pseudoephedrine, phenylephrine& Imidazole derivatives-oxymetazoline(Drixine, Otrivin).

Antihistamines(2nd generation)

- Non-sedating
- No anticholinergic side effects
- Half -lives permit once or twice daily dosing
- They do not penetrate the blood-brain barrier, less psychomotor impairment
- Relieve rhinorrhoea, sneezing, conjunctivitis but not nasal congestion
  - Fexofenadine (active metabolite of terfenadine)
  - Loratidine
  - Terfenadine
  - Cetirizine (carboxylated metabolite of hydroxyzine)



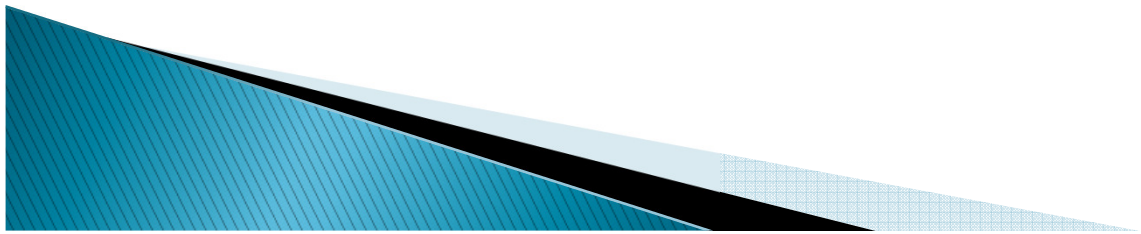
Allergic Rhinitis: Rx(contd)

Steriods:

- Nasal Sprays:
  - beclomethazone(Beconase); triamcinolone(Nasacor); budesonide(Rhinocort)& fluticasone(Avanis,Flixonase).
- Oral:
  - Prednisolone & prednisone

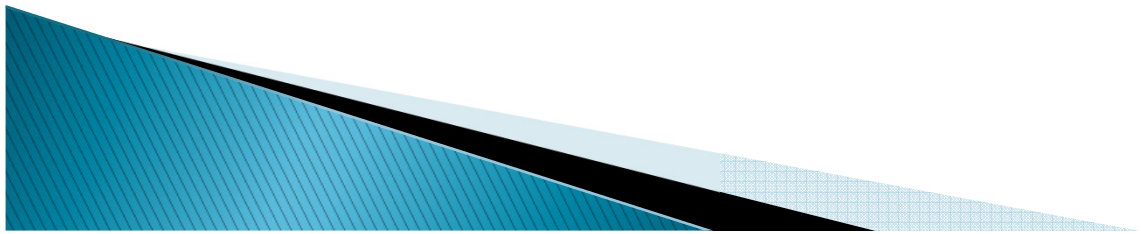
MOA:

- Inhibition of mediator release from mast cells & basophils
- Reduction of the # of mast cells, basophils & eosino's
- Prevention of leukocyte chemotaxis
- Inhibition of arachidonic acid metabolism.



Leukotrine receptor antagonists

- Montelukast
- Alternative to oral antihistamines
- Selective leukotriene receptor antagonist that inhibits cysteinyl leukotriene receptor.
- Selectively prevents action of leukotrienes released by mast cells and eosinophils.
- Administration : orally.
- Dosage: Montelukast(Singulair): 10 mg OD.



Allergic Rhinitis: Rx(contd)

Mast Cell Stabilizers:

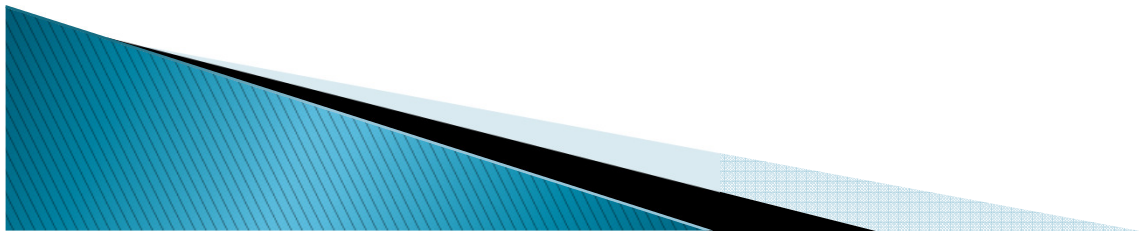
- Sodium Chromoglycate

MOA :

- Mast cell & basophil stabilization – prevention of degradation.

Anticholinergics :

- Ipratropium bromide(Atrovent,Duovent).
- MOA : Anticholinergic – with sympathomimetic override.
- Decreases nasal secretion.
- Intra-nasal Spray: 0.03%- 42mcg/nostril TDS.



Acute Sinusitis

Pathogens:

- S pneumoniae; H influenzae; S pyogenes(grp A), Moraxella catarrhalis; Staph aureus.

Symptoms:

- Mostly the maxillary sinusses
- Pain & pressure over the cheek, can refer.
- Discoloured nasal discharge
- Poor response to decongestants
- Also ethmoidal,sphenoidal & frontal sinusses

Imaging:

- Limited noncontrast coronal CT-scans – all of the paranasal sinuses – rapid and effective.
- Severe infection or possible malignancy: MRI with gadolinium

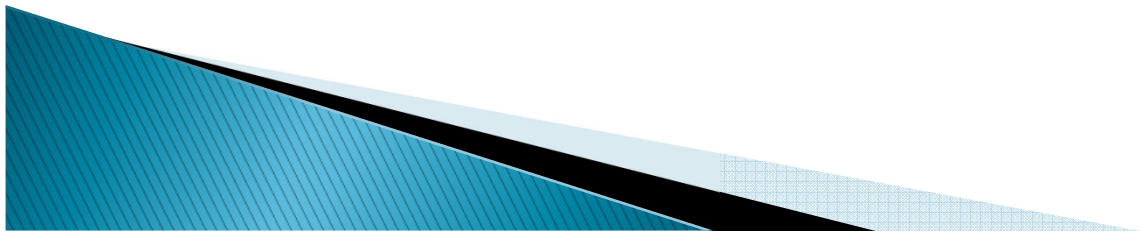
Treatment of Acute Sinusitis

If symptoms for > 10 – 14 days, or severe !

- **Symptomatic**:
  - Oral/nasal decongestants.
- **Antibiotics**:
  - First Line: Amoxycillin(90mg/Kg/D) or Co-
  - Trimoxazole or Doxycycline – for 7 – 10 days.
- Recent antibiotic therapy – Levofloxacin(Tavanic) or Co-Amoxyclav – 10 days.
- If no improvement after 3 days of First Line antibiotics:
  - Co-Amoxyclav, moxifloxacin(Avelon) or telithromycin(Ketek)(10-14 days after first-line therapy) – 10 days

Complications:

- Orbital cellulitis – proptosis & orbital pain(ethm. Sin)
- Osteomyelitis – removal of necrotic bone
- Intra-cranial extention
- Cavernous sinus thrombosis – ophthalmoplegia, chemosis & visual loss.



Pharyngitis & Tonsillitis

- The main concern is which patients are likely to have a Group A-hemolytic streptococcal(GABHS) infection?

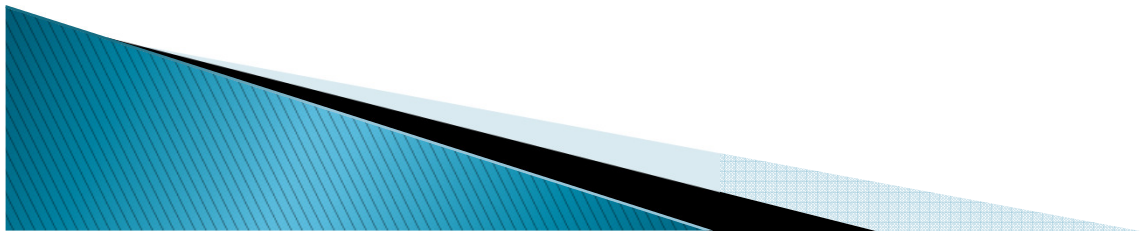
Clinical Findings:

Most suggestive of GABHS-infection include:

- Fever > 38°C
  - Tender anterior cervical adenopathy
  - Lack of a cough
- Pharyngotonsillar exudate

- Centor Criteria GABHS : 3 or 4+: Laboratory sensitivity of rapid antigen exceeds 90% Only 1+=unlikely
- ±Odynophagia, tender adenopathy and a scarlatiniform rash.

  WBC and a left shift.



Pharyngitis & Tonsillitis

Pathogens:

- Viruses; GABHS; Neisseria gonorrhoea
- Mycoplasma; Chlamydia trachomatis;
- **Ebstein-Barr Virus –infectious mononucleosis**

Rx:

- Pen V-K : 500mg BD – for 10 days!
- Cefpodoxime proxetil 250mg BD – 5 – 10 days
- Erythromycin or Azithromycin : 500mg OD – 3 days
- Pen V-K treatment results in a 94% clinical response rate & a 84% streptococcus eradication rate.

Complications:

- If untreated:Scarlet fever.
- Glomerulonephritis.
- Rheumatic myocarditis
- Local abscess formation.

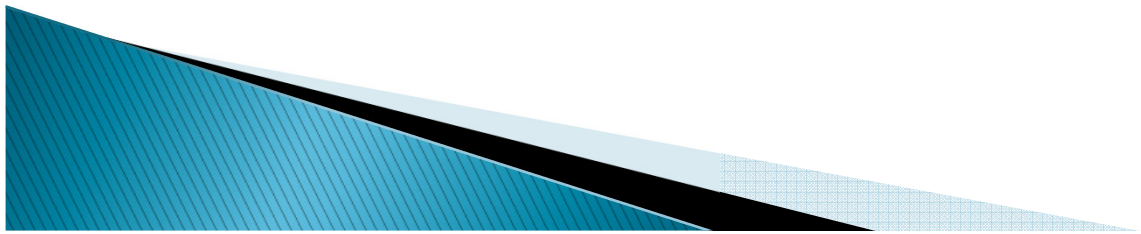
Otitis Externa (swimmer's ear)

Localised or Diffuse bacterial infection, caused by:

- *E. coli,*
- *P. aeruginosa,*
- *S. aureus or*
- *Fungi: C.albicans*

Rx:

- Adequate Aural Toilette -1% acetic acid solution in spirit.
  - Eardrops: Aminoglycoside(Gentamicin) + Corticosteroid(Maxidex) in an acid medium.
  - Severe: Ciprofloxacin 500mg BD, PO

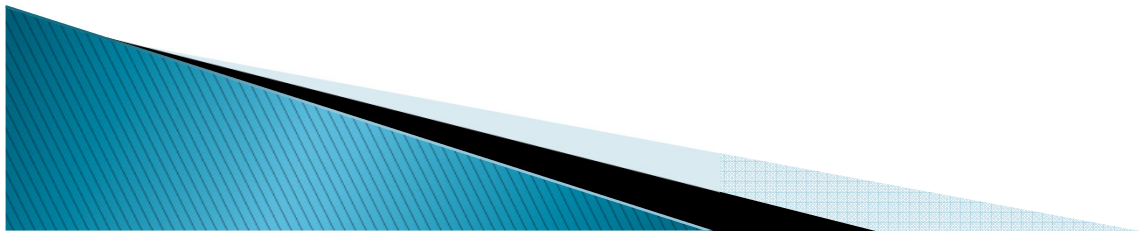


Furunculosis of the ear canal

- Infected hair follicle – *S. aureus*

Rx:

- Cloxacillin(Cloxin) 500mg Q6H PO AC
- Analgesics
- Impregnate 1cm x 10cm bandage with Covomycin-D, plug ear canal
- Lancing if appropriate

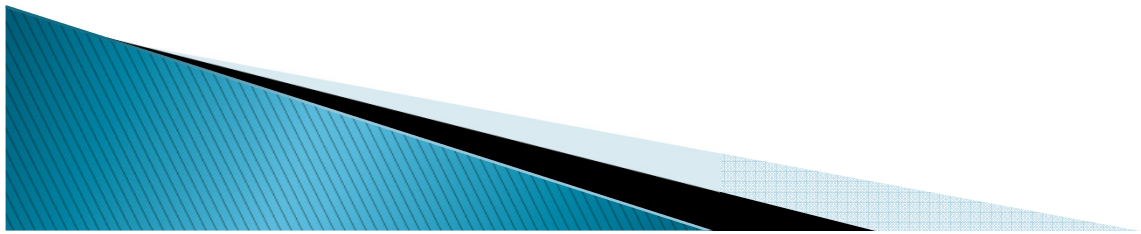


Chronic Otitis Externa

Causes: Chronic Otitis Media

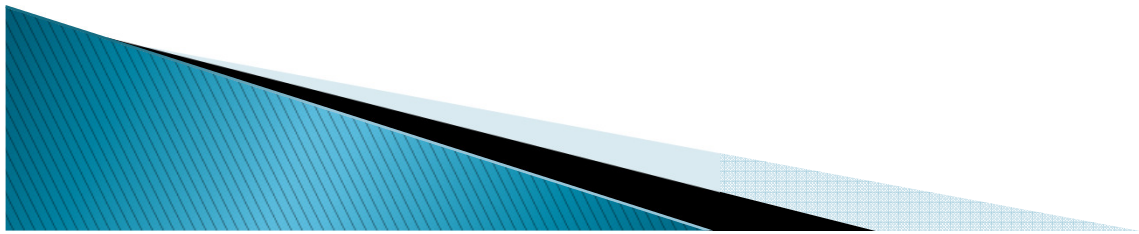
- Syphilis
- T. B.
- Leprosy

Rx: Underlying cause



Malignant Otitis Externa

- Persistent in diabetic / immune compromised patients
- Causative organism: *P. aeruginosa*
- Develops osteomyelitis – starts in the floor of the ear canal and extends
- Progressive cranial nerve palsies
- Rx: Medical – Ciprofloxacin 500-1000mg PO, BD for months
- Surgery if deteriorates



Acute Otitis Media

Causative organisms:

- *S. peumoniae*
- *H. influenzae*
- *S. pyogenes(Group A)*
- *Moraxella catarrhalis*
- *Staph. aureus*

Rx:

- Amoxycillin -90mg/ kg/ day – 5-7 days

Alternative choices:

- Co-amoxiclav(Augmentin) 90mg amox/kg/D Q8H
- Cefpodoxime proxetil(Orelox) 8 – 16mg/Kg/D
- Cefuroxime axetil(Zinnat) 15 – 30mg/Kg/D

β -lactam allergy:

- Azithromycin :10mg/ kg O D – 3days.
- Clarithromycin : 7.5 – 15mg B D – 5-7days.
- Erythromycin estolate – 40mg/ kg B D – 5-7days

Failed initial treatment:

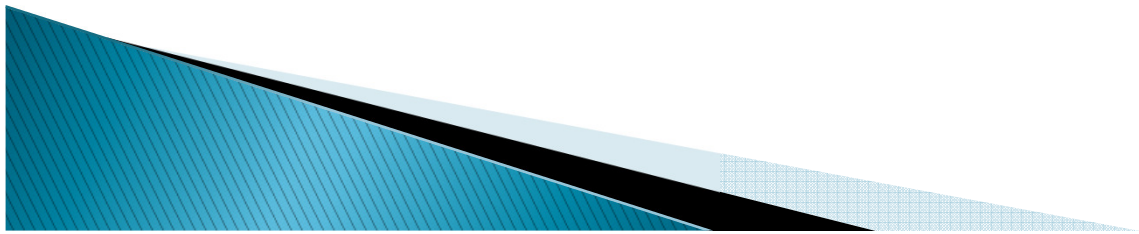
- Co-Amoxiclav
- Ceftriaxone ; IV/IM:-50-75mg/Kg OD x3

Acute Otitis Media-with Tympanostomy

- More *P.aeruginosa and S.aureus*

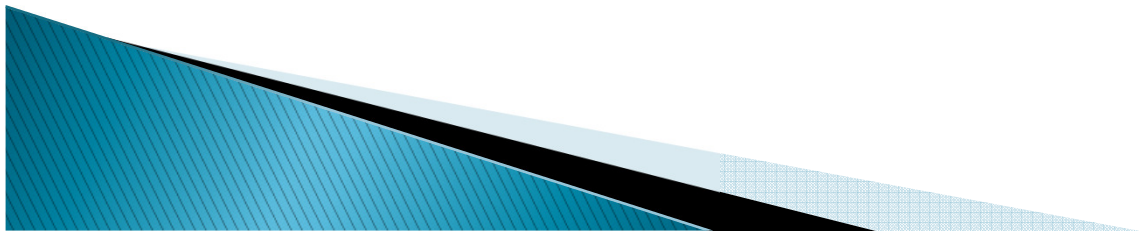
Rx:

- Topical ciprofloxacin – effective and less resistance
  - Cipro 0.3% / dexamethasone 0.1% otic suspension : Cilodex™: Min IV BD – for7 days.



Pneumococcal Conjugate Vaccine (PCV)

- 7-valent pneumococcal conjugate vaccine
- 20% decrease in incidence of AOM!
- 32.3% decrease expenditure



Meniere's Disease

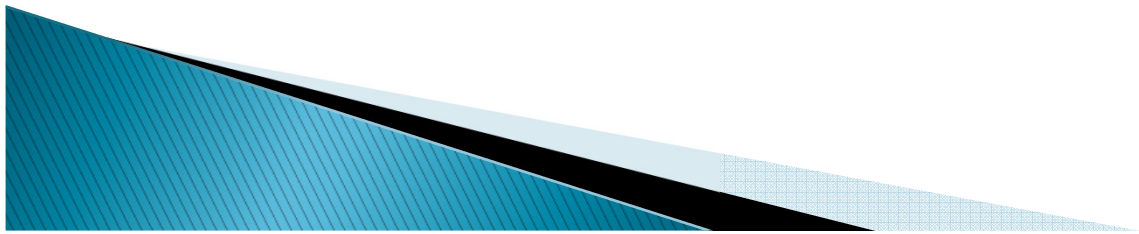
- A disorder of the inner ear that affect hearing and balance to a varying degree.

Treatment :

- Lower the endolymphatic pressure
  - Low salt diet (< 2g sodium/ D)
  - Diuretics: Hydrochlorothiazide 50- 100mg/ D
  - Antibiotics - as required

  Surgical repair of perilymphatic fistulas
- **Vestibular Neuronitis:**
  - Paroxysmal, single attack of vertigo, can persist for days
  - Viral origin?, No auditory symptoms.

Rx: symptomatic



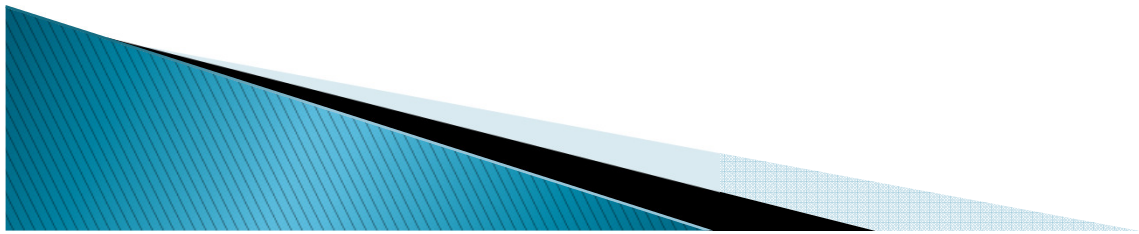
Motion sickness

Treatment

- Hyoscine orally or transdermally 0.5mg/ D

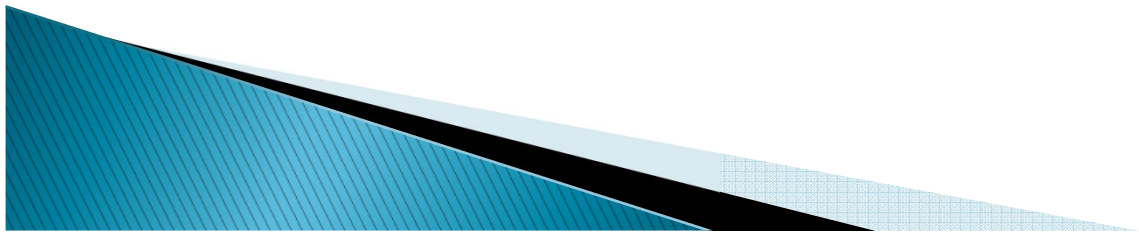
Not in RSA (= scopolamine)

- Cyclizine – 50mg / buclizine 25mg
- Prochlorperazine – 5mg
- Betahistine (SERC®) – 24mg
- Cinnarizine (STUGERON®) – 25mg



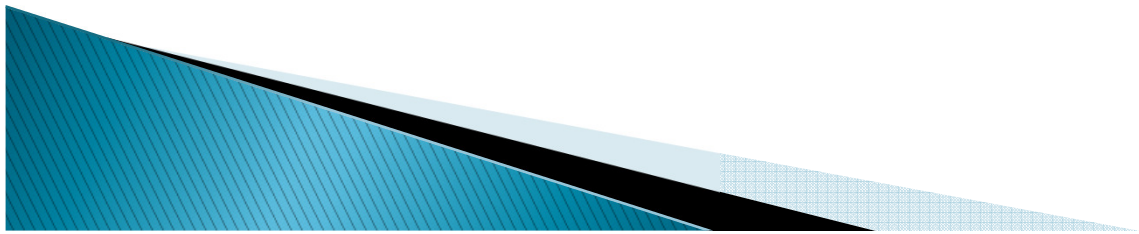
Anti-emetics

- Antihistamines
  - E.g. cyclizine, promethazine
- Dopamine antagonists
  - Phenothiazines, butyrophenones, metoclopramide
- Serotonin antagonists (5-HT_3 receptor anatagonists)
  - Odansetron, granisetron, dolasetron
- Muscarinic receptor antagonists
  - Hyoscine
- Corticosteroids
- Cannabinoids
- Neurokinin-1 receptor
  - Aprepitant, fosaprepitant



Vertigo

- Either a sensation of motion when there is no motion or an exaggerated sense of motion in response to a given bodily movement
- Cardinal symptom of vestibular disease
- Must differentiate peripheral from central aetiologies of vestibular dysfunction



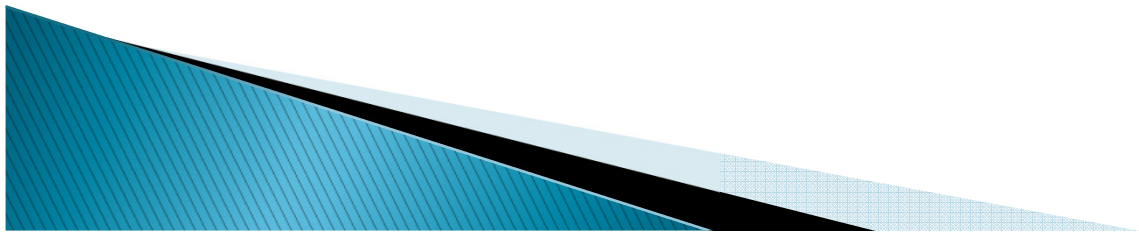
Treatment: Vertigo

Acute Severe Vertigo:

- Diazepam 2.5 – 5mg IM/IV/S-ling
- Anti-emetic: Prochlorperazine 10mg IM

Less severe:

- Antihistamine: Meclizine, Cyclizine
- Bedrest: Exercise if chronic.
- Prednisone: Recalcitrant vertigo and clusters
- Selective chemical destruction



Tinnitus

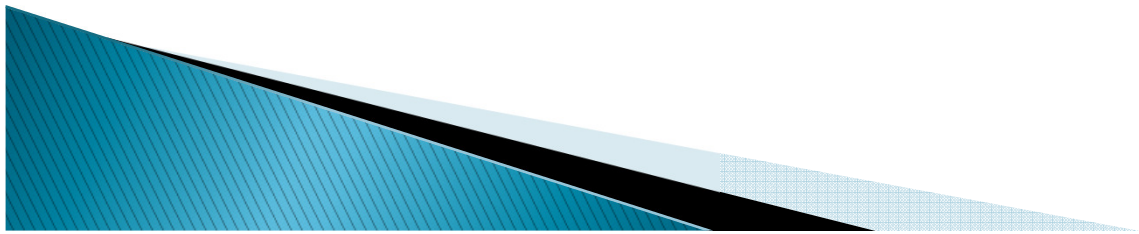
- Tinnitus is the perception of abnormal ear or head noises
- Persistent tinnitus = presence of sensory hearing loss

Avoidance:

- exposure to excessive noise ototoxic agents factors causing cochlear damage.

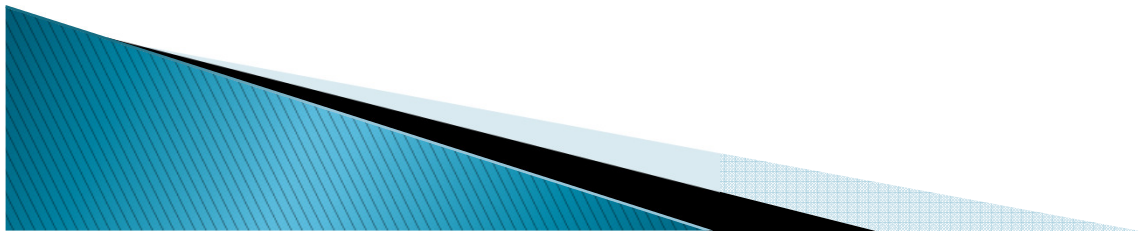
Rx:

- IV lidocaine , amitryptiline 50mg P O ?



Bell's palsy

- Sudden onset of lower motor neuron facial palsy
- Hyperaccusis or impaired taste may occur
- No other neurological abnormalities



Treatment

- 60% recover completely without treatment
- Severity of the palsy during the 1st few days after presentation is prognostic

Poor prognosis

- Complete palsy
- Advanced age
- Hyperacusis ?
- Severe initial pain

Corticosteroid ± acyclovir

Prednisone 60-80mg / D, divided doses, for 4-5days

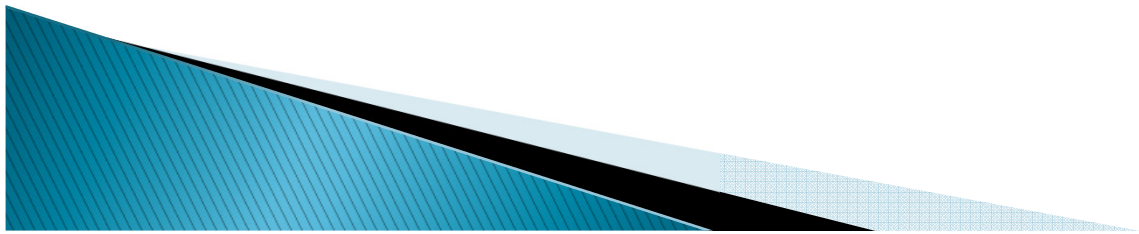
Taper over 7-10days

Acyclovir(Activir) 200mg Q4H – 5D

Protect the eye ?= lubricating drops

Ototoxicity

- Prolonged use of aminoglycoside containing eardrops:
  - e.g. Neomycin, framycetin, gentamicin and tobramycin
- Other antibiotics that may exert an ototoxic potential include:
  - polymyxin, bacitracin and chloramphenicol

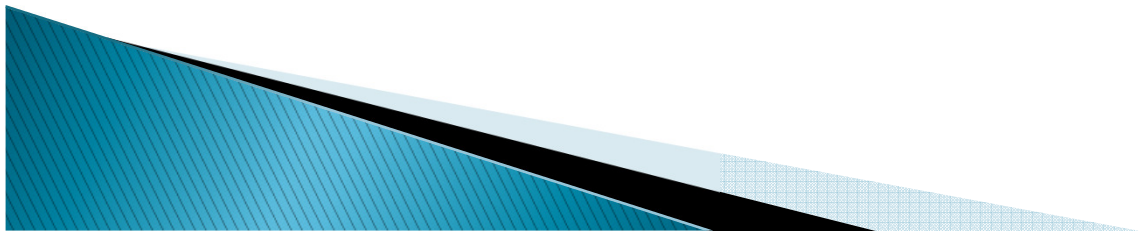


Ototoxicity (cont..)

- Aminoglycosides Systemically: Eighth nerve damage is potentially catastrophic and is often irreversible
- Related to duration of therapy and through plasma concentrations

Ototoxicity (cont..)

- Platinum compounds: Cisplatin
  - Ototoxicity develops in up to 30% of patients
  - Audiometry should be carried out before, during and after treatment
  - – Less toxic?– Carboplatin = oxaliplatin – cold induced neurosensory toxicity



Ototoxicity (cont..)

- Loop diuretics: Furosemide:
  - Ototoxicity with hearing loss is associated with excessive peak plasma concentrations caused by too rapid IV!
  - It may be related to inhibition of Na+K+Cl2- cotransporter in the ear, which is involved in the formation of endolymph