PRINCIPLES OF TREATMENT OF OCULAR DISORDERS

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DATE: 15/8/2016

ANATOMY REVIEW

- External part/adnexa
  - Eye lids
  - Conjunctiva
- Eye ball
  - Sclera
  - Cornea
  - Pupil
  - Lens
  - Iris
  - Ciliary body
  - Choroid
  - Retina
  - Fovea
  - Optic nerve
- Bony orbit

INTRODUCTION

- Optics
- Misaligned eyes
- External conditions
  - Blepharitis
  - Hordeolum – stye
  - Pre-septal cellulitis
  - Orbital cellulitis
  - Pterygium
  - Corneal ulcer
  - Conjunctivitis:
    - Viral ‘pink’ eye
    - Adenovirus
    - Bacterial
    - Allergic
    - Hyper-acute
    - Chlamydial
- Internal conditions
  - Glaucoma
  - Cataracts
  - Macular degeneration
  - Retinal detachment
- Systemic diseases

SYSTEMIC DISEASES THAT AFFECT THE EYE

- Infectious
  - Toxoplasmosis
  - Tocxocariasis

- Non-infectious
  - Diabetes Mellitus

PRINICPLES OF TREATMENT

- Ocular therapeutics
- Lasers
- Cryotherapy

OCULAR THERAPEUTICS

- Modes of administration
  - Topical – drops, ointment, gel, soft CLs
  - Peri-ocular – Sub-conjunctival, Sub-tenon, Peri-bulbar, Retro-bulbar
  - Intraocular – Intracameral, Intra-vitreal
  - Systemic – Oral, IV, IM

- Antimicrobials

- Other ophthalmic agents
  - Cycloplegics
  - NSAIDs etc.

TOPICAL DRUGS – MODE OF ACTION

- Cornea main barrier crossed easily by both water/fat soluble

- Benzalkonium preservative increases corneal surface wettability increasing absorption

TOPICAL

- Eye drops (gutta)
  - Aqueous
  - Suspension

- Immediately available

- Quickly diluted by tears

- Out the drops in the lower fornix

EYE OINTMENT (OCULENTUM)

- Increased contact time as compared to eye drops
- Blurs vision (good for bedtime or eye-pad)
- The ointment is put in the lower fornix; make sure the tip of the tube does not touch the eye to limit spread of infection.

GELS

- Less blurry vision
- Difficult to prepare
- A little bit heavier than drops but lighter than ointments
- Conditions:
  - Severe dry eyes – artificial tears in gel form
  - Post-laser treatment
  - Post-rheumatoid arthritis
  - SJS

- NB: most artificial tears are in drops or gel forms.
- Also LA gels are available.

OCUSERTS

- Delivers through membrane

- The drug is left in the eye for slow release e.g. post-graft ocuserts steroids to prevent rejection; ocuserts in diabetic macular edema.

- Placed in fornix
  - Releases drug for up-to a week, constant rate e.g. Pilocarpine for glaucoma

- Mostly steroids are the ones given in form of ocuserts.
- Anti-cancer drugs can also be given in this manner (rarely) e.g. retinoblastoma

SOFT CONTACT LENS

- Pre-soaked soft contact lens
- Delivers higher concentration in emergencies
- Examples:
  - Pilocarpine acute glaucoma
  - Antibiotic ulcers
  - Antiviral ulcers
- The contact lens keep the drug in the eye longer

PERI-OCULAR

- **Sub-conjunctival injection**
  - To achieve higher concentration
  - Drugs which can’t penetrate due to large size
  - Penetrate via sclera

- **Sub-tenon**
  - Preferable
  - Administer steroids in severe uveitis
  - Ant. Sub-tenon – disease anterior to the lens
  - Post sub-tenon – diseases posterior to the lens

- **Retro-bulbar injection**
  - Drugs (e.g. steroids) for optic neuritis
  - Optic neuritis
  - Papillitis
  - Posterior uveitis
  - Retro bulbar LA block

- **Peri-bulbar**
  - Preferable to retro-bulbar injections for anesthetic block
  - Drugs moves into the muscles to nerves by diffusion and the needle is shorter,

- **Always remember to clean the eye thoroughly with povidone iodine before injecting.**

INTRA-OCULAR INJECTIONS

- Injection in severe infections – endophthalmitis or also for LA:
    - Intra-cameral (Anterior chamber)
    - Intra-vitreal (vitreous)
        - Approx. 3.5-4 mm from the limbus
        - Put a 30 gauge needle through the sclera at this point
        - Under sterile conditions
        - Diluted antibiotics can be injected
        - Used for endophthalmitis, age-related macula edema from diabetic retinopathy or complications of surgery

SYSTEMIC ADMINISTRATION

- Oral

- IM/IV
  - Main barrier is blood aqueous only crossed by small MW and high lipid soluble drugs.

LASERS

- **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation.

- There are different forms

- **Mode of action**
  - Photocoagulation: burns
    - For diabetic retinopathy
    - Post-procedure, the patient may complain of visual scotomas (partial losses of the visual field); advice the patient to turn the head.

  - Photo-disruption: for tumors

  - 2.3 Photo-ablation: cutting the cornea e.g. LASIK for correcting refractive errors

CRYOTHERAPY

- Application of cold probe (-40^{0}C to -100^{0}C) causes tissue necrosis

- Uses:
  - Lid tumors
  - Corneal ulcers
  - Glaucoma e.g. cyclocryo of Ciliary body to reduce production of vitreous humor
  - Retina – sealing holes in retinal detachment

TYPED BY DR. E. NAILA