Glaucoma & Inflammation.

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Definition.

- Inflammatory ocular conditions compromise outflow of aqueous humor.
  - Keratitis
  - Episcleritis.
  - Scleritis.
  - Uveitis
Glaucoma & Keratitis.

- Anterior uveitis often accompanies it.
  - Open angle mechanism.
    - Inflammatory cells & debris occludes the TM.
  - Angle closure.
    - Pupillary block.
      - Posterior synechiae. (bombe).
    - PAS.
      - Acute.
      - Chronic.
Epidemiology of Glaucoma & Keratitis.

- Keratitis and elevated IOP is uncommon.
  - But occurs in 33% of patients with HSV keratitis associated with uveitis and/or endothelial disease.
    - 10% develop glaucoma.
    - Peripupillary iris atrophy.
- H. Zoster ophthalmicus.
  - 40% have uveitis.
  - 10% secondary glaucoma.
  - 25-30% chance of glaucoma if h. zoster keratouveitis is present.
  - Sector iris atrophy.
Epidemiology of Glaucoma & Keratitis.

- Other infections causes.
  - Treponema pallidum.
  - Leprosy.
  - Bacterial, Fungal keratitis.
  - Adenovirus type 10.
    - keratoconjunctivitis/pharingitis/fever.

- Chemical burns.
  - Alkali.
    - Initial raise due to shrink of outer coats of the eye.
    - Followed by slow late increase in IOP, prostaglandins mediated.
Differential diagnosis.

- Hx, SLE. Gonio, DFE.
  - Corneal abrasion, recurrent erosion syndrome.
  - HSV, HZO.
  - Leprosy.
  - Infectious causes.
  - Chemical.
Rx: Glaucoma & Keratitis.

- Treat underlying condition.
  - Antivirals, steroids.
  - Aqueous suppressants.
    - Beta-blockers.
    - Alpha-2 agonists.
    - CAIs, topical vs systemic
- Surgery.
- Restasis for HSV keratitis in steroid responders?
Glaucoma & Episcleritis.

- Rare.
  - 9% in patients without past history of glaucoma.
    - 50% were using steroids.
    - More common in recurrent cases.
    - Less common in bilateral cases.
  - Mechanism, open angle but cause still not clear.
- DD.
  - Scleritis.
    - Decrease in VA, uveitis, glaucoma.
- Rx: oral NSAIA, soft steroids, or topical NSAIA, local support.
Glaucoma & Scleritis.

- Scleritis.
  - Severe ocular pain, orbital radiation.
  - Photophobia, decrease VA.
  - Ciliary injection.
    - Vessels not movable.
  - 50% association with systemic disease.
  - Anterior vs Posterior.
  - Sector (Nodular) vs Diffuse.
Gl. & Scleritis, Epidemiology.

- Anterior.
  - 12-13% glaucoma.
  - 20% of those have also keratitis.
  - 18.7% glaucoma in rheumatoid scleritis.
  - Damage to TM.
  - PAS.
  - Other: Steroid response.

- Herpes zoster.
  - Episcleritis then 3 months later scleritis.
Gl. & Anterior Scleritis.

- Mechanism.
  - Open angle.
    - Inflammation of TM.
    - Pre-existent pathology of TM aggravated by perilimbal inflammation and edema.
    - Elevated episcleral venous pressure.
    - Steroid response.
Gl. & Anterior Scleritis.

- Closed angle.
  - Less common, needs uveitis.
    - Pupillary block (posterior synechiae).
    - PAS
  - Neovascular glaucoma.
- Posterior uveitis:
  - Choroidal effusion, secondary angle closure.
Dx & Rx.

- R/O Necrotizing scleritis.
- Recognize association with systemic vasculitis.
- Steroids, immunosuppressives.
- IOP.
  - Aqueous suppressants.
  - Mydriatics.
  - LPI, iridoplasty, pupiloplasty, filtering sx.
Glaucoma & Uveitis.

- Elevated IOP is common.
  - All possible mechanisms present.
    - Secondary Open angle. e.g.: HSV uveitis.
      - Most common.
      - Clogging of TM by inflammatory cells & debris.
        - Occasional “KP” at the TM.
    - Swelling of the corneal stroma.
    - Inflammation of the endothelial cells of the TM.
  - Primary Angle closure.
    - Occurrence in those with previous relative pupillary block component.
Glaucoma & Uveitis.

- Secondary Angle Closure.
  - PAS.
    - Adherence of inflammatory cells and material to TM & iris drawing them together.
  - Forward CB rotation.
  - Pupillary block
    - Posterior synechiae.
    - Secussio, occlussio pupillae.
Glaucoma & Uveitis, Dx & DD.

- Hx, SLE, gonio.
  - Flare & cells aq. Humor/vitreous.
  - Gonioscopy.
    - “KP”s.
    - PAS.
    - Rubeosis.

- DD.
  - Adenoma of the non-pigmented CB.
  - UGH.
  - Lens induced glaucoma-uveitis.
Glaucoma & Uveitis. Rx.

- Balancing act.
  - Topical “strong” steroids.
    - To improve TM function but it may also normalize inflow or lead to an steroid response.
    - NSAIA & soft steroids?
  - Periocular injections.
  - Glaucoma meds.
    - Aqueous suppressants.
    - Diamox? (avoid it with Trusopt/Azopt).
    - Cartelol (best beta-blocker in uveitis?)
    - Avoid miotics & PGF
      - (when desperate some try: Acular + Xalatan?)
Glaucoma & Uveitis. Rx.

- Mydriatics & Cycloplegics.
  - Avoid posterior synechiae.
  - Always gonio first.
  - Homoatropine 5%.
    - Shorter than atropine but good mydriasis & cycloplegia.

- Immunosuppression.
  - Cyclophosphamide.
  - Methotrexate.
  - Azathioprine.
  - Restasis, CsA (systemic).
Glaucoma & Uveitis. Rx.

- Surgery.
  - Avoid it if possible, specially in an inflamed eye.
  - Filtering surgery has a low success rate.
    - 75% ≤ 21 with MMC.
    - Fibroblast proliferation.
    - Subconjunctival fibrosis.
      - Uveitis eyes have an elevated number of T Lymph.
  - Setons, indicated in active stage.
  - CPC.
    - Increase post-op inflammation.
    - Further angle closure.
Specific syndromes.

- Fuchs’ Iridocyclitis.
  - Chronic anterior uveitis.
    - Stellate KP’s.
      - Auto-antibodies to corneal endothelium 90%
    - No PAS.
    - Iris nodules (Koeppe’s like).
    - Vessels in TM (no typical rubeosis).
      - Some cases of true rubeosis seen in ant.segment ischemia.
  - Heterochromia.
  - Cataract.
Specific syndromes.

- Fuchs’
  - Open angle glaucoma.
    - Prevalence: 6.3%-59%.
    - Risk 0.5%/year.
    - Failure rate of trab: 56%.
  - Other causes.
    - Lens-induced.
    - Rubeosis.
    - Recurrent spontaneous hyphema.
  - Rx: Aq. Suppressants.
    - Glaucoma non-responsive to Rx for uveitis.
Specific syndromes.

- Posner-Schlossman.
  - Usually unilateral, rare cases OU.
    - 20-50 yrs old.
    - 40% hypochromia of the iris.
    - Most cases self-limited, 2.8 x risk of OAG after 10 yrs of active disease.
  - Open Angle.
    - Severe episodic elevation of IOP.
    - Corneal edema.
    - Mild A/C reaction.
      - Sentinel KP.
  - PUD, GIT disorders, HSV?
  - Rx. Aq suppressants, steroids.
Specific syndromes.

- JRA.
  - Secondary glaucoma. 14-27%.
    - Pauciarticular.
    - Pupillary block.
    - Progressive closure by PAS.
    - Less often: decrease outflow with open angle.
    - Steroid response.
  - Rx. Aq suppressants.
    - Regular filters not very successful.
    - Setons, trabeculodialysis.
Specific syndromes.

- Intermediate Uveitis (Pars Planitis).
  - Inflammation peripheral retina OU.
    - Snow banking.
    - Vitritis.
  - MS, Sarcoid, Lyme’s disease, TB, idiop.
  - Glaucoma in 7-8% of adults, 15% children.
    - PAS, rubeosis, steroid response.
- Rx. Aq suppressants.
  - Sx: Setons, CPC.
Specific syndromes.

- Behçet’s.
  - Acute hypopion, iritis.
  - Oral & Genital Ulcers.
  - Erythema nodosum in young adults.
  - Male:Female almost 2:1, males have greater incidence of ocular disease 90%.
    - Mediterranean, turks.
- Glaucoma:
  - Clogging of TM by cells and debris.
  - PAS.
  - Rubeosis.
**Specific syndromes.**

- Behçet’s.
  - Poor prognosis for VA.
  - Resistance to steroids.
    - Use Chlorambucil or Cytoxan.
  - IOP.
    - Aq. Suppressants.
    - Setons.
Specific syndromes.

- VKH.
  - Attack to Ag of melanocytes
  - OU:
    - Panuveitis.
    - Serous R/D.
    - Choroidal infiltrates.
    - Perilimbal vitiligo.
  - Headaches, nausea, vomits, vitiligo, hearing loss, poliosis, alopecia, madarosis.
  - 20-50 yrs. Old, Asian or Native-Americans.
Specific syndromes.

- VKH.
  - Glaucoma.
    - Secondary open-angle.
    - Pupillary block.
    - Secondary angle closure.
      - Rotation of CB.
  - Rx. Aq. Suppressants, Mydriatics.
- LPI.
- Setons.
Specific syndromes.

- Sympathetic ophthalmia.
  - Bilateral granulomatous panuveitis after injury to one eye.
    - Uveitic glaucoma almost 50%.
      - Pupillary block, bombe.
      - PAS, thickening of iris and CB, cell infiltration.
    - Filtering procedure in a blind-painful eye is often the origin.
  - Rx: Rx. Aq. Suppressants, Mydriatics, Immunesuppression.
  - Sx: Setons.
Specific syndromes.

- **Sarcoidosis. 38% ocular involvement.**
  - Bilateral chronic granulomatous uveitis.
    - 20-40 yrs, blacks & women.
    - Systemic, lungs, liver, spleen, joints.
    - 52-74 % occurrence with ocular involvement.
    - Mutton fat KP’s.
    - Iris nodules.
    - PAS.
    - Glaucoma.
    - 11-26% in patients with sarcoid uveitis.
    - Higher risk in blacks.
Specific syndromes.

- Glaucoma in sarcoidosis.
  - Pupillary block (posterior synechiae).
  - PAS.
  - Clogging of the TM.
  - Steroid response.
  - Rubeosis.

- Rx: Aq. Suppressants, LPI, filters, setons.
- Direct damage to optic nerve, similar to glaucomatous optic neuropathy.
Specific syndromes.

- HSV.
  - Superficial Keratitis.
  - Disciform.*
  - Stromal keratitis.
  - Neurotrophic ulcer.*
  - Uveitis. 5% of all uveitis in adults.
  - Retinitis.

* Keratitis with greater incidence of elevated IOP.
Specific syndromes.

- Increase IOP in 28-40% of HSV infection.
  - 10% of HSV will have secondary glaucoma.
  - Clogging of the TM, trabeculitis.
  - PAS.

- Rx: Control the HSV, aq. Suppressants.
  - Oral acyclovir.
  - Sx. Filters, combined sx.
Specific syndromes.

- HZV.
  - Ocular involvement in 2/3 of patients with HZ ophthalmicus.
    - Areas, like HSV plus:
      - Scleritis.
      - Choroiditis.
      - Optic nerve neuritis.
    - Glaucoma. 16-50%. (uveitis, keratitis).
      - Trabeculitis.