Essentials of Ophthalmology

Vikram. D Durairaj, M.D.

Associate Professor of Ophthalmology and Otolaryngology/Head and Neck Surgery

Residency Director, Dept. of Ophthalmology
Fellowship Director, Oculoplastic and Orbital Surgery
Rocky Mountain Lions Eye Institute
University of Colorado Denver School of Medicine
Learning Objectives

At the conclusion of this presentation, the participant should be able to:

• Understand how to perform the basic eye exam

• Understand the differences between sight-threatening disorders and those that can be managed safely by the primary care physician

• Diagnose common ophthalmic disease
The basic eye exam

The tools:

- visual acuity chart (can be your near card)
- near card (has pupil sizes & ruler)
- bright light (can use your direct ophthalmoscope)
- direct ophthalmoscope
- tonopen*
- slit lamp*
- eye drops: topical anesthetic, fluorescein dye, dilating drops
The basic eye exam

- History & physical

- History: glasses, contacts, surgery, trauma,

- Symptoms: foreign body sensation (surface problem), itch (allergy), photophobia (uveitis), diplopia (orbital or CN problem), flashes or floaters (retina problem), color vision or distortion (retina problem)
The basic eye exam
The basic eye exam

- Visual acuity
- Pupils
- Alignment & Motility
- Visual fields (VF)
- Intraocular pressure
- External exam: lids and lashes, conjunctiva, sclera, cornea, anterior chamber, iris, lens
- Dilated fundoscopic exam (DFE): optic nerve, vessels, macula, periphery

VITALS
Visual acuity

- Typically measured by Snellen acuity but there are many optotypes (letters, tumbling E, pictures)
- May be tested at any distance
- Recorded as fraction (numerator is testing distance, denominator is distance at which person with normal vision would see figure)
Visual acuity

- Measured without & without glasses (Vacc & Vasc), want to know best corrected acuity
- Occlude one eye, children need to be patched
- 20/20 to 20/400, CF (counting fingers), HM (hand motion), LP (light perception), NLP (no light perception)
Visual acuity

- The pinhole (PH) exam can show refractive error
- Need a pinhole occluder
- Central rays of light do not need to be refracted
Sensory visual function

- Stereopsis (perception of depth), contrast sensitivity, glare, color vision
- The red desaturation test
Pupillary exam

- Pupil size - measure with pupil gauge on near card
- Anisocoria should be recorded under bright and dim light (greater than 1 mm is abnormal)
Pupillary exam

- Relative afferent pupillary defect (RAPD) or Marcus Gunn pupil (has nothing to do with size of pupils but the comparative reaction to light)

- Detected with swinging flash light test

- Indicates unilateral or asymmetric damage to anterior visual pathways (optic nerve or extensive retinal damage)
Pupillary exam: APD
Ocular alignment & motility

- Strabismus is misalignment of the eyes
- Important to recognize in children to prevent development of amblyopia
- Phoria is latent tendency toward misalignment (shows up sometimes)
- Tropia is manifest deviation (present all the time)
Ocular alignment & motility: corneal light reflex

- Normal or straight
- Exotropia (out)
- Esotropia (in)
Ocular alignment & motility: corneal light reflex

- Be aware of pseudoesotropia in children with epicanthal folds
Ocular alignment & motility: cover testing

- Cover-uncover or alternating cover testing can reveal strabismus as non-occluded eye fixates on object,
Ocular alignment & motility

- Elevation, depression, abduction, adduction
Confrontational visual fields
**Intraocular pressure**

- Measured by tonopen or palpation
- Varies throughout the day, normal is 10-22 (start to worry when pressure is in the 30s and up)
- Palpation may be useful if you suspect angle closure glaucoma (never perform in trauma)
External exam

- Lids & lashes (head, face, orbit, eyelids, lacrimal system, globe)
- Compare symmetry, use your ruler
- Flip the lid; make a lid speculum
- What am I seeing?
Blepharitis
Chalazion: Treatment

- Warm compresses
- Lid hygiene if associated blepharitis
- Oral antibiotics?
  - Cephalosporin
Pre-Septal versus Orbital Cellulitis
Cellulitis: PreSeptal vs. Orbital

- Children: most common
- Associated lid swelling (upper and lower)
- History of URI or sinus infection
- Both may have temp and elevated WBC
Preseptal

- Eye Exam normal
- Patient does not appear “toxic”
- Can treat with oral antibiotics and close observation
  - Unless in NEONATE!! Then hospitalize
Orbital

- A dangerous infection requiring prompt treatment
- Orbital Signs:
  - Decreased vision
  - Proptosis
  - Abnormal pupillary response and motility
  - Disc swelling
Orbital Cellulitis: Ancillary Tests

- CT or MRI: Look for Sinus infection or orbital abscess
- Blood cultures
  - Conjunctival swabs of no diagnostic value
Orbital Cellulitis

Treatment

- Prompt drainage of orbital or sinus abscess
- Systemic IV antibiotics
  - Haemophilus, Staph and Strep
  - Semisynthetic PCN/ Cephalosporin
Ptosis
Ptosis
Thyroid Eye Disease
Proptosis
Dermatochalasis
Pre-op Photo
Blepharoplasty

Pre-operative Photo 1 week post-operative Photo
Dacryocystitis
Naso-lacrimal duct Obstruction

- Epiphora (Tearing)
- Recurrent bacterial conjunctivitis
- Often history of facial trauma
- TREATMENT: DCR
Ectropion
Entropion
Trichiasis
Conjunctiva & Sclera

- Look at the bulbar (the eye) & palpebral (inside of the lids) conjunctiva
- Injection & erythema; what is the distribution
- Discharge; watery, mucous or membranous
- What do I see?
Scleritis or episcleritis
Scleritis

- Red painful eye with decreased vision
- Often associated with underlying collagen vascular disease
  - RA, Lupus
- Diffuse, Nodular, Necrotizing forms
- REFER!!
  - Requires systemic immunosuppression
  - Indocin, Prednisone, Cyclosporin, Cytoxan
Rheumatoid Arthritis
Subconjunctival Hemorrhage

- Dramatic but harmless
  - Sneezing, coughing, straining, eye rubbing
- Associated with anticoagulation
  - Aspirin
- If no obvious cause and associated with bruising or repetitive than: CBC, Platelet count, Bleeding time, PT/PTT
Subconjunctival Hemorrhage
Pterygium
Pterygium

- Latin for wing
- Benign fibrovascular tumor (UV induced)
  - Elastoid degeneration (wrinkle)
- Often become inflamed
- Treatment:
  - Artificial Tears, Sunglasses, Short term use of vasoconstrictors
  - Refer if large or conservative Rx fails
  - Conjunctival Autograft with Tisseel Glue
Pingueculum
Bacterial Conjunctivitis
Conjunctivitis: Bacterial

- Redness and mucopurulent discharge
  - Minimal discomfort
  - Vision minimally affected
- Treatment
  - Will resolve without treatment
  - Polytrim (polymixin-trimethoprim) q 2 hours the first day then QID for 1 week
Gonococcal Conjunctivitis
Hyperacute Purulent Conjunctivitis

- Sudden onset with rapid progression
- Bilateral
Viral Conjunctivitis
Conjunctivitis: Viral (EKC)

- URI
- History of contact
  - VERY CONTAGIOUS
- Sx’s: Photophobia, redness, watery discharge
  - Bilateral but asymmetric
- Preauricular node
- Treatment: None--Avoid Topical Steroids!!
Allergic (Hay fever)
Conjunctivitis
Conjuntivitis: Allergic

- ITCH
- SEASONAL
- Bilateral
- Mucopurulent discharge, no pre-auricular node
- Redness, Chemosis
Allergic Conjunctivitis: Treatment

- Avoidance
- Associated with Dry Eye
  - Wash eyes out with tears
- Cold Compresses
- Ocular antihistamines/mast cell stabilizers
  - Patenol, Alocril, Zaditor
Cornea

- Clarity
- Haze, or scars (including surgical)
- Pterygium
- Epithelium (use fluorescein dye & a cobalt blue filter to examine the epithelium for defects including punctate erosions, abrasions, ulcers, dendrites)
- What do I see?
Abrasion

- History of Trauma or Contact Lens wear
  - Very Painful: More pain nerves per mm than any other location
- Diagnosis:
  - Drop of Proparacaine
  - Fluorescein lights up epithelial defect
Treatment

- Relief of Pain and Rapid Visual Rehabilitation
  - Antibiotic ointment, dilation, patch
  - Bandage Contact lens
    - With Antibiotic Drops
    - Topical NSAID: Acular or Voltaren
  - Recommend Follow-up (Infection)
Patching
Dry Eye

- Postmenopausal women
- Sometimes associated with Arthritis
  - Lupus, RA, Sjogren’s
- Often related to climate/humidity
- Exacerbated by systemic medications
  - Diuretics (HCTZ), antihistamines, and anti-depressant
Dry Eye: Symptoms

- Foreign body sensation
- Photophobia
- May complain of redness
- Associated blepharitis or allergic conjunctivitis is common
Dry Eye: Diagnosis

- Schirmer’s test
- Fluorescein staining
- White, quiet eye is common
Flourescein Staining
Rose-Bengal
Schirmer Test

Without anesthesia
- Measures reflex tear secretion

With anesthesia
- Eliminates stimulated tearing
Dry Eye: Treatment

- Artificial Tears: (Genteal, Theratears, Systane)
  - Watch for preservative toxicity (BAK)
- Saturation therapy
- Preservative free drops
  - If using more than 4/day
- Consider punctal occlusion or Restasis (Cyclosporine)
Restasis

- Cyclosporine (.05%) in lipid vehicle
- Treats surface inflammation
  - Inhibits T-cell infiltration of lacrimal gland
- Burns on instillation
- Administer BID (1 vial for the day)
Dendrite
Treatment of HSV Keratitis

- Topical Antivirals (Viroptic) Trifluridine
- Systemic Acyclovir or Famvir if immunosuppressed or extensive associated skin lesions
Chemical Injuries

- Acid or Alkali?
  - Cation determines speed of penetration
    - $\text{NH}_4^+, \text{Na}^+, \text{K}^+, \text{Ca}^{++}$ (OH)
- Battery Explosions
  - Chemical plus blunt force trauma
  - Foreign body
Chemical Injuries

- Irrigate, Irrigate and Irrigate

  - Topical anesthetic, 7th nerve block helpful

- Prognosis determined by:

  - Type of chemical (acid vs. alkalai)
  
  - pH
  
  - Length of exposure

- TIME BETWEEN EXPOSURE AND IRRIGATION

REFER as soon as possible
Corneal foreign body
Corneal scar
Anterior chamber

- Clarity; measured by cells (counted) & flare
- Depth
Hypopyon
Hyphema
Cell & Flare
Iritis/Uveitis

- “Arthritis of the Eye”
- Associated with Collagen Vascular disease
- HLA-B27 associated
- Crohn’s disease, RA, Lupus
- Sx’s: Photophobia, Floaters, Red Eye, Pain, Decreased vision
- Circumlimbal flush
Iritis
Lens

- Best examined through a dilated pupil
- Senile cataracts can appear white or yellow
Cataract
Intraocular lens
Dilated fundoscopic exam

- Red reflex with direct ophthalmoscope
- Dilate with phenylephrine 2.5% & tropicamide 1% (not used in infants)
- Get close with the direct ophthalmoscope
- Vitreous clarity (hemorrhage)
- Nerve, vessels, macula & periphery with direct ophthalmoscope
Papilledema
Diabetic retinopathy
Vitreous Hemorrhage

- Sudden onset of painless decrease in vision
- Floaters
- Often Diabetic
- Dx: No red reflex
Macular degeneration