“Did you see that?”
...a case by case look at the pediatric eye exam

-Wade Mincher MD
-Sangeeta Jain MD
*not ophthalmologists

TESTING INSTRUCTIONS

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Room name: TPSEYE

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Objectives

- Review components of the pediatric eye exam using an interactive, case-based approach
- Discuss common ophthalmologic conditions and their presentation in both the inpatient and outpatient setting
- Highlight techniques for specific eye exam components including the “difficult” eye exam

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Case

Discharge newborn exam with asymmetric RR, unilaterally dull.

- Referred to ophthalmology
- Diagnosis: ???

“that pesky Red Reflex”
Abnormal RR = opacification

1) Cornea
2) Lens
   - Cataract
3) Vitreous
4) Retina
   - Retinoblastoma

Cataracts

1-6/10,000 Live Births

- 50-60% Idiopathic
- 10-25% Genetic
- 15-30% Other

Associated with:
- Infections: TORCH
- Genetic: Trisomy 13, 18, 21, Turner
- Metabolic: galactossemia
- Endocrine: hypoparathyroid, hypocalcemia, diabetes
- Trauma
- Drugs/toxins

Congenital Cataract management...

Treatment:
- Surgical removal
- Aphakia

IOL (intraocular lens) implantation
- After 2 years of age
<table>
<thead>
<tr>
<th>QUESTION: What is the most common late complication of cataract surgery?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Retinal detachment</td>
</tr>
<tr>
<td>B) Glaucoma</td>
</tr>
<tr>
<td>C) Retinal hemorrhages</td>
</tr>
<tr>
<td>D) Endophthalmitis</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>A Needle in the haystack!</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment is urgent!</strong></td>
</tr>
<tr>
<td>- Early diagnosis is key!</td>
</tr>
<tr>
<td><strong>If bilateral cataracts are not treated by 2 months of age:</strong></td>
</tr>
<tr>
<td>- Sensory (acquired) nystagmus</td>
</tr>
<tr>
<td>- Bilateral poor visual acuity (&lt;20/200)</td>
</tr>
<tr>
<td><strong>Later signs/symptoms of undiagnosed mild cataracts:</strong></td>
</tr>
<tr>
<td>- Lack of reaction to light</td>
</tr>
<tr>
<td>- Strabismus</td>
</tr>
<tr>
<td>- Failure to notice toys and faces</td>
</tr>
<tr>
<td>- Developmental delay</td>
</tr>
<tr>
<td>- Photophobia in bright lights</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Another Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge newborn exam with asymmetric RR, unilaterally dull.</td>
</tr>
<tr>
<td>Referred to ophthalmology</td>
</tr>
<tr>
<td>Diagnosis: Peter’s Anomaly</td>
</tr>
</tbody>
</table>
1) Cornea
   - Peter's Anomaly
   - Congenital Hereditary endothelial
     dystrophy
   - Forceps Injury
   - Mucopolysaccharidosis
2) Lens
   - Cataract
3) Vitreous
   - Persistent Fetal Vasculature
4) Retina
   - Retinoblastoma
   - ROP (<30 weeks, <1500g)
   - Other: optic disc colobomas, Coat's
     disease
   - Retinal detachment
5) Strabismus or refractive errors

Peter’s Anomaly
- Rare
- Dense opacity in center of cornea
- 50% develop glaucoma
- Longterm: corneal transplant
- Outcomes: “uniformly poor”

Retinoblastoma
- 1/15,000 children
- Typically, diagnosed by age 3
- May be hereditary
- Uniformly fatal without treatment
- Cure rate: 90% or better if promptly treated
QUESTION: Aside from leukocoria, what is the second most common presenting sign for retinoblastoma?

- A) Eye tearing
- B) Hyphema
- C) Red, painful eye
- D) Strabismus

Tips
- Use a darkened room
- Set the ophthalmic lens power at “0” diopter
- Observe the eyes
  - both together (Bruckner test)
  - individually
    * straight on
    * obliquely

QUESTION: At what distance should you examine the baby’s red reflex?

- A) 6-12 inches
- B) 12-18 inches
- C) 18-24 inches
- D) 24-30 inches

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Abnormal findings

1) absent, dulled, or asymmetric RR
2) white or opaque reflex
3) dark spots

Additional tips

- At minimum: Check the eyes at initial exam, discharge exam, newborn WCC, and every WCC thereafter!
- “Push the lids open to the edges of the orbital rim”
- Parents might bring you the diagnosis
- Refer if unsure 😞

QUESTION: Within what time frame should a baby with an abnormal red reflex be evaluated by an ophthalmologist?

- A) <1 week
- B) < 2 weeks
- C) < 1 month
- D) whenever

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Significant Family History

- Retinoblastoma
- Infantile Cataracts
- Congenital Glaucoma
- Blindness from birth
- Any other ocular disorders that presented early in life

- Refer to Ophthalmology

CASE

12mo male presenting with concerns for “eye turning in”
**Strabismus**

- Misalignment of eye
  - Comitant
  - Incomitant
- Tropia vs phoria
- Direction of deviation
  - Eso vs exo
  - Hyper vs hypo
- Important questions:
  - Age of onset
  - Intermittent vs fixed
  - Situation in which noticed
  - Family history

**QUESTION:** A large percentage of newborns have intermittent strabismus. What is the most common type and at what age should you expect it to resolve?

- A) Exotropic, 4mo
- B) Esotropic, 6mo
- C) Exotropic, 8mo
- D) Esotropic, 2mo

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**Strabismus**

- Exotropia
  - Intermittent
  - Commonly occurs between 2-8 years of age
  - Fatigue exacerbates
  - Best observed with the cover test
  - Surgery for:
    - Increasing exotropia
    - Present >50% of the time
    - Poor fusion control
  - Convergence insufficiency
**Strabismus**

- **Esotropia**
  - Congenital/Infantile
  - First 6mo age
  - High risk for amblyopia
- **Accommodative**
  - 12mo-5yr age
  - Managed with vision correction
- **Acquired**
  - Cranial nerve pathology
  - Intraocular tumors
  - Other neurologic pathology

**Eye alignment exam**

- Baseline observation
- Eye position
- Head tilting
- Fix and follow
- Light reflex (Hirschburg test)
  - Can help determine amount of deviation
  - Fixate on object at 1m
- Red reflex
- Cover-uncover testing
- Cross-cover testing
Case continued…
- Mom states she notices patient's eyes crossing while reading to him and if she is giving him a toy to grab.
- Started noticing the inward deviation around 8mo of age.
- Father needed glasses when he was younger.

On exam:
- No head tilt or squinting
- Eyes appear aligned at baseline with symmetric light reflex
- No nystagmus
- No ptosis
- Normal pupillary response

QUESTION: Differential diagnosis for this patient is **less likely** to include the following:
- A) Infantile esotropia
- B) Pseudoesotropia
- C) Accommodative esotropia
- D) CN VI palsy

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Accommodative esotropia
- Presents from infancy to early childhood
- Progressive
- Initially intermittent
- Increases in degree and persistence over time
- Associated with far sightedness
- Treated with corrective lenses
- Surgery if not successful with glasses alone
- Overall good prognosis if detected and treated early
### Pseudostrabismus
- Typically pseudoesotropia
- Secondary to facial structure
- Wide nasal bridge
- Epicanthal folds
- May exist with true strabismus

### Additional case:
- 12yo female admitted to inpatient service due to complaints of HA, double vision
- Admitted for workup
- Exam significant for:
  - Lateral gaze (CN VI) palsy
  - Papilledema
  - MRI normal
  - LP with elevated opening pressures
- DX: Pseudotumor cerebri

### Suppression
- Ability of child to cortically “turn off” deviated eye
- Leads to amblyopia if not addressed
- Complaint of diplopia presents in older children
  - Typically after 6-7 years of age
  - Mature visual system cannot suppress double image
  - Development of diplopia implies acquired strabismus
Indications for referral
- Suspected congenital esotropia
- Presence of intermittent or constant exotropia at 6mo
- Associated with other abnormal findings
  - Abnormal red reflex
  - Nystagmus
  - Abnormal eyelid position
- Any child >6mo with or suspected deviation

Case
12 day old baby with eye discharge x 24hours
- Born FT SVD without complications
PE:
  - Happy baby
  - Good weight gain.
  - Normal exam.
Eye exam reveals:
  - 2 equal symmetrical eyes
  - PERRLA
  - Conjunctiva are clear
  - Yellow discharge in the corner of the left eye
QUESTION: What is the most common cause of persistent discharge or tearing in children <3mo of age:

- A) ocular infection
- B) allergy
- C) glaucoma
- D) lacrimal duct obstruction

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Nasolacrimal Duct Obstruction

- 5% of infants have symptoms of NLDO
- 90% clear spontaneously in 1st year

Acute Dacryocystitis

- Infection of the Naso Lacrimal System
  - Erythema
  - Swelling
  - Warmth
  - Tenderness of the lacrimal sac
  - +/- purulent discharge
Case

You are about to walk out of the room, but you reflect…this is a 2 week old. Anything else to consider?

Case

Mom and dad seem happily married and both attended the child's visit today.

Maternal hx:
- No H/o STIs.
- H/o UTI during 3rd trimester that was treated.
- No symptoms thereafter.

Family history:
- Nothing.

Recommendation:
- Consider grabbing a few swabs
- Return if things get worse

QUESTION: They return 2 days later (DOL 14). Of the following, what does this child most likely have?

- A) Gonococcal conjunctivitis
- B) Chlamydia conjunctivitis
- C) Glaucoma
- D) Endophthalmitis

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Case continues...DOL 14
- Had increasing eye discharge
- GC/Chl labs pending
- Referred to ophthalmology
  - Saw a pseudomembrane
  - Diagnosed with chlamydia trachomatis
  - Started on oral erythromycin qid x 10 days
- Next day test for chlamydia trachomatis was positive
- Follow up exam normal per ophthalmology

Neonatal conjunctivitis
- Aseptic : Chemical (DOL 1-2)
- Bacterial:
  - Chlamydia (most common) (DOL 5-14)
  - GC (most dangerous) (DOL 2-6)
  - Other bacteria: staph/strep/gram negatives
- Viral
  - Herpes (<1%) (DOL 1-35)

clarification on conjunctiva…
- The front skin of the eye.
- Extends from under the eyelid to over the white part of the eye.
<table>
<thead>
<tr>
<th>Chemical conjunctivitis</th>
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</thead>
<tbody>
<tr>
<td>Chemical conjunctivitis</td>
</tr>
<tr>
<td>Seen ~24-48 hours of life</td>
</tr>
<tr>
<td>Mildly red eye(s)</td>
</tr>
<tr>
<td>Some swelling of the lids</td>
</tr>
<tr>
<td>Self limiting</td>
</tr>
<tr>
<td>Less common now because we use erythromycin drops</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GC ophthalmia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presents: 2-5 days after birth, but can be later</td>
</tr>
<tr>
<td>Findings:</td>
</tr>
<tr>
<td>Purulent conjunctivitis</td>
</tr>
<tr>
<td>Profuse exudate and</td>
</tr>
<tr>
<td>Swelling of the eyelids</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chlamydia Conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presents:</td>
</tr>
<tr>
<td>5-14 days after birth</td>
</tr>
<tr>
<td>Typically bilaterally</td>
</tr>
<tr>
<td>Mild to moderate conjunctivitis</td>
</tr>
<tr>
<td>Finding:</td>
</tr>
<tr>
<td>Mild swelling with watery discharge → mucopurulent → marked swelling with chemosis → bloody discharge</td>
</tr>
</tbody>
</table>
CASE

Optho revealed: Pseudomembrane

Herpes Conjunctivitis

Presents:
- First 6 weeks of life
- Unilateral (almost always)

Findings:
Early:
- Excessive eye watering,
- Crying from apparent eye pain
- Conjunctival erythema

Later:
- Vesicles
- Blepharoconjunctivitis
- Follicular conjunctivitis

When to refer…
- Can potentially confirm diagnosis!
- Help monitor for poor outcomes and resolution of disease.
Case: Alternate ending

QUESTION: 4 week old infant presents with persistent eye discharge/tearing. Previous eye cultures are all negative. On PE, patient possibly has a dull red reflex. Which finding would NOT support your working diagnosis?

- a) Enlarged cornea
- b) Smaller than normal cornea
- c) Corneal clouding
- d) Photophobia

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Tip: Check the red reflex

"As for all newborns, the ophthalmic examination should start with the Red Reflex test."

"If the pathology is isolated to the conjunctiva and does not involve the cornea or intraocular structures, the Red Reflex should be normal."

– Kenneth Wright MD.

Primary Infantile Glaucoma

- Extremely rare, 1/100,000 births
- 70% Bilateral

Cause: abnormal fetal development of the angle structures

- Impaired drainage of aqueous fluid
- Increased IOP

Most severe consequence

- Optic nerve damage
**Congenital Glaucoma**
- Tearing
- Photophobia
- Blepharospasm
- Large cornea
- Corneal clouding
- Abnormal Red Reflex

**Conjunctivitis**

**Infectious**
- Viral
- Bacterial

**NonInfectious**
- Allergic
- Nonallergic
  - Trauma (mechanical or chemical)
  - Neoplasm
  - Ocular inflammation
  - Idiopathic

**Conjunctivitis: A Clinical Diagnosis of Exclusion!**
(Sangeeta’s) “Rule of 7”:
- No significant pain
- No significant loss of vision
- No photophobia
- No focal pathology of the eye or lids
- No focal erythema
- No idiosyncrasies (PERRLA, ZOM, RR+B)
- No Improvement
When to refer...

Rule of 6 “loosely inverted”:
- More severe pain (or FB sensation that prevents a patient from keeping the eye open)
- Loss of vision (>20/40)
- Photophobia (abnormal corneal abrasion cannot be treated without referral initially)
- Focal pathology (ex. corneal opacity)
- Focal erythema (ex. ciliary flush)
- Eye idiosyncrasies (ex. Fixed pupil, abnormal red reflex)

#7 Lack of improvement

CASE

7yo female presenting with “swelling and redness” of her L eye
External Inspection - Eyelid

- Know normal anatomy for your patient
  - Location!
- Edema
  - Focal
    - Hordeolum/Chalazion
    - Lacrimal pathology
    - Generalized (periorbital)
    - Periorbital cellulitis
  - Unilateral vs Bilateral
- Skin changes
  - Erythema
  - Ecchymosis
### External inspection - Proptosis

- **Congenital**
  - Craniofacial abnormalities
- **Acquired**
  - Secondary to mass effect
    - Bilateral
    - Graves disease
  - Unilateral/Bilateral
    - Infectious
    - Tumors
    - Inflammatory
    - Vascular

- **Six “P”s**
  - Pain
  - Proptosis
  - Progression
  - Palpation
  - Pulsation
  - Periorbital changes
External inspection - Proptosis

- Exam
  - Eyelid symmetry with frontal view
  - Axial view
  - Pseudoproptosis
  - Direction of displacement
  - Visual acuity
  - Systemic evaluation
  - Immediate evaluation

Extraocular movements

- Limitation to movement
  - Neurological
    - Intracranial pathology
    - CN pathology
    - Neuromuscular
  - Mechanical
    - Entrapment
    - Obstructive
    - Congenital

<table>
<thead>
<tr>
<th>Extraocular Muscle</th>
<th>Cranial Nerve</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR, IR, MR, IO</td>
<td>CN III</td>
</tr>
<tr>
<td>LR</td>
<td>CN VI</td>
</tr>
<tr>
<td>SO</td>
<td>CN IV</td>
</tr>
</tbody>
</table>

Extraocular Movements
Increased Orbital Pressure

- Limited room for volume expansion
- Bony boundaries
- Encased structures
- Manifestations
  - Proptosis
  - Pain
  - Limitation in EOM
  - VA changes

QUESTION: What is the preferred initial imaging modality for this patient?

- A) MRI brain/orbits with IV contrast
- B) Orbital ultrasound
- C) CT orbits with IV contrast
- D) XR sinus

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**Question:** What is the most common origin of pediatric orbital cellulitis?

- A) Trauma
- B) Hematologic spread
- C) Sinusitis
- D) Odontogenic infections

**Orbital Cellulitis**

- Infection posterior to the orbital septum
- Extension from periorbital structures
- 90% of all cases of orbital cellulitis are caused by paranasal sinusitis
  - Majority from ethmoid sinusitis
  - Dacrocystitis or odontogenic infections

- Classic sinus organisms:
  - *Haemophilus influenzae*
  - *Staphylococcus aureus*
  - *Streptococcus species*
  - *S.pneumo*
  - *GAS*
  - *Moraxella catarrhalis*
  - Anaerobic species
    - *Peptostreptococcus*
    - *Fusobacterium*
    - *Bacteroides*

**Differential**

- Infectious
  - Bacterial
  - Fungal
  - Idiopathic inflammation
  - Orbital pseudotumor
  - Myositis
  - Sarcoidosis
  - Neoplasms
    - Leukemia
    - Retinoblastoma
    - Rhabdomyosarcoma
Orbital Cellulitis
- Median age 7 years
- More common in colder weather
- Parallels that of acute sinusitis, URI
- Complications 2-5%
  - Vision loss
  - Cavernous sinus thrombosis
  - Intracranial extension

Management
- Admission
- Parenteral antibiotics
  - Target sinus organisms
  - MRSA
- Adjunctive therapies
  - Steroids
  - Decongestants
- Surgical management
  - Severe disease

QUESTION: Which of the following increases risk for surgical intervention in a patient with orbital cellulitis?
A) Significant periorbital edema limiting ability to open eye
B) Proptosis of eye
C) Pain with extraocular movement
D) Younger age
### Surgery for POC
Risk factors for surgical intervention include:
- Older age
- Proptosis
- Limitation in EOM
- Non-medial SPA

### Case
A 4-month-old baby girl here for WCC.
- Mom is sweet and a little anxious. Dad is quiet. Both parents wear glasses.
- “She doesn’t look at me and smile.”
- “How do I know if she can see me?”

**PE:** Quiet infant. Looks at you vacantly, never smiles. Doesn’t engage with either parent.
- No dysmorphic features. Resembles dad.
- Vitals stable. Overall growth at 50%.
- PE grossly normal.
VISION

• Legal blind adult 20/200
• Newborn 20/400
• (2 months 20/150)
• (4 months 20/60)
• 3yo 20/40
• 4yo 20/30
• 5yo 20/20

<table>
<thead>
<tr>
<th>Age of child</th>
<th>Visual Behavior</th>
</tr>
</thead>
</table>
| 1 month      | • Make eye contact, but appear serious
• Begin to look at objects that are close to their face |
| 2 months     | • Display facial expression as they fixate |
| 3-4 months   | • Begin to watch activity that occurs around them |
| 6 months     | • Observe their surroundings
• Recognize favorite things/people at a distance |

QUESTION: Vision assessment in children younger than 3 years or any nonverbal child is further accomplished by evaluating:

- A) Ability to fix & follow objects
- B) Tumbling E eye chart
- C) LEA Symbols eye chart
- D) Asking the child

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Fixation Reflex

<table>
<thead>
<tr>
<th>Age of child</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 months</td>
<td>Human face</td>
</tr>
<tr>
<td>&gt; 4 months</td>
<td>Small, colorful toy, sticker on end of tongue depressor</td>
</tr>
</tbody>
</table>

**TIPS:**
- No white light
- Nothing noisy

**CASE**
- She does fix/follow

<table>
<thead>
<tr>
<th>Milestones that require eyesight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixing</td>
</tr>
<tr>
<td>Following</td>
</tr>
<tr>
<td>Developing social smile</td>
</tr>
<tr>
<td>Searching for objects</td>
</tr>
<tr>
<td>Fine pincer grasp</td>
</tr>
<tr>
<td>Crawling/walking</td>
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</table>

**Vision Assessment**

**History:**
- Does your child see well?
- Do the eyes appear to cross or wander?
- Have you noticed anything unusual about your child’s vision?
- Does your child hold things close?
- Does your child squint?
- Do your child’s eyelids droop?
- Have your child’s eyes been injured?

**Past History**
- Prematurity

**Family History**
- Cataracts
- Strabismus
- Amblyopia
- Glaucoma
- Retinal problems
- Nystagmus

**Case**
- Decide to monitor for now.
- At 6mo WCC, the patient is quietly smiling at mom.
- Thereafter, child seems to meet all milestones at WCCs.
QUESTION: “Dr. Jain, when can you check my little girl’s eyes with an eye chart?”
- A) 3
- B) 3.5
- C) 4
- D) 5

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OPTOTYPE testing
- Start at age 3 years.
- Vision testing should be performed at a 10 foot distance and well lit area.
- Test binocularly, and then monocularly
- General Rules:
  1. Start at the critical line!
  2. Read the line!
  3. Miss 2, move to a higher line!
QUESTION: What is the best method for covering the eye that is not being tested?

- A) Patient's hand
- B) Parent's hand
- C) Paddle occluders
- D) Occluder patches

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OPTOTYPE testing

<table>
<thead>
<tr>
<th>Behaviors to watch out for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skipping symbols</td>
</tr>
<tr>
<td>Memorizing charts</td>
</tr>
<tr>
<td>Squinting</td>
</tr>
<tr>
<td>Peeking</td>
</tr>
<tr>
<td>Uncooperative child (especially repeatedly)</td>
</tr>
</tbody>
</table>

- Remember: the child wants to get things right!
### Case

3yo WCC—the visual acuity testing shows 20/40 vision in both eyes, do you refer to ophtho?

3yo WCC—Would you refer if the Right eye was 20/20 and left eye was 20/40?

#### Refer if:

- Worse than 20/50 in a 3yo
- Worse than 20/40 in a 4yo
- Worse than 20/30 in a 5+yo

#### Refer if:

- 2 line difference between eyes even within passing range

### Case Diagnosis: Amblyopia

“Abnormal processing of visual images by the brain during a critical period of vision development, which results in a permanent reduction in visual acuity.”

- 1-4% of children
- Unilaterally or Bilaterally

### Amblyopia

#### Causes:

- Deprivational
- Strabismus
- High Refractive Error
- Anisometropia

#### Treatment:

- Provide a clear retinal image
- Correct ocular dominance
Near Vision testing...see ophtho

- Decline in school performance
- Reading difficulty
- Eye strain
- Headaches
- Double vision
- Blepharospasm
- Blurred or distorted near vision

CASE
15yo female presenting with "blurry vision" and eye pain

"Why are things so blurry?"
Case follow-up questions
- Prior VA deficits
- Monocular vs Binocular “blurriness”
- Prior or family history of migraines
- Recent trauma
- OTC or prescription medication usage
- Any other neurological deficits
- Significant life stressors/anxiety

Neuro-Ophtho exam
- Cranial nerves
- VA
- Motility deficits
- Pupillary exam
- Nystagmus
- Fundoscopic exam

Pupillary exam
- Inspection
  - Iris abnormality
  - Coloboma
  - Aniridia
  - Heterochromia
  - Anisocoria
  - Congenital vs acquired
- Function
  - Afferent defect
  - Efferent defect
QUESTION: You are performing the swinging light test on our patient and note the following:

- Symmetric pupils on initial inspection
- Ipsilateral and contralateral constriction when light source at R eye
- No constriction when light source at L eye

How would you describe the defect?

- A) Afferent defect involving the R eye
- B) Afferent defect involving the L eye
- C) Efferent defect involving the R eye
- D) Efferent defect involving the L eye
- E) Not sure, but would contact ophthalmology regardless

Fundoscopic exam

- Look for:
  - Atrophy
  - Swelling
  - Blurring of disc margin
  - Elevation of disc
  - Hemorrhages along optic nerve
  - Obscured vessels
Case continued:
- First episode of "blurry vision" and HA
- Loss of color vision, only able to appreciate shapes
- Exam significant for:
  - Relative APD in L eye
  - Blurring of optic disc margin on fundoscopic exam
  - No motility defects noted
  - No other significant neurological findings

Causes of Acute Loss of Vision
- Cortical blindness
- Psychogenic blindness
- Optic neuropathy
- Retinal disease
- Visual media problems
Optic Neuritis

- Demyelination of optic nerve
- Can be isolated or associated with other demyelinating diseases
  - Neuromyelitis optica (Devic Syndrome)
  - Multiple sclerosis
    - 15% later MS presentation for isolated optic neuritis
    - Increased risk factors for later MS
  - Unilateral symptoms
  - Recurrent symptoms within a year

- Etiology
- Clinical findings
- Management

Ptosis

<table>
<thead>
<tr>
<th>Congenital</th>
<th>Acquired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibrosis of extracocular muscles</td>
<td>Horner syndrome</td>
</tr>
<tr>
<td>Horner syndrome</td>
<td>Lid inflammation</td>
</tr>
<tr>
<td>Myasthenia</td>
<td>Mitochondrial myopathies</td>
</tr>
<tr>
<td>CN III palsy</td>
<td>Myasthenia gravis</td>
</tr>
<tr>
<td>CN III palsy</td>
<td>Trauma</td>
</tr>
</tbody>
</table>

Abnormal Eye Movements

- Nystagmus
  - Involuntary, rhythmic oscillation
  - At least one phase is slow
  - Variable pathology
- Ocular Flutter
  - Bursts of rapid horizontal oscillation during fixation
  - Associated with cerebellar/brainstem disease
- Ocular dysmetria
  - Overshooting or oscillation on refixation
  - Associated with cerebellar disease
- Opsoclonus
  - Nonrhythmic conjugate movements
  - Neuroblastoma
Nystagmus

- Types
- Acquired
- Detected by patient
- Intracranial pathology
- Congenital
- Motor nystagmus
- Bilateral, symmetrical
- Can have face turn, relatively good VA
- Congenital
- Motor nystagmus
- Bilateral, symmetrical
- Can have face turn, relatively good VA
- Sensory
- Due to neonatal blindness
- Larger amplitude, poor fixation
- 6-8 weeks

Indications for referral to ophtho

- Abnormal red reflex
- Personal history of prematurity or metabolic or genetic disease with ophthalmology implications
- Family history of childhood cataract, retinoblastoma, retinal dysplasia, or glaucoma
- Inability to fix and follow by age three months
- Abnormal ocular alignment
- Papillary asymmetry of 1-1 mm in diameter
- Corneal asymmetry
- Uveal plaque or other lesion obstructing the visual axis (eg, eyelid hemangioma), which may cause amblyopia
- Asymmetry of visual (eye preference) or visual acuity difference of two lines or more between eyes
- Visual acuity worse than 20/30 in a three-year-old, worse than 20/40 in a four-year-old, or worse than 20/50 in a child ≥ 5 years
- Abnormal instrument-based vision screening
- Nystagmus
- Neurodevelopmental delays

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