What Classifies an Emergency?

- Any condition in which the patient has the potential for:
  - vision loss,
  - currently experiencing vision loss,
  - permanent structural damage,
  - pain or discomfort,
  - or is an “emergency” for the patient.
- It is important to be able to triage a walk-in patient and, more importantly, a call-in patient.

Common Types of Ocular Emergencies

- Vision Loss:
  - Gradual vs. sudden onset
  - Vision loss with or without pain
- Trauma
- Red eyes

What questions to ask?

<table>
<thead>
<tr>
<th>Onset</th>
<th>suddenly noticed or sudden onset?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Loss</td>
<td>any loss of vision?</td>
</tr>
<tr>
<td></td>
<td>loss vs. blurry vision</td>
</tr>
<tr>
<td></td>
<td>one eye or both</td>
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<tr>
<td></td>
<td>part of visual field or all</td>
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<tr>
<td></td>
<td>transient vs. permanent</td>
</tr>
<tr>
<td>Pain</td>
<td>is there pain? constant? scale (1-10)</td>
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<tr>
<td>Redness</td>
<td>is there any redness? location?</td>
</tr>
<tr>
<td>Associated</td>
<td>contact lens wear? trauma?</td>
</tr>
<tr>
<td>Factors</td>
<td>discharge?</td>
</tr>
<tr>
<td></td>
<td>photophobia? medical history (eg. DM)</td>
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</tbody>
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Visual Loss

- Visual loss varies greatly in meaning from patient to patient
  - ranging from blur to complete blindness and may affect one or both eyes
- Components include:
  - acuity,
  - visual field,
  - color and brightness may be affected jointly or separately
- Detailed history and extent of vision loss crucial
Profound Loss of Vision

- Referring to a complete or greatly diminished vision affecting the whole field
- Common causes of severe vision loss:

<table>
<thead>
<tr>
<th>Vascular</th>
<th>central retinal vein occlusion, central retinal artery occlusion, vitreous heme</th>
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</thead>
<tbody>
<tr>
<td>Inflammatory</td>
<td>optic neuritis</td>
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<tr>
<td>Infiltrative</td>
<td>optic neuropathy</td>
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<tr>
<td>Mechanical</td>
<td>retinal detachment</td>
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</tbody>
</table>

Monocular vs. Binocular

- Ocular or optic nerve pathology causes monocular vision loss
- Lesion at or posterior to chiasm causes binocular vision loss
  - VF defects become more congruous the further back in the visual pathway
  - Homonymous VF defects noted posterior to chiasm
- Difference between mono vs. bino usually straightforward, keeping the following in mind:
  - Patients occasionally mistake homonymous hemianopsia (similar loss of visual field in both eyes) for a monocular loss

Visual Defects

Monocular

- Differentiate between eyes that have lost all useful vision and those that have blurred vision
- Blurring of vision is not localized and may be caused by pathology anywhere from cornea to optic nerve
- Need to get anatomical diagnosis first before considering the cause

General Appearance

- Level of consciousness
  - When introducing yourself be aware of the patient’s gross level of consciousness?
  - Is the patient awake, alert and responsive?
- Personal Hygiene and Dress
  - Is it appropriate for the environment, temperature, age and social status of the patient?
  - Is the patient malodorous or disheveled?

General Appearance

- Posture and Motor control
  - What posture does patient assume while sitting in the exam chair
  - Are there any signs of involuntary motor activity such as tremors
  - E.g. damage to the cerebellum may produce a tremor that usually worsens with movement of the affected limb
Case Example

• 48 yr old white female presented for diabetic eye exam on referral from her PCP
  – She was scheduled 2 weeks previously but had fallen and was unable to make that appointment
  – She reports that her vision in her right eye seems to be getting worse over the past several weeks.
  – Was diagnosed with diabetes 1.5 years ago
    • BS control has been erratic with range between 6.67-13.3 (120-240)
    • Last A1C: 9.1

Blood Sugar

• Throughout a 24 hour period blood sugar typically maintained between 3.9-7.8 mmol/L (70-140 mg/dL)
  – Diabetes is diagnosed with a fasting BS of ≥ 7.0 mmol/L (126 mg/dL)
  – or an A1c value of ≥ 6.5
• Hypoglycemia is typically defined as plasma glucose 3.9 mmol/L (70 mg/dL) or less
  – patients typically become symptomatic of hypoglycemia at 2.8 mmol/L (50 mg/dL) or less

Entrance Skills/Health Assessment

VA: OD: finger count
OS: 6/12 (20/40)
CVF: OD: unable to assess
OS: temporal hemianopsia
Pupils: sluggish reactivity with a 2+ RAPD OD
SLE: corneal arcus noted, no other significant findings
IOP: 16, 16 mmHg OD, OS
DFE: see photos

Physical Presentation

• Upon entering the room I noted that her right hand was twitching
  – I asked her how long that had been going on and she said about 2-3 weeks
  – I asked her if she experienced headaches, to which she said she had bad headaches that even woke her up at night

Referral

• Contacted her PCP who reported that she had examined the patient 3 weeks prior and had not noted any of these findings
• Referred the patient for an immediate MRI
  – wasn’t able to be scheduled until the next day

Imaging/Surgery Referral

• MRI revealed large mass in her brain
  – Patient was diagnosed with a Craniopharyngioma
  – She was referred for immediate surgery
    – Neurosurgeon reported that she removed a tangerine sized Craniopharyngioma
    – was the largest tumor she has ever removed

Note: not patient photos

Note: not patient MRI
http://neurosurgery.uta.edu/images/PituitaryCraniopharyngioma/Cranio_Sag_Preop_fullylabeled.jpg
Craniopharyngioma

- Craniopharyngioma:
  - slow-growing,
  - epithelial-squamous origin,
  - calcified cystic tumor
  - arises from remnants of the craniopharyngeal duct
- Craniopharyngiomas have a benign histology but malignant behavior
  - they have a tendency to invade surrounding structures and recur after what was thought to be total resection

Our Patient

- Patient had a complete resection of the tumor in addition to radiation therapy
- She developed several significant perioperative complications:
  - Leakage of CSF which resulted in her having to have a shunt
    - She subsequently developed an infection post surgically
  - She is NLP in her right eye, but did regain 6/12 (20/40) vision in her left eye
    - Retains a temporal hemianopsia OS
  - Diabetes control became erratic and was put on several hormone replacement medications

Neurological Screening: Cerebrum

- Frontal lobe
  - Emotions, drive, affect, self-awareness, and responses related to emotional states
  - Motor cortex associated with voluntary skeletal movement and speech formation (Broca)

Right vs Left Brain Injury

- So what happens if one side of the brain is injured?
  - People who have an injury to the right side of the brain "don't put things together" and fail to process important information.
    - As a result, they often develop a "denial syndrome" and say "there's nothing wrong with me."
  - People with left hemisphere injuries tend to be more depressed, have more organizational problems, and have problems using language.
Gradual Onset Vision Loss: Cataracts

- Most common non-refractive cause of visual impairment
- S&S include:
  - misting/blurring of vision
  - colors seem faded
  - poor night vision
  - glare,
  - change in refractive error (typically myopic shifts)
- Most common are age related (though congenital, metabolic and traumatic possible)
- By age 80, more than half of all patients either have a cataract or have had cataract surgery.

Gradual Onset Vision Loss: Cataracts

- The decreased acuity must correlate with the severity of the cataract...
  - i.e. if cataract doesn’t correlate with the amount of vision loss (or afferent pupillary defect present) then you need to find another reason for the vision (or other test results)

Preseptal Cellulitis

- infection and inflammation anterior to the orbital septum and limited to the superficial periorbital tissues and eyelids.
- Signs and Symptoms include:
  - eyelid swelling,
  - redness,
  - ptosis,
  - pain and
  - low grade fever.

Preseptal Cellulitis Treatment

Treatment:
- Mild:
  - Keflex or Cefclor 250-500mg QID for 5-7 days
  - Augmentin 500 mg TID
    - or 875 mg BID for 5-7 days
- Moderate to severe:
  - IM Rocephin (ceftriaxone) 1-2 grams/day or
  - IV Fortaz (ceftazidime) 1-2 g q8h.

Case

- 20-year-old male presents with a red painful eye
  - complains about red/painful right eye
  - Started that morning when he woke up
  - reports a watery discharge, no itching, and is not a contact lens wearer
- SLE:
  - See attached image with NaFl stain

Herpes Simplex Keratitis: Clinical Features

- Characterized by primary outbreak and subsequent reactivation
- Primary outbreak is typically mild or subclinical
- After primary infection, the virus becomes latent in the trigeminal ganglion or cornea
- Stress, UV radiation, and hormonal changes can reactivate the virus
- Lesions are common in the immunocompromised (i.e. recent organ transplant or HIV patients)
Herpes Simplex Keratitis

- **Tx:**
  - Topical aciclovir ointment 5 times/day for 3 days after fluorescein staining has resolved
  - Vidarabine ointment 5 times/day for 3 days after fluorescein staining has resolved
- **Oral acyclovir (2 g/day) has been reported to be as effective as topical antivirals without the toxicity**
  - Valtrex (valacyclovir) 500 mg TID for 7-10 days
  - Famvir (famciclovir) 250 mg TID for 7-10 days

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**Herpes Simplex Keratitis**

- Consider prophylaxis of 400 mg acyclovir BID for 1 year to decrease recurrence
  - Valtrex 500 mg qd
- If stromal keratitis present, after epi defect has healed, add Pred Forte QID until inflammation reduced and then slowly taper.

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**Case**

- 65 year old Caucasian patient presents with sudden onset loss/blurring of vision in the right eye
- **PMH:** HTN for 15 years, takes “water pill”
- **VA’s:** 6/18 (20/60) OD, 6/7.5 (20/25) OS
- **Pupils:** PERRL – APD
- **CVF:** Inferior defect right eye, no defects noted in the left eye
**Vision Loss Without Pain:**

**Diabetes/Diabetic Retinopathy**
- Microvascular complications resulting in capillary closure & abnormal permeability
- S&S include:
  - blurring of vision (maculopathy and refractive error shifts),
  - sudden drop in vision (vitreous heme),
  - dot and blot hemes,
  - exudate,
  - cotton wool spots,
  - neovascularization (iris, retina and disc)

**Aug. 10, 2012: FDA approves Lucentis to treat diabetic macular edema**
- The drug's safety and effectiveness to treat DME were established in two clinical studies involving 759 patients who were treated and followed for three years.
  - patients were randomly assigned to receive monthly injections of Lucentis at 0.3 milligrams (mg) or 0.5 mg, or no injections during the first 24 months of the studies
  - after 24 months, all patients received monthly Lucentis either at 0.3 mg or 0.5 mg
- Results:
  - 34-45% of those treated with monthly Lucentis 0.3 mg gained at least three lines of vision compared with 12-18% of those who did not receive an injection.

**VEGF and DME**

**Vision Loss Without Pain:**

**Vein Occlusion**
- Associated with:
  - hypertension,
  - coronary artery disease,
  - DM and
  - peripheral vascular disease.
- Usually seen in elderly patients (60-70), slight male and hyperopic predilection.
- Second most common vascular disease after diabetic retinopathy.

**Branch Retinal Vein Occlusion: Signs/Symptoms**
- BRVO: sudden, painless, visual field defect.
  - patients may have normal vision.
  - quadrantic VF defect,
  - dilated tortuous retinal veins with superficial hemes and CWS
  - typically occurs at A/V crossing (sup/temp)

**BRVO**
- BRVO more common than CRVO and has more favorable prognosis
  - Overall 50-60% of BRVO patients will maintain VA of 6/12 (20/40) or better
- Visual loss results from:
  - Macular edema
  - Foveal hemorrhage
  - Vitreous heme
  - Epiretinal membrane
  - RD
  - Macular ischemia
  - Neovascularization complications
Question

What would you recommend to a patient with a non-ischemic BRVO who has decreased vision secondary to macular edema?

1. Monitor as it will resolve on its own
2. Monitor for 5-6 months then macular grid laser if not resolved
3. Macular grid laser immediately
4. Monitor for 5-6 months then initiate anti-VEGF if not resolved
5. Initiate anti-VEGF treatment immediately

Central Retinal Vein Occlusion

• Visual morbidity and blindness are primarily from:
  – persistent macular edema,
  – macular ischemia and
  – neovascular glaucoma

Central Retinal Vein Occlusion

• CRVO’s can be ischemic or non.
  – Classical definition of ischemic is 10-disc area of non-perfusion found on angiography
  – RAPD and ERG maybe better predictor
  – VA’s typically worse in ischemic
  – Increased number of cotton wool spots with decreased VA maybe predictive
Central Retinal Vein Occlusion

- Ischemic CRVO may lead to iris neovascularization and neovascular glaucoma
  - Estimated approx 20% of CRVO’s are ischemic with 45% of those developing neo
  - Traditional treatment for iris neo has been PRP
- Regular examinations (1-2 wks) to monitor for ischemia or neo development
  - should include gonio as angle neo can precede iris rubeosis

Vision Loss Without Pain: Artery Occlusion

- Primarily embolic in nature from cholesterol, calcifications, plaques.
- Usually occurs in elderly associated with:
  - Hypertension (67%), carotid occlusive disease (25%), DM (33%) and cardiac valvular disease.
- Sudden loss of unilateral, painless vision
  - defect dependent upon location of occlusion

Vision Loss Without Pain: Artery Occlusion

- BRAO typically located in temporal retinal bifurcations.

CRAO

- CRAO has profound vision loss with history of amaurosis fugax.
  - Vision is usually CF (count fingers) to LP (light perception) with positive APD.
  - Diffuse retinal whitening with arteriole constriction, cherry red macula.

Study Design CRUISE (n=392)

CRVO

Central Retinal vein occlusion Study: Efficacy & safety

Mean Change from Baseline BCVA

CRVO

Vision Loss Without Pain: Artery Occlusion

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  - Vision is usually CF (count fingers) to LP (light perception) with positive APD.
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Ophthalmic Emergency

• Treatment is controversial due to poor prognosis and questionable benefit.
• Treat immediately before workup, if patient presents within 24 hours of visual loss:
  – Digital ocular massage,
  – Systemic acetazolamide (500 mg IV or po),
  – Topical ocular hypertensive drops (lopidine, β-blocker),
  – Anterior chamber paracentesis,
  – Consider admission to hospital for carbogen Tx (high carbon dioxide)