Foresight: 5 Ocular Emergencies Not to Miss

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Disclosures

Tara McSwigan has no professional affiliations nor financial interests to disclose pertaining to this topic.

Question #1

A patient presents with a red vesicular rash along his left brow. What additional finding would make one most suspicious of ocular herpetic involvement?

A) Left sided facial drooping
B) A series of lesions along the zygomatic arch
C) Vesicular lesion on the tip of the nose
D) Redness/edema of the left upper eye lid

Question #2

What is the most common/appropriate first line imaging to confirm your suspicion of orbital cellulitis?

A) Plain films of facial structures/Water's view
B) Orbital ultrasound
C) Enhanced CT of facial structures
D) MRI of facial structures

Question #3

A 48 year old female presents with abrupt onset of intense right eye pain. Her vision is impaired, conjunctiva is injected, and anterior chamber is cloudy. Which of the following would NOT be anticipated with her exam/work-up?

A) CT scan finding of periorbital edema
B) An IOP of >70mmHg
C) A dilated and semi-fixed pupil
D) Associated nausea and/or vomiting

Objectives:

- Describe systematic approach to the eye, so as to formulate a narrow and applicable differential diagnosis
- Discuss 5 major ocular emergencies, from classic presentations through interventions and outcomes

Expert eye witness

- Few areas of medicine impact the patient's quality of life as does his ability to see

- Often intimidated by ophthalmology; systematic approach and awareness of pitfalls find this discussion easy to navigate

Expert eye witness

- Think your way through the exam: patient will talk you to a narrow differential diagnosis
- Ability to communicate and work with Ophthalmologist crucial to improving outcomes

Pertinent history

- Painful condition? With or without change in vision…
  Anterior eye for differential diagnosis
- Painless loss of vision?
  Posterior eye, ALWAYS emergent
- Aggravating/alleviating factors
- Use of contacts?
- Previous ocular issues

Ocular complaints

- Painful eye:
  - Corneal abrasion/ulceration
  - Foreign bodies
  - Infections
  - Trauma
  - Acute glaucoma
- Painless loss of vision:
  - Retinal detachment
  - Vascular occlusion
  - Amaurosis fugax/TIA

Systematic exam: anterior to posterior

Anterior:

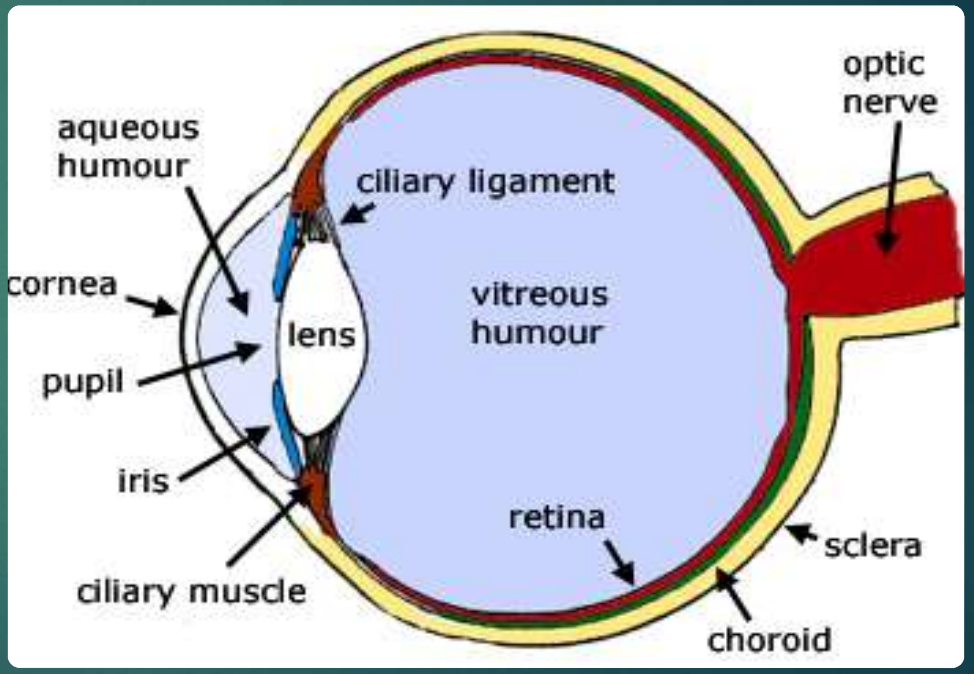
*Lids, lashes, soft tissue and orbital structures

Mid-eye:

*Cornea, anterior chamber, iris, ciliary muscles, lens, conjunctiva

Posterior:

*Globe/vitreous humor, post orbital tissue, retina, neurovascular distribution, cup/disk, macula



http://www.a-levelphysicstutor.com/images/optics/eye-diagram.jpg

Pertinent physical: remember the basics

- How about those pupils?
- Extraocular movements?
- ALWAYS check visual acuity!
- May need to obtain intraocular pressure (IOP)

Now emergencies!!

5 Most common non-traumatic emergencies

- Complete a thorough assessment
- Identify the "purple shiners:" specific finding unique to emergent diagnosis
- Communication with the experts

Corneal ulceration

- ***Etiology:***

  Pseudomonas causes injury to corneal epithelial cells, typically in contact lens users

- ***What's the emergency?***

  Scarring from ulcers may lead to permanent visual impairment

https://www.eyecenters.com/wp-content/uploads/2016/10/cornea_ulcer_2.jpg

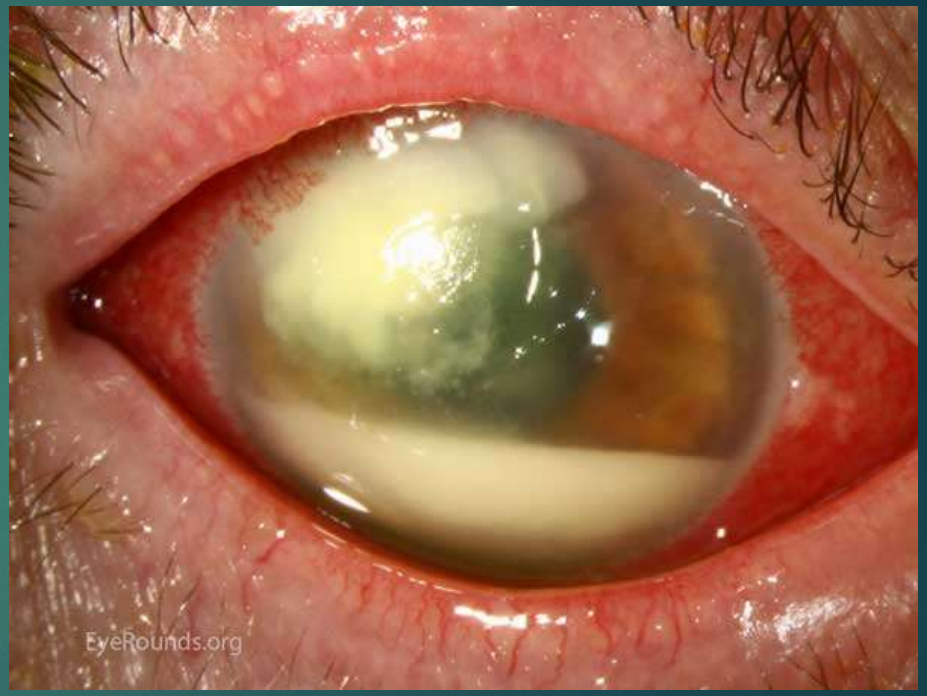
Chief complaint/history

- Pain, photophobic
- Foreign body sensation
- Increased tearing
- Contact lens user

1. http://bestpractice.bmj.com/best-practice/images/bp/en-gb/561-4_default.jpg

Physical exam

- May need to use topical anesthesia for thorough exam/blepharospasm
- Vision affected if in central visual axis
- Generalized conjunctival injection



http://webeye.ophth.uiowa.edu/eyeforum/atlas/pages/Fungal-keratitis/1b-fungal.jpg

Purple shiner:

- Well demarcated opaque corneal lesion, seen with white light (readily seen with stain and wood's lamp)
- Make note of location of ulcer: if over pupil, will affect vision and has bigger implications with scarring

Plan of care

- Treat with quinolone eye drops, prefer 4th generation if available: Moxifloxacin (Vigamox), Gatifloxacin (Zymar)

- Various regimens to be considered
  - 1 drop QID
  - 1 drop every 30 minutes while awake
  - Drops during day, quinolone ointment for overnight

Consult ophthalmology!!

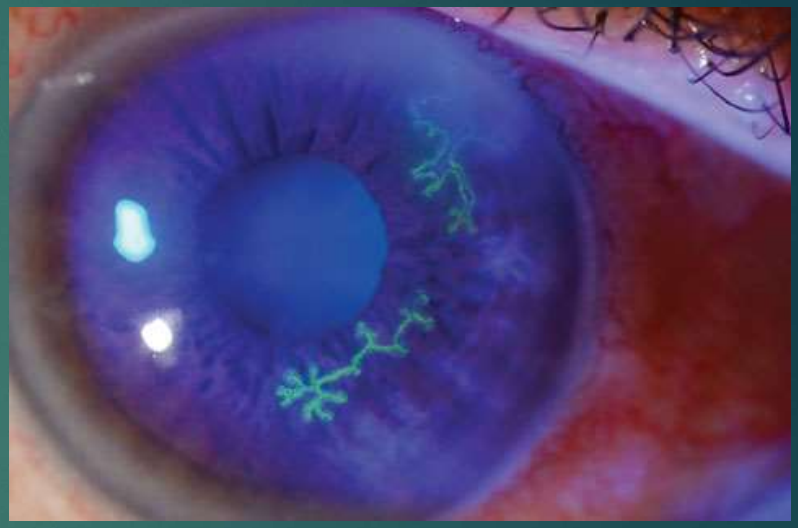
Herpes Simplex/Zoster keratitis

- ***Etiology:***

  Infection of cornea/anterior chamber secondary to inoculation by herpes simplex virus or exacerbation of shingles

- ***What's the emergency?***

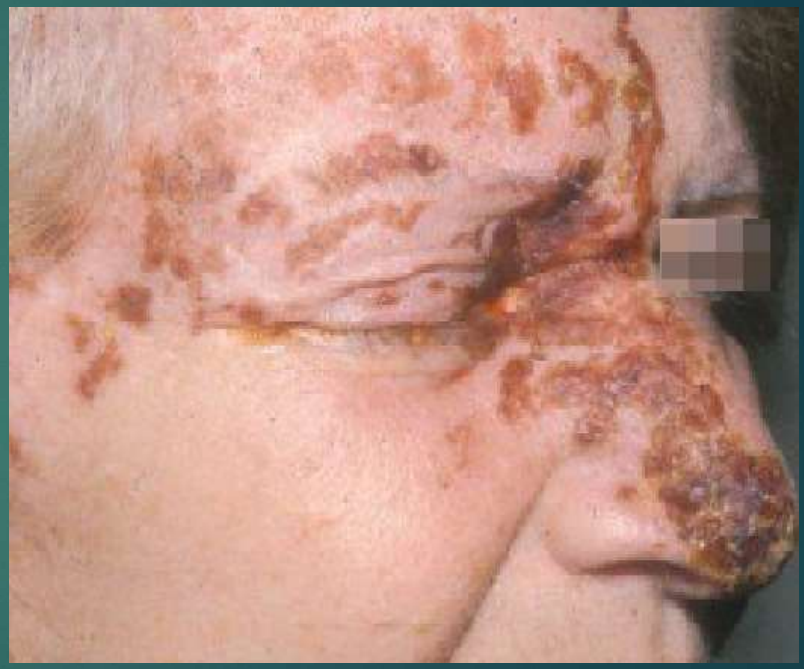
  Similar to ulceration, the associated herpetic lesions may scar and lead to permanent impairment of vision



http://www.artisanoptics.com/Documents%20and%20Settings/27/Site%20Documents/Condition%20Images/Herpes%20Simplex%20Keratitis.jpg

Chief complaint/history

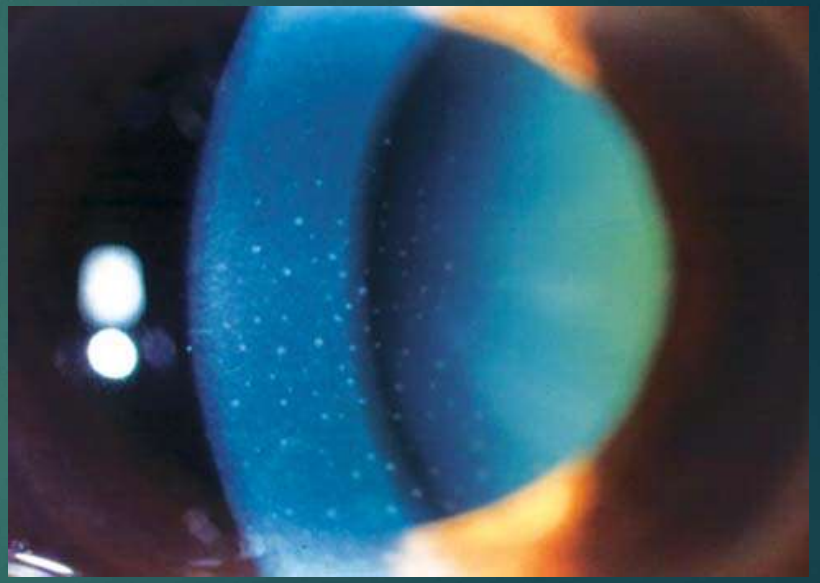
- Eye pain/photophobia
- Increased tearing
- Foreign body sensation
- Burning facial pain/itching
- Dermatomal rash



http://img.medscape.com/pi/emed/ckb/emergency_medicine/756148-780913-783223-1789905.jpg

Physical exam

- Conjunctival injection
- Decreased visual acuity depending on lesion location
- Dermatomal rash: think trigeminal nerve distribution (cranial nerve V)
- Flare and cell of anterior chamber



http://www.jaypeejournals.com/eJournals/_eJournals%5C276%5C2011%5CJanuary-April%5Cimages/2_img_1.jpg

Purple shiners:

- Herpes Simplex: Dendritic lesions on corneal surface, sometimes punctate keratitis, all seen with fluorescein staining

- Herpes Zoster: Hutchinson sign, shingle lesion on tip of nose

Work-up/plan of care

- Viral culture gold standard/time consuming
- Can consider polymerase-chain reaction assay (PCR) to confirm diagnosis if uncertain
- Oral antiviral regimen: Valacyclovir(Valtrex)1000mg TID x 7 days, Famciclovir (Famvir) 500mg TID x 7 days
- Ophthalmic antivirals: Trifluridine (Viroptic) or Vidarabine (Vira-A)
- May consider oral steroids

Consult Ophthalmology!!

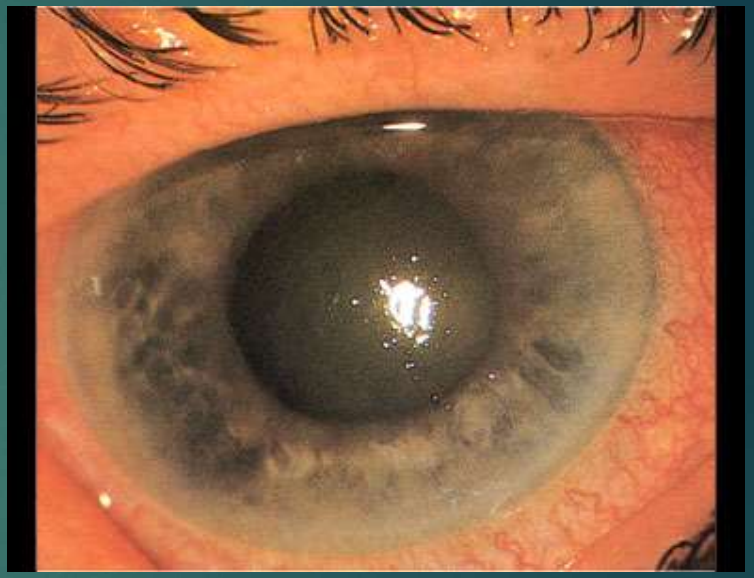
Acute angle-closure glaucoma

- ***Etiology:***

  Increased intraocular pressure of anterior chamber because of obstruction of aqueous outflow

- ***What's the emergency?***

  Increased anterior pressure translates into increased vitreous pressure in globe, can lead to blindness in 3-4 days

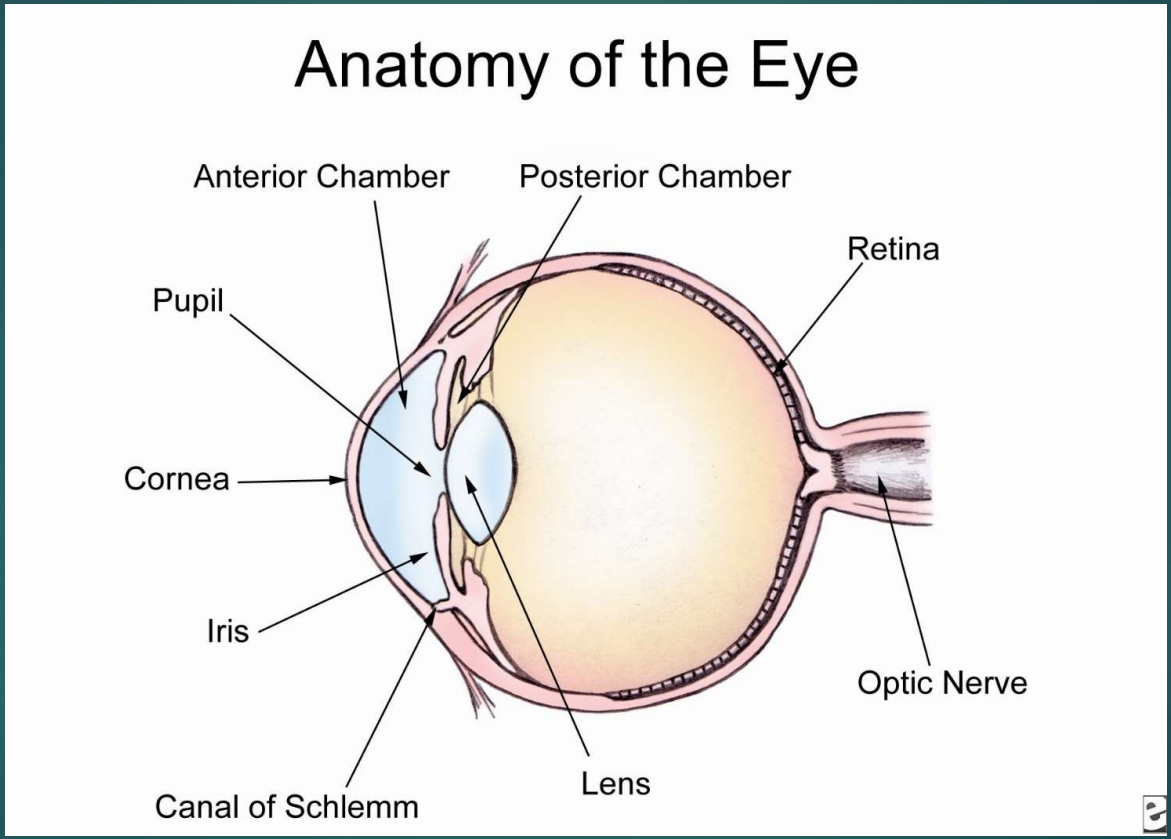


http://rmscharf.ipower.com/Acute%20Glaucoma%20M.jpg

Anatomy/physiology

- Aqueous produced by ciliary bodies, occupies anterior chamber
- Continuous drainage through trabecular meshwork, out through canal of Schlemm
- Occlusion of canal blocks drainage, while more aqueous is continually produced
- Usually from iris displacement or lens dislodgement

Aqueous humor flow



https://images.emedicinehealth.com/images/4453/4453-12596-14545-16395.jpg

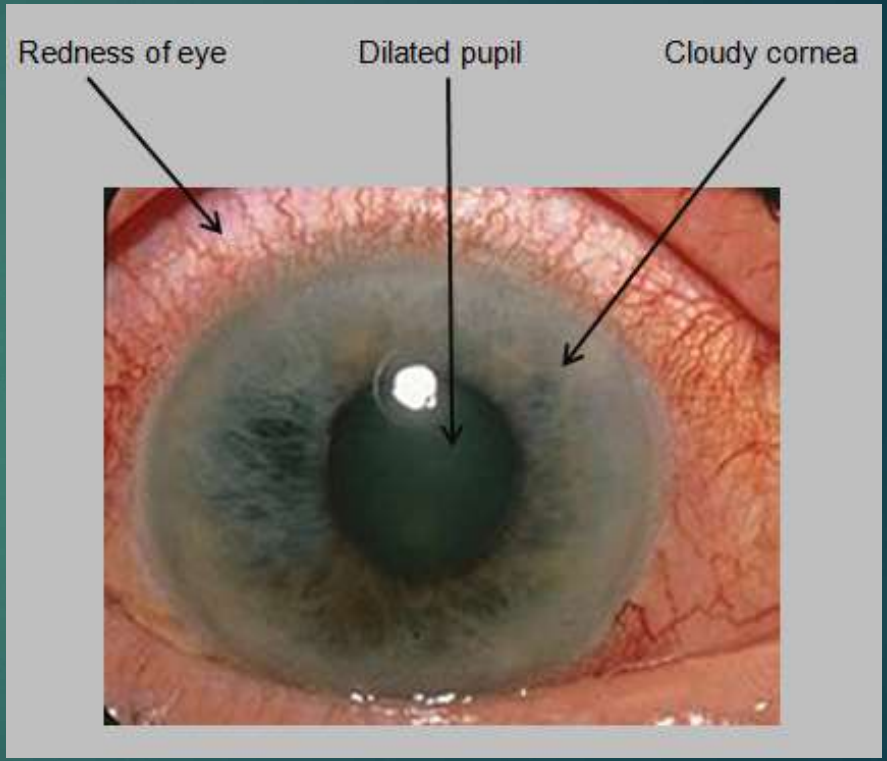
Chief Complaint/history

- Sudden onset of severe eye pain and associated cephalgia
- Increased tearing
- Impaired, cloudy vision
- Nausea/vomiting
- Atraumatic

http://www.focaleyecentre.com/components/fckeditor/upload/image/images/conditions/ANGLE-CLOSURE-GLAUCOMA.png

Physical exam

- Diffuse conjunctival injection
- Mildly dilated pupil, less reactive
- Hazy appearance of anterior chamber
- Impaired visual acuity



http://www.educatehealth.ca/media/306373/example%20of%20acute%20angle%20closure%20glaucoma.png

Purple shiner:

- Marked increased IOP, >70mm mercury
- Determined ideally with tonometry, gross palpation not inappropriate

Plan of care:

- Administration of medications:
  - Diamox (Acetazolamide) stat dose of 500mg IV, followed by 500mg PO
  - Topical beta-blocker (timoptic 0.5% 1 drop)
  - Pilocarpine 2% q15 minutes x 2 dose
- **Immediate consult with ophthalmology**

- Emergent laser peripheral iridectomy 24-48 hours after IOP is controlled

Orbital cellulitis

- ***Etiology:***

  Infection of soft tissues of preseptal and post orbital structures, typically preceded by bacterial sinusitis

- ***What's the emergency***

  Extensive infection surrounding ocular structures impair eye function and lead to secondary life threatening complications

https://www.aao.org/detail/image.axd?id=2e1ed2d7-b92b-4b31-a188-ae27aa48b2c0&t=635509794751700000

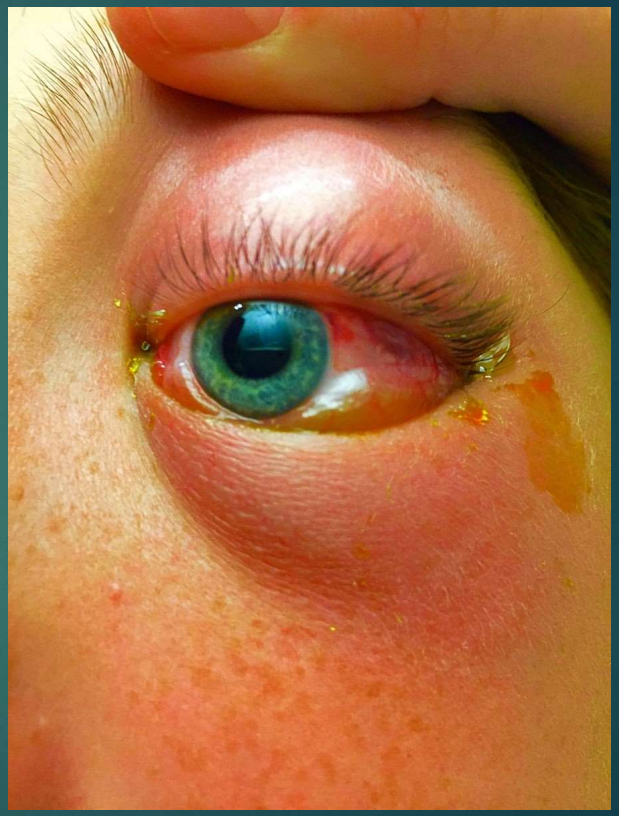
Chief complaint/history

- Facial pain surrounding eye/orbital structures
- Associated swelling, redness
- Cephalgia
- Recent upper respiratory infection

http://3.bp.blogspot.com/-O2g3htabB8k/TrrA63V4sTI/AAAAAAAAAeY/j0tmrRxC1sE/s1600/IMG_2079.JPG

Physical exam

- Periorbital edema/erythema; eye may be swollen shut
- Conjunctival injection/chemosis
- Visual impairment
- Proptosis
- Fever



http://blog.sermo.com/wp-content/uploads/2016/08/4030c3a3db9c508aa32094f143d4a09e4edf9ee9.jpg

Purple shiner:

- "Cement globe," impaired extraocular movements secondary to edema of orbital soft tissues, including those surrounding rectus muscles

Work-up/plan of care

- Confirmation with enhanced CT of orbital structures
- CBC, ESR, CMP, blood cultures
- Intravenous antibiotics: Vancomycin (Vancocin)1gm daily, Ceftriaxone (Rocephin)2 gm q 12 hours, or Cefepime (Maxipime) 2 gm q 12 hours
- NPO
- Effort to clear infection and lessen probability of secondary complications

Consult ophthalmology and neurosurgery!

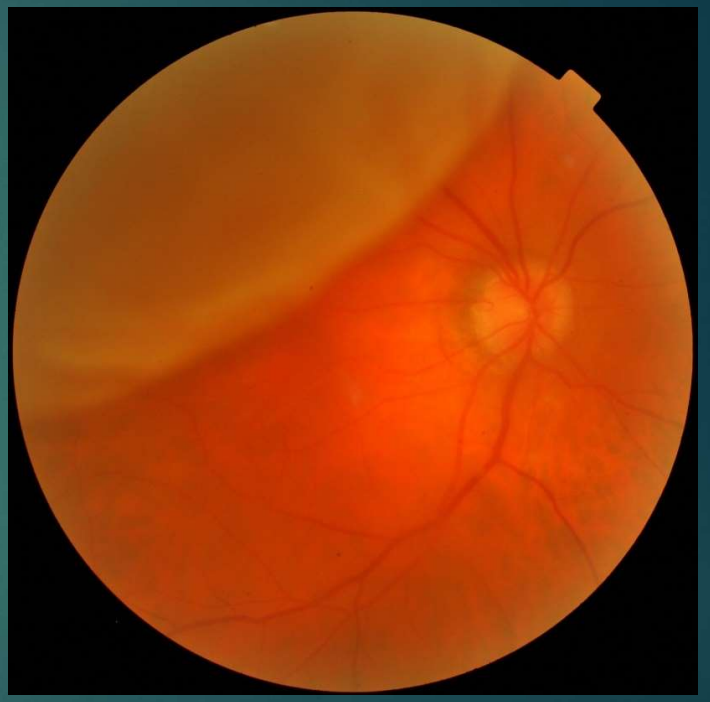
Retinal detachment

- ***Etiology:***

  Separation of retina from posterior eye, dismantling essential structures that send visual images to the brain.

- ***What's the emergency?***

  Lack of prompt intervention/repair will result in permanent blindness



http://1.bp.blogspot.com/_LMdPu119VcY/TUvdCSKz8UI/AAAAAAAAACI/1a-rm3XG6ac/s1600/retinal+detach.jpg

Anatomy

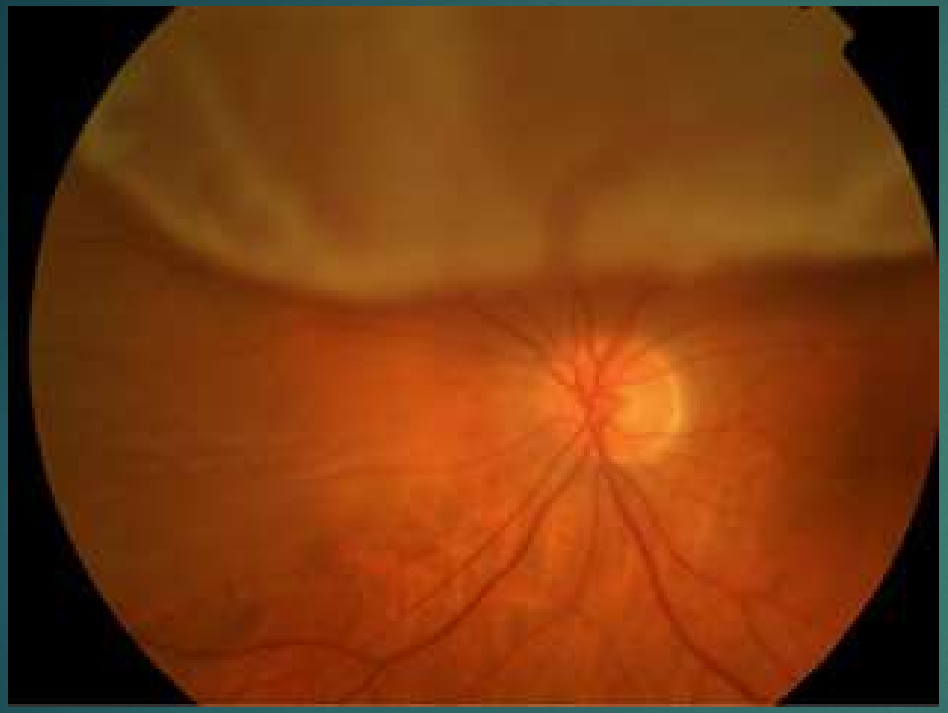
- Posterior eye completely lined with retina
- Contains/suspends vasculature, nerve distribution
- Separation of retina from globe wall secondary to anterior "tugging" of vitreous, can result in collapse of retina

Chief complaint/history

- Often atraumatic, but may have had injury within months preceding complaints
- Gushes of floaters or flashing lights
- "Dark curtain" obstructing portion of visual field/most common superior
- No ocular pain or cephalgia

Physical exam

- With or without changes to visual acuity
- Fundoscopic exam enhanced with pupillary dilatation (ie Cyclopetolate/Cyclogel)
- May or may not appreciate findings on funduscopic exam, “billowing folds” of retina
- Some clinicians practiced to visualize detachment with ultrasound of eye



http://iahealth.net/wp-content/uploads/2013/02/Retinal-Detachment.jpg

"Billowing folds" from superior posterior eye can cause the dropped curtain visual change

Purple shiner:

- All in the history!!
- Always flagged by painless changes in visual acuity!

Plan of care

- If symptoms suggest potential for detachment: limit lifting, supine rest until follow up with eye doctor tomorrow
- If detachment has ensued or if unsure….
  - ***Emergent ophthalmology assessment/intervention!***
- Repair with vitrectomy, gas-fluid exchange, and endolaser therapy

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A patient presents with a red vesicular rash along his left brow. What additional finding would make one most suspicious of ocular herpetic involvement?

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B) A series of lesions along the zygomatic arch

C) Vesicular lesion on the tip of the nose

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Rationale

A lesion on the tip of the nose, referred to as Hutchinson sign, leaves one most suspect of ophthalmologic herpetic infection. This is because the eye (cornea, globe) and the nasal tip are both supplied by the nasociliary branch of cranial nerve V. Classic facial zoster is inflammation of one of the three branches of cranial nerve V. It is common for lesions along the forehead to cause associated erythema and swelling around the eye, as well as to involve the second branch/the zygoma. Facial nerve palsies are not typical with shingles, as cranial nerve VII is a motor nerve.

Question #2

What is the most common/appropriate first line imaging used to confirm your suspicion of orbital cellulitis?

A) Plain films of facial structures/Water's view
B) Orbital ultrasound
C) Enhanced CT of facial structures
D) MRI of facial structures

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Rationale

The most common means to evaluate/confirm the diagnosis of orbital cellulitis is with enhanced CT imaging of facial structures. Plain film x-rays may reveal opacities/fluid levels of sinus cavities but will not demonstrate edema/infiltration of the periorbital soft tissue structures. Ultrasound is not inappropriate, but has limitations due to associated boney structures. MRI serves the same purpose as enhanced CT, but is typically less accessible, hence not often considered.

Question #3

A 48 year old female presents with abrupt onset of intense right eye pain. Her vision is impaired, conjunctiva is injected, and anterior chamber is cloudy. Which of the following would NOT be anticipated with her exam/work-up?

A) CT scan finding of periorbital edema
B) An IOP of >70mmHg
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B) An IOP of >70mmHg

C) A dilated and semi-fixed pupil

D) Associated nausea and/or vomiting

Rationale

This patient presents with a classic episode of acute glaucoma. The diagnosis should be suspect based upon her history. It is not unusual for IOP's to surpass 70mmHg with the build up of aqueous in the anterior chamber. This impairs the reactivity of the ciliary muscles, hence a mildly dilated pupil is common. The pain is intense enough to cause associated emesis. There are no changes on a facial CT, as all of the pressure changes are confined to the anterior chamber and eventually to the globe itself.

Lessons for practice

- Have intentional and systematic approach to the eye, obtaining a thorough history and executing an appropriate exam.
- Remain vigilant for "purple shiners" and other threatening presentations – a prompt diagnosis preserves vision.
- Refine your understanding of and ability to discuss ophthalmology – our most pertinent role may be in filtering to the specialist.

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Thank you!!

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