



Foundations Frameworks

Approach to Vision Loss

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Acute, unilateral vision loss has a limited range of causes, but nearly all of these require emergent diagnosis, as some are reversible if caught and treated early. These are also usually exclusive of the causes of bilateral and chronic or progressive vision loss, the causes for which have much wider differentials but rarely require emergent management from the standpoint of the Emergency Department.

Step 1. Check visual acuities. These are the vital signs of the eye, and they can be easily trended.

Step 2. Narrow down the things you need to worry about. This can be broken down into painful and painless causes of vision loss.

Painful:

- **Glaucoma:** Acute angle-closure glaucoma will be painful, chronic glaucoma may not be. Check IOP (> 20 mmHg is diagnostic), consult ophtho, and give miotics (e.g., timolol) and agents to lower IOP (e.g., acetazolamide).
- **Giant Cell Arteritis:** These patients will usually be female and > 50. Check an ESR (normal values rule out GCA; GCA is also one of the few things that will elevate ESR above 100). Exam findings include temporal tenderness. Admit for a biopsy and start steroids right away if you think this is what's going on.
- **Iritis:** This can be post-traumatic (look for a hyphema), or it can occur in the setting of autoimmune or inflammatory bowel disease. Check a slit lamp exam (cell/flare, hyphema), give pain control, and consult ophtho regarding steroids and followup.
- **Optic Neuritis:** Usually occurs in MS patients. Check pupillary reflexes (an afferent defect will be present) and optic US (increased optic nerve sheath diameter). Treat with IV steroids and admit, usually to neurology given the preponderance of this in MS.
- **Trauma:** This can cause a variety of problems, chief among which is globe rupture, hyphema, or retro-orbital hematomas. DO NOT CHECK AN IOP WITH DIRECT OCULAR TRAUMA, as doing so can worsen the problem. Look for a Seidel sign on slit lamp exam, and you will usually need to get a CT face/orbits. If you have ruled out globe rupture but a retro-orbital hematoma is present, you can check IOP to determine whether a lateral canthotomy is necessary.

Painless:

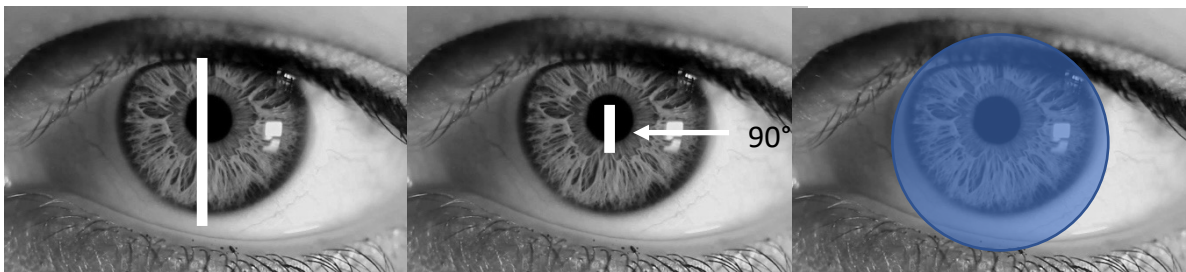
- **CRAO:** This is a stroke of the eye, and the patient will often have usual stroke risk factors. Fundoscopy will show a pale retina. Treatment is unfortunately limited, but you can consider ocular massage (may move the clot more distally and lessen the degree of damage), acetazolamide, or consult IR for intra-arterial tPA (institutionally dependent).
- **CRVO:** This is a DVT of the eye. Fundoscopy will show dilated and tortuous veins, diffuse hemorrhages, and cotton wool spots ("blood and thunder" fundus). Treat by lowering IOP and starting anticoagulation.

- **Occipital Stroke:** The vision loss here will be unilateral for the patient, but binocular. Usual stroke care should be followed- emergent CT/CTA, EKG, glucose, and neuro consultation. Consider t-PA if the patient meets criteria.
- **Vitreous Hemorrhage:** This mostly occurs with underlying pathology, such as malignancy or bleeding dyscrasia. IOP may be elevated and pupillary reflexes may show an afferent defect. Ocular US may show a “washing machine” sign. Treat the underlying problem (e.g. reverse a suprathreshold INR).
- **Retinal Detachment:** Classically presents with “flashers and floaters” or vision loss “like a curtain falling down.” Check visual fields, consider ocular US. Ophtho should be consulted for emergent surgical correction. Remember that this can occur in the setting of trauma as well.

Step 3. Consult ophthalmology or arrange for urgent follow-up

Also note that patients don't have to have only one disease (e.g., trauma can cause both retinal detachment, which is typically painless, and traumatic iritis, which is painful)

The Slit Lamp Exam:



1. Start with white light, narrow/long beam and directly in front of the eye

Scan over whole eye, look for corneal FB or infiltrates and opacification, as well as ciliary flush, pupil shape and reactivity

2. Shorten beam and move to 90° lateral to eye, highlighting the anterior chamber

Look for cell and flare, hypopyon, hyphema

3. Apply fluorescein dye, switch to cobalt blue (dark blue) light, and broaden/lengthen beam

Look for focal uptake (abrasion, punctate keratitis, “ice skate” tracks, dendrites, ulcer, etc.), Seidel sign

References:

- Eye image: <https://i.ytimg.com/vi/-01-XBHxFq8/maxresdefault.jpg>
- Knoop KJ and Dennis WR. Chapter 62: Ophthalmologic Procedures. *Roberts and Hedges' Clinical Procedures in Emergency Medicine*, 6e. Saunders 2014. 1259-1297.
- Guluma K and Lee JE. Chapter 61: Ophthalmology. *Rosen's Emergency Medicine: Concepts and Clinical Practice*, 9e. Elsevier 2018. 790-819.