Ophthalmology On-Call Survival Guide

Updated June 2020, David Ramirez

Introduction

Starting call as a first-year resident can be challenging, no doubt about it. A major theme of our residents' early experiences seems to be, "I wish I had known this sooner," or, "I wish someone had told me that." This on-call guide is designed to help you hit the ground running, and to serve as a reference for most situations that you will encounter on call. It is not meant to be exhaustive, but rather concise and practical. References are provided when appropriate.

As you prepare to take primary call, here are some important points to keep in mind:

1. Don't blind anyone. If you are ever unsure how to proceed ("Should I go in?") always err on the side of caution. See the patient.
2. You are never alone. There is always back-up available. Every senior resident (and endowed professor) has been a first-year.
3. You don't need to be a diagnostic savant on call. Much like an emergency physician, your job is to identify those diagnoses which can seriously affect a patient's vision and/or overall health and get them to the appropriate next step. If you are prepared, you may save someone's vision, or even help save their life. Extensive workups for zebra diagnoses can usually wait until morning, when a well-rested day team can help evaluate the patient.
4. Call is an endurance event, not a sprint. There will be days when you have hours of free time, and others when 4 true emergencies show up at once. Use your downtime judiciously. When you are not seeing patients or fielding phone calls, prioritize food, sleep, hydration, and showering. You may only have time for one of these activities before the pager goes off. Taking care of your body will help keep your mind fresh.
5. Your co-residents are your team. They are your allies in the trenches, and the ones most likely to know where a certain instrument is stored, what a specific attending expects, and to cover your shift when emergencies come up. Life doesn't stop while you are in residency, and you may make some of the best friends of your life if you prioritize relationships with not only your family, but also your fellow surgeons-to-be. Forget the petty stuff and pay it forward.

Welcome to Iowa! As you will soon see, our department has a profound and far-reaching legacy of ground-breaking research, unmatched resident education, and outstanding patient care. You are now a part of this family. We are happy to have you!

Iowa City, July 2020

Important numbers

UIHC Frequently Used Numbers

Code to the call room (7th floor): 3-1-2-3
Code to the Resident Room (7404 JCP): 1-3-1-5

3RCW: 6-3660
3RCE: 6-3680
4JP Pharm (wknd intra-vit): 6-3040
ER/Create Pt Enc: 6-2233 or 68586
Main OR: 3-6400
Main OR (specific OR): 6-66xx (xx= room #)
ASC: 6-7876
ASC (specific OR): 6-61xx (xx = room #)
SFCH (specific OR): 8-51xx (xx = room #)
Bed Placement: 4-5000

Eye Clinic Fax: 319.678.8880
Nurses station Fax: 319-384-5619
Eye Clinic Tube Station: 510

Comp Clinic: 3-7617
Triage/Scheduling: 6-2864

Day call pgr: 3314
Anes Pgr (after hrs cases): 3911
Radiology pgr (notify of request after hours): 3205
CT reading room after hours: 6-8466

UIHC Operator: 356-1616
UIHC page retrieval: 356-2000
Call Center: 384-8886
Automated operator: Dial 111
from any in-house phone and
follow instructions
To page UIHC pgr: 131 (in house) then pgr#
6-7000 (from outside)

Calling a patient from home:
From cell phone: *67-1-#
Can also call through operator or
the Doximity app

Calling a patient from UIHC:
9-1-#, double beep, 6 digit code
Key for calling from outside:
3 = 35**3**-####
4 = 38**4**-####
5 = 33**5**-####
6 = 35**6**-####
7 = 46**7**-####
8 = 67**8**-####

Social Worker

- **Ophthalmology social worker:**
  Stephen Loutsch, pager 4698

- **Urgent needs** (patient is in front of you in clinic, she will come now to talk about insurance assistance):
  Michelle O'Leary, pager 8218

- **Non-urgent needs** (no insurance, underinsured, discharge planning):
  ReferralsH@healthcare.uiowa.edu

List of diagnoses which qualify under Emergency Medicaid linked below:

https://dhs.iowa.gov/sites/default/files/ICD-10_Emergency_Dx_5.pdf?102020201125

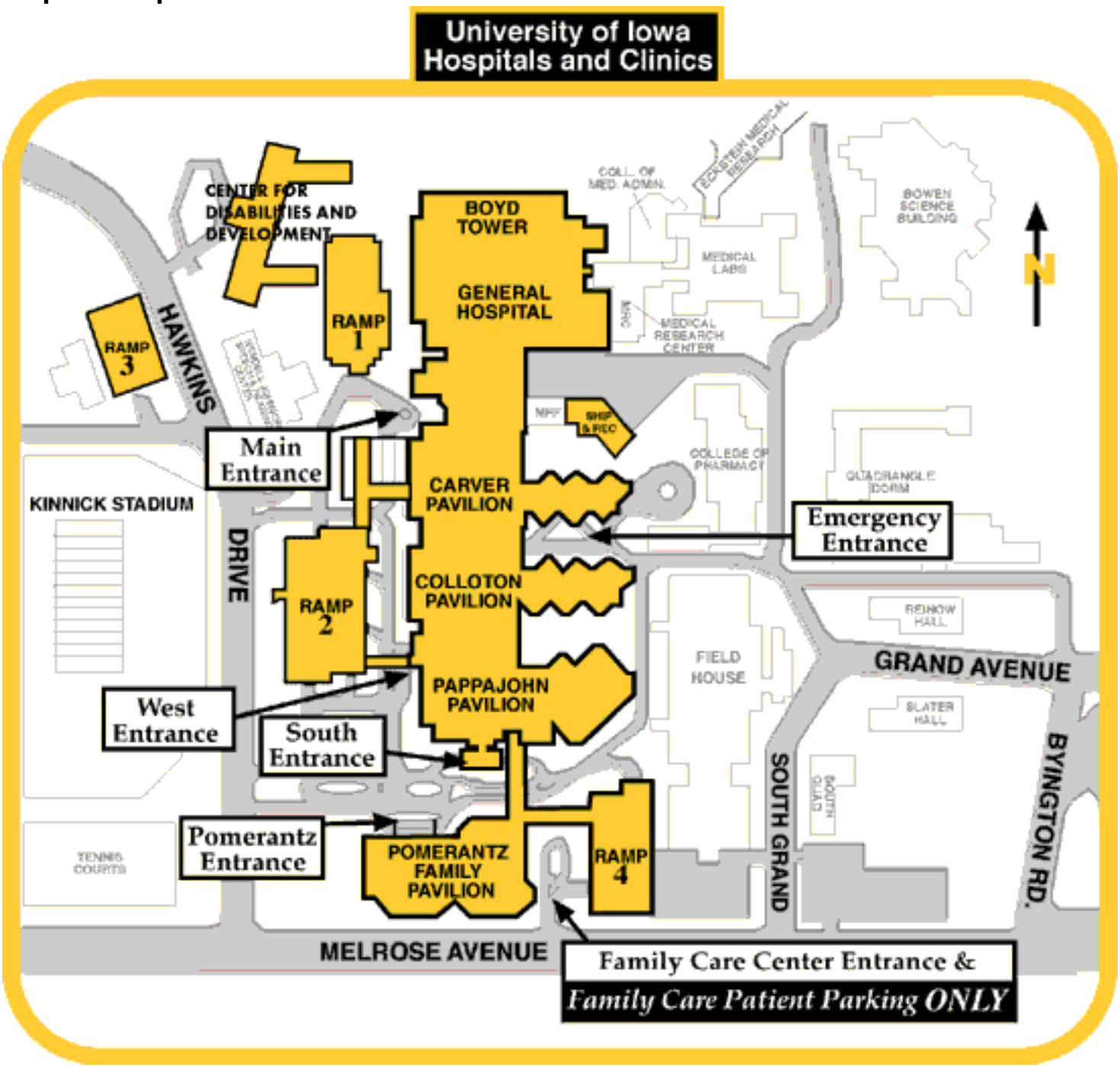
VA (Iowa City)

VA Eye Clinic Schedulers: 338-5844
VA operator: 338-0581
Eye pager: 333
To call the VA from outside VA, dial 319-338-0581 then 63 + 4 digit extension
To call a VA number from the VA, dial 63 + 4 digit extension
To call the VA from UIHC, dial "158" wait then the 4 digits
To call UIHC from the VA, dial "2" and then the 5 digits (e.g. 2-6-2864)
To page a VA pager from the VA, dial "11" and then the 3-digit pager

Parking:

You can park in Ramp 4 or lot 43 free of charge from 4:30pm to 7:30 am (weekdays) and all day on weekends/holidays. This is valid for all parking ramps and lots.

Hospital Map



UIHC Layout

Buildings are in alphabetical order (by last name) from North to South, as are the elevators.

Boyd Tower (BT) - aka General Hospital	Elevators A, B, C
Roy Carver (RC)	Elevators D, E
John Colloton (JC)	Elevators F, G, H
John Pappajohn (JP)	Elevators I, J
Pomerantz Family Pavilion (PFP)	Elevators K, L, M

	Floor	Elevator:
Burn Unit	8 JC	G (H)
Call Room – Ophtho	7 JC	H
CT Scanner	3 JC	H
CVICU	4 JC	G (H)
East Room	8 JC	D
ER	1 RC	D
Main OR	5 JC/JP	G (H)
Med Psych	3 BT	A
Microbiology	6 BT	A
MICU	5 RC	E
MRI/Reading Room	Lower Level JC	G or F
Neuro/Neuro-surg	6JCW	G (H)
NICU	6 JP	I
Ocular Path	2 MRC	BB
Ophtho Inpatient	3 RC	D (**Slit lamp on 3 RC in Room #2. Door code is: 1-2-3-4)
Peds Inpatient	SFCH	I, then walk over on floors 1 or 2 to SFCH
Pharmacy, Outpatient	2 PFP	K
Pharmacy, Discharge	1 RC	D or E
PICU	7 JP	I
Radiology Reading Room	3 JC	F
SICU	5 JP	I
Specimen Control	6 RC	E
Main Cafeteria	1 Gen Hospital	C

Wards

8	**Floors change between GH and RC** →				Rooftop Cafe		Burn Unit			ASC: Ambulatory Surgery Center DOSA: Day of Surgery Admission (pre-op) MICU/SNICU: Medical/Surg-Neurosurg ICU RSCCU: Respiratory Spec. Comprehensive Care Unit ^West at the compass, left at the end of the hallway. Rooms are on the left w/ badge access *Turn left off elevator, then left down hallway. Should see sign for "clean scrubs." Service window with times (630-8a, 230-4p, 10-1115p). If not open, can walk through double doors and ask for scrubs. #Turn card over for more info ✕ Cannot walk through Regular access between JPP and Stead			Conference space	12
7				Atrium Dining	Atrium Dining	Atrium Dining	Palliative RSCCU						Red (HemeOnc)	11
6					6RC: IntMed	Locker Rooms#	Neuro Inpt	NICU Bays 1, 2/3 L&D ✕ Mother-Baby					Blue	10
5	Psych partial	^Student call rooms			Pathology MICU	**OR**	**OR/DOSA** **ECT (back of DOSA)**	**SNICU**			Melrose dining	Melrose Conf. Room Ob/gyn lib	Green	9
4					4RC: Cardiology, Vasc/CT surgery	GI Clinic	CV ICU	4JP: SurgOnc, HemeOnc			ASC/ASC Locker room	Pain clinic		8
3	Med/ Psych	Med Alum IM Conf		Uro Clinic	3RC: Ophtho, Ortho, Urology	Radiology/ Rad Conf		Mother-Baby2 3JP: GynOnc			Derm Lab	OB/gyn clinic		7
2		Student workroom GH C238		Neuro Clinic	2RC: GI, Transplant, Surgery		2JCP: ENT inpt FM inpt	Psychotic disorders Geri psych			ENT		NICU Bay 4	6
1			Main cafe	ED	Bread Garden		Ziffren (Surg Conf)	Child Psych Mood Psych Eating Disorder			Ophtho Bread Garden	Cancer Clinic	Locker rooms	5
LL				*Green scrubs		MRI center		PET	Ortho Clinic		FM Clinic Ortho South ✕		OR Peds Cath	4
	A	**B**	**C**	**D**	**E**	**F**	**H**	**I**	**JJ**		**K/L**	**M**	PICU	3
Boyd Tower (BT)/General Hospital (GH)				Roy Carver (RCP)		John Colloton (JCP)		John Pappajohn (JPP)		Skywalk	Pomerantz Family (PFP)		Specialty Clinics	2
													Cafeteria Bread Garden	1
													Peds Radiology	LL
													Stead Children's Hospital	

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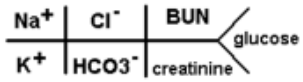
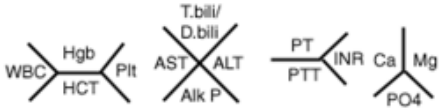
													Stead Children's Hospital	

EPIC Tricks

OR

- To view OR schedule: Click the **EPIC** button in the top left corner. Under **Status Boards** select **Status Boards**. Choose appropriate location in far left box (e.g. ASC, Main OR, etc) then click desired **Date**. Default is today's date.
- Main OR locker rooms: 6th floor, to the right off elevator F. Double doors to the right, badge scanner on opposite wall.
- Maroon Scrubs: Locker room on right. Machines hold different sizes. Use badge scanner than enter size (size chart on machine).
  - Return scrubs with machines on back wall.
  - Only have credits for 2 scrubs, **make sure to turn them in**
- ASC and locker rooms: 4th floor PFP. Walk towards elevator M and keep walking. Go through double doors and scrub machine will be in the hallway.
- OR requirements:
  - When crossing a red line into OR territory: NO white coat or green scrubs. Maroon scrubs required for clinical personnel. Shoe covers, hair net: these are located in the cupboards by the sinks right before the red line at the main entrance.
  - Entering room: Mask on. Be mindful of any sterile fields that may be close to the room doors.





Creating a Note

- Select your patient on the schedule or the patient list
- Click **Notes** tab on left side of screen (may have to click on "More" at very bottom → "Rarely Used" and find in this list) → **"New Note"** at top left
- Enter **note type** (H&P, Progress Note, Discharge Summary, Clinic Note, etc). Ask residents for their **dot phrases** for templates.
- Almost 100% of the time if you are signing the note (not just pending it) you will need to **cosign** to an attending: Click the box labeled **Cosign Required**. Enter faculty's name before clicking **Sign.**

Misc Inpatient EPIC

- **SRG Rounding Report**: Search "SRG" in the search bar located at the right end of the tool bar (towards top of screen). Good resource for vitals, pain, and oxygen source.
- **Ctrl + O** within a chart will show the patient's orders. This includes medications, diet, activity level, etc.
- **Intake/Output**: tab on left side of screen. May have to click on "More" at very bottom → "Rarely Used" and find in this list. Gives details of fluid/blood given, urine/stool output, drain output, chest tube output, etc.
- **MAR Report:** Search "MAR" in the search bar located at the right end of the tool bar (towards top of screen). Will show what medications patient got and when.
- **Pending cultures or pathology reports:** Chart review tab (left side of screen) → **Micro** or **AP** tab along top of screen

"EPIC" TRICKS

Find a pre-existing inpatient list

- After logging in, go to upper right-hand corner and click drop-down arrow next to "LOGOUT"
- Click "CHANGE CONTEXT" and search for "DEPARTMENT" of interest (e.g. CRITICAL CARE MICU LIP)
- Go to PATIENT LISTS in top left corner 
- Go to SYSTEM LISTS and find floor/unit of interest

Create a patient list

- Click 

- Click "CREATE MY LIST"
- Choose a name for your list (e.g. Renal Patients)
- Choose fields to display (suggested fields: Patient Name/Age/Sex, MRN, Unit, Room/Bed, Patient Comments)
- Click "ACCEPT"
- Drag selected patients from other lists into your newly created list

"EPIC TRICKS" cont.

Find an outpatient clinic schedule

- After logging in, go to upper right-hand corner and click drop-down arrow next to "LOGOUT"
- Click "CHANGE CONTEXT" and search for "DEPARTMENT" of interest (e.g. CRITICAL CARE MICU LIP)
- Click "SCHEDULE" in top left corner 
- Click on dropdown arrow next to clinic schedule and find provider of interest

Create an outpatient clinic list

- Click "SCHEDULE" in top left corner 
- Click 

in left-hand column
- Name your list and select desired fields to display
- In the same window, click "CONFIGURATION"
- Click "DEPARTMENT"
- Select providers to add their schedules to your list
- Click ACCEPT

SCRUBS

Maroon scrubs

Elevator F, 6th Floor
Elevator I, 6th Floor
Elevator K/L, 4th Floor

Green scrubs

Elevator D, Lower Level (Turn left after exiting elevators and follow signs down hallway to storage room. Enter storage area through double doors and turn immediately to the right towards a self-service cabinet with scrubs available to take away.)

How to scrub

https://www.youtube.com/watch?v=MpwMnjQR41Y

PAGING FORMAT

Patient last name. MRN. Reason for consult. Name, Pager #*last 5 of nearby phone.
"Rodriguez.12345678. Ready for thoracentesis. Jane, 8889*12345"

In case of Blood/Body Fluid Exposure:

1) Wash/flush the exposed area
2) Inform your instructor/preceptor/attending
3) ID the source of exposure, including name/hospital number/ID of individual if applicable
4) Immediately call
   Student Health Nurseline: 319-335-9704
   (After hours, call UIHC call center:
   319-777-8442)
5) Follow additional instructions as directed

Patient encounters: Phone calls, clinic visits, and ED/inpatient visits

General tips:

1. Dilate everyone (unless medically contra-indicated, e.g. for neuro monitoring)
2. Offer to see every patient who calls. Even if you don't think the situation is emergent, it's still wise to let patient decide.
3. Never hesitate to call for help.
4. Document, Document, Document. Take photos whenever possible. Complete your documentation within 24 hours of your call shift.
5. Above all, help your fellow residents out whenever you can. Remember, we are in this together.

I. Patient phone calls

A. Name and MRN are provided by the call center

1. New patients: If we have never seen a patient in clinic, you should NOT speak to the patient directly. They should be advised to come to the ED or call the triage line in the morning to make an appointment.
2. Established patients: Can be seen in the ED or in the clinic at your discretion. If you feel unsafe being alone with a patient in clinic, it is perfectly reasonable to see them in the ED.

B. If you're occupied, call the operator and tell them to page you a call back number.

1. NOTE: You have only 3-5 minutes after the first page before you are paged again. If you fail to respond to the second page, the operator will page your senior. If your senior fails to respond once, they will page your attending. Your job is to never let this happen.

C. Select "Telephone call" in EPIC and select the patient. Review the chart. Click the "Documentation" button and type while you talk.

1. In general, document all phone conversations.
2. Identify:
   a. Chief complaint
   b. Symptomotology

Symptom	*Possible Cause*
Itching	Allergic conjunctivitis
Scratchy Sensation	Dry eyes, foreign body in the eye, blepharitis
Burning	Lid, conjunctival or corneal disorders
Localized lump or tenderness	Hordeolum, chalazion
Ocular Pain	Iritis, keratopathy, glaucoma, scleritis, infection, orbital cellulitis, corneal abrasions, myositis,
Photophobia	Iritis, keratopathy, glaucoma, corneal abrasions
Mucoid discharge	Allergic conjunctivitis, chlamydial infection
Watery discharge	Viral conjunctivitis, chemical irritants
Purulent discharge	Bacterial conjunctivitis, corneal ulcer, orbital cellulitis

   c. Set a time for arrival

1. If urgent, tell them to be BPO, lay flat (for retinal detachments), and go to the Pomerantz Family Pavilion or the ED
   a. Smartphrase: "Directions: The Ophthalmology clinic is located on the 1st floor of the UIHC Pomerantz Pavilion building on the south end of the hospital complex. The closest parking is in Ramp 4. If you are coming for an after-hours or weekend appointment, please enter through the main entrance of the building until you reach a set of locked

glass doors. Use the phone on the wall to your right to dial '0' and tell the operator that you are there to see the eye doctor on call."

2. Obtain a callback number (especially if they do not arrive at your agreed-upon time)

D. Offer to see all patients and document this:

1. *"I offered to see the patient in clinic. The patient declined/accepted this offer."*

E. See section III

II. Outside provider phone calls (ED physicians, ophthalmologists or optometrists)

A. Open a Telephone encounter as above. Document during the call.

B. Obtain pertinent history as above.

C. Triage; determine whether the patient needs to be seen tonight or if they can be seen in clinic.

1. In general, for trauma, air on the side of seeing the patient.
2. Early in your training, air on the side of seeing the patient.
3. Generally, see patients from ophthalmologists/optometrists. These are our colleagues.

D. Obtain referral information

1. Physician name and phone number
2. Referring physician should be kept informed (dictated letter +/- phone call)
3. Request medical records (ie imaging in fractures)

E. Transfer the patient to UIHC through the ER.

1. From an outside ED provider: Ask them to stay on the line (the operator always listens in) and they will be connected to our ATC (admission and transfer center)
   From an outside eye care/clinic provider: Have them advise patient to present to the ED. Then call the ER charge (6-2233, ask for charge nurse) and inform them that the patient is coming

III. Seeing patients in clinic ("Eye After Hours")

A. Documentation:

1. If you decide to see a patient in clinic, you MUST call the ER first to create an encounter in EPIC
   a. Call 6-8586 or 6-2233 and ask to create an after-hours eye clinic encounter. Have the MRN and the name of the attending/fellow on call ready.
2. Click "Patient Station" and select the patient
3. Click on the "Eye Clinic After Hours" encounter
4. Enter a clinic note just as you would in general clinic using the ophthalmology exam and clinic note template.
   a. Clinic notes are co-signed by the faculty on call or the fellow, if involved

B. Recommended sequence for exam:

1. If the patient is unstable, take immediately to ER.
2. Visual acuity in each eye – eye chart or near with appropriate add (e.g. +2.00D loose lens)
3. Check for RAPD
   a. If there is a dramatic change in VA, call the senior first. They may need to verify an RAPD.
4. Check cornea, then for iris neovascularization, narrow angles
5. IOP
6. Dilate (if OK with Neurosurgery/Neurology)
7. EOM
8. CVF
9. View of optic nerve and posterior pole
10. Form an assessment and plan <u>before</u> calling the senior resident.

a. Do your best – we know it's tough at first!!
b. Don't be afraid to call!
c. Early in the year, always discuss with the senior resident. All patients going to the OR or being admitted need to be seen by the senior resident.

C. If a clinic patient appears surgical (i.e. open globe, canalicular laceration, lid margin-involving laceration)
   a. Call senior resident. While you wait:
      i. Determine time of last meal
      ii. Place on NPO
      iii. Print patient labels
      iv. Fill out consent form
      v. Pend H&P
      vi. Update tetanus if indicated
      vii. If ok with senior, call anesthesia for pre-op evaluation (131-3911)
      viii. If ok with senior, call OR for available time (3-6400)
      ix. If ok with senior, or call bed placement (4-5000)

D. If a clinic patient needs imaging (CT/MRI/X-ray):
   1. Page the radiology resident on-call to ensure the proper protocol is being ordered
   2. Put the order in EPIC (see Appendix for recommendations on imaging protocols)
   3. If giving contrast check BUN/Creatinine
   4. Transport the patient to radiology

IV. Inpatients or ER patients

**Hint – To view the ER board, log in as ED instead of Eye General, but always document as Eye General.*

A. Triage:
   1. Obtain relevant information from the provider
   2. Ask if the patient can be dilated, particularly if Neurosurgery is requesting the consult

B. Preparation:
   1. Check all devices in the call bag before you leave and exchange what is needed (e.g. ensure the indirect, Finhoff, and portable slit lamp all turn on)
   2. Stock the call bag for your journey
      a. Essentials: near card, +2.00D loose lens, indirect, Finhoff, tonopen (+covers), drops (fluorescein, proparacaine, tropicamide, phenylephrine), portable slit lamp
      b. Other supplies as indicated by consult:
         1. Trauma/plastics: Desmarres retractors, utility scissors, paufiques, Westcott scissors, 5-0 fast gut sutures (yellow package), 5-0, 6-0, and 7-0 vicryl sutures (purple), lido w/epi
         2. Glaucoma: latanoprost, cosopt, and brimonidine drops
         3. Neuro-op: Ishihara plates, prism bars, red cotton ball, Maddox rod

C. Documentation/Orders
   1. Link all consult notes with consult orders (many providers forget to put this in; remind them)
   2. "Notes" tab -> New Note -> enter "consult" as type
   3. Choose "Eye Kaleidscope Note" from the text list, or adapt this to make your own
   4. All ED consults are staffed by the ED attending unless seen by a fellow
   5. All inpatient consults must be staffed by the Ophtho faculty on call within 24 hours
      a. Must notify senior resident about these patients prior to contacting staff
   6. The ER/inpatient resident will do all orders EXCEPT:
      a. Corneal cultures: use EYE:CORNEAL ULCER
      b. Fortified antibiotics: Discharge tab -> Order reconciliation -> ordersets -> EYE:Ulcer

orderset

D. Recommended sequence for exam:
   1. Visual acuity in each eye – eye chart or near with appropriate add (e.g. +2.00D loose lens)
   2. Check for RAPD
   3. IOP (defer in globes)
   4. Dilate (if OK van Herick and OK with Neurosurgery/Neurology)
   5. EOM
   6. CVF
   7. View of optic nerve and posterior pole
   8. Ocular exam – specific to trauma
      a. sub-conj heme – if 360 degrees of SCH and you cannot see sclera, be cautious of occult open globe
      b. hyphema/hypopyon
      c. iridodialysis, traumatic mydriasis
      d. pigmented tissue visible
      e. periorbital ecchymosis/edema with TIGHT LIDS (need for canthotomy/cantholysis!)
      f. V2 infraorbital paresthesia
      g. orbital rim step-offs
      h. lacerations – especially in open globes, important information for making an OR plan
      i. subcutaneous emphysema
      j. telecanthus or rounding of medial canthus (medial wall fracture)
      k. facial asymmetry
      l. forced ductions if limited motility or intubated fracture patient – senior will help the first time you have to do this
   9. Review CT scans – page radiology to review (or go visit in ED reading room)
   10. Determine other services' surgical plans: ENT, General surgery, Neurosurgery, Ortho, etc.
      a. Necessary if a multiple-trauma patient to coordinate services and plan OR time
   11. If the patient looks surgical and other services are mobilizing, let the senior know

V. Miscellaneous

A. Diurnal pressure checks
   1. Glaucoma tech will notify you of diurnal curve patients
   2. You are responsible for 7PM, 10PM, and 7AM IOP checks
   3. The patient will meet you at the front sliding doors – you'll be paged when they arrive
   4. Set expectations at this visit:
      a. Determine where to meet – usually they will call from front door
      b. Determine time: "I'm on call and may be tied up, but I'll be there as soon as I can"
      c. if you anticipate an excessive wait, call your back up

B. S/p vitrectomy patients
   1. You may be paged about Saturday morning post-ops arriving at the door; generally the fellows know they are there and you do not need to come in for this (you can text the fellows if unsure)
   2. Never take lightly a retina patient complaining of head or eye pain! (May indicate endophthalmitis)

C. Retinal detachments, retinal holes, etc.
   1. Call retina fellow directly for evaluation of definite RD referrals
   2. Exam and documentation should ALWAYS BE COMPLETE BEFORE calling a fellow
   3. If there is diagnostic uncertainty, call your senior first
   4. Remember: the B-scan is your friend!

Staffing and Follow up

A. Staffing

Officially, all inpatient consults are supposed to be staffed by a fellow or attending within 24 hours. An ED consult can technically be "staffed" by the ED provider.

1. Complicated – Complicated patients should be discussed with or seen by the senior resident. It is our policy that faculty only be contacted by the senior resident. Sometimes, staffing can occur the next day in the faculty's clinic. It is permissible for the first year resident to contact a fellow directly regarding the staffing of complicated patients if the first year resident has become proficient in the examination of that particular type of patient. Otherwise, they should be discussed or seen by the senior resident first. *includes all non-accidental trauma w/u and any patient requiring the OR

2. Uncomplicated – Uncomplicated patients can often be discussed with the senior resident over the phone. On some services, it is standard practice to e-mail the fellow (such as the case of an uncomplicated orbital fracture) in order to ask them about staffing.

3. Really Uncomplicated – On rare occasion, you will be asked to see a post-op corneal abrasion or something like a subconjunctival hemorrhage in a patient recently intubated on Coumadin. In these cases, it is often unnecessary for these patients to be staffed and also unfair for the patient to be billed for these consults. If this is the case, it is permissible to triage/discuss the case with the consulting service, and if they agree, cancel the consult order and document a short note into EPIC. *If after discussion, the consulting provider still wants you to see the patient, you have to see the patient.

B. Follow-up

After receiving permission from a fellow or attending to schedule a follow up in their clinic place a "Follow Up: Eye" order with attending name and date/time frame for return. It is helpful to write in the order "please call patient with appointment time", so that the schedulers know whether the patient has been notified or not. If the patient needs to be scheduled within 24-48 hours, call scheduling or e-mail them at ophthalmologyschedulers@healthcare.uiowa.edu, or walk to the front scheduling desk and they will assist you.

Inpatient follow-up can be easily documented by creating a new progress note. This does not have to be co-signed. PGY2s are responsible for follow-up on inpatients in these cases:

- The inpatient did not require subspecialty care but have eye issues that need follow-up – (e.g. corneal abrasion, exposure keratopathy, hyphema)
- The patient was unable to be dilated at the time of the initial consultation. When you perform the DFE, document your findings as a progress note in EPIC. It is helpful to use kaleidoscope when filling out the DFE, so that other providers can see your exam at follow up.
- The patient was seen by a subspecialty service by they requested you follow-up on issues.

No-man's land (consults you are called with between 7:30AM and 8AM)

1. Generally passed off to the day team if possible. If the patient can be reasonably evaluated prior to the start of clinic ~8:30am, see it to help your colleagues. If this is impossible, pass to the day team or add to clinic.

FAQ

"I had eye surgery the other day and my eye is watery."

- Some degree of irritation and watering is normal after eye surgery. Are you having an increase in redness? Are you having pain in the eye? Is your vision getting worse? If any of these are true, you should come in tonight so that I can take a look, since I can't rule out an infection or high pressure in the eye over the phone.

- (NOTE: Have a very low threshold for bringing in a postoperative patient who calls with a concern)

"I've had glaucoma surgery in the past and my eye is red. I think I have pink eye."

- Patients that have had trabeculectomy are at increased risk of infection inside the eye. If you've had a trabeculectomy, you should come in tonight to make sure your bleb and your eye aren't infected. It could be simple conjunctivitis, but you need to come in so we can make sure.

"I had retina surgery earlier this week and my eye has been hurting. It hurts right above my eyeball, and I feel sick to my stomach. Can you prescribe something for the nausea?"

- I'm concerned that the pressure in your eye may be elevated, which can happen after eye surgery, especially retina surgery. I want you to come in tonight to be seen.

"I had endothelial transplant (DMEK, /DSAEK) and now I see a large floater on top portion of my vision."

- As the AC bubble reabsorbs the meniscus involves the visual axis. No need to worry as long as symptoms fit what you expect with the dynamics of a floating bubble.

"I had an intravitreal injection today and my eye is tearing, red, and painful."

- It is normal for the eye to be red after an injection. Tearing and pain after the injection is usually due to the toxicity of the iodine and numbing medication. This can also happen if the front of your eye gets scratched (corneal abrasion) during the injection. This usually improves very quickly over the course of 12-24 hours with rest, Tylenol and artificial tears. If this does not improve (in 12-24h) or gets worse in any way, call back so we can see you.

"My bandage contact lens fell out. Do I need to come in?"

- You can attempt to carefully put it back in yourself or with help if you are comfortable doing so. If the eye feels uncomfortable, increase lubrication. If the eye is still uncomfortable or if the lens was placed for a corneal wound leak, we can arrange for you to be seen tomorrow to replace it or you can see a local eye care provider if you live a long distance away.

"My nasolacrimal duct stent is coming out. Do I need to come in?"

- You can carefully feed it back into the tear duct with your fingers if you feel comfortable doing so. Otherwise, tape the protruding end to your cheek and we will arrange to see you tomorrow to replace it.

“I just had an enucleation and the conformer has fallen out. Do I need to come in?”

- I would recommend rinsing off with artificial tears and trying to replace it. We have a webpage (https://webeye.ophth.uiowa.edu/eyeforum/cases/279-anophthalmic-socket.htm) that has a video of how to replace it. If you still cannot, you should come in so we can replace it.

"Outside provider: I have a patient with an orbital fracture, do they need to be seen?"

- At UIHC, we examine all orbital fractures acutely. Please transfer them to our ETC evaluation.

"I have AMD and am noticing new metamorphopsias."

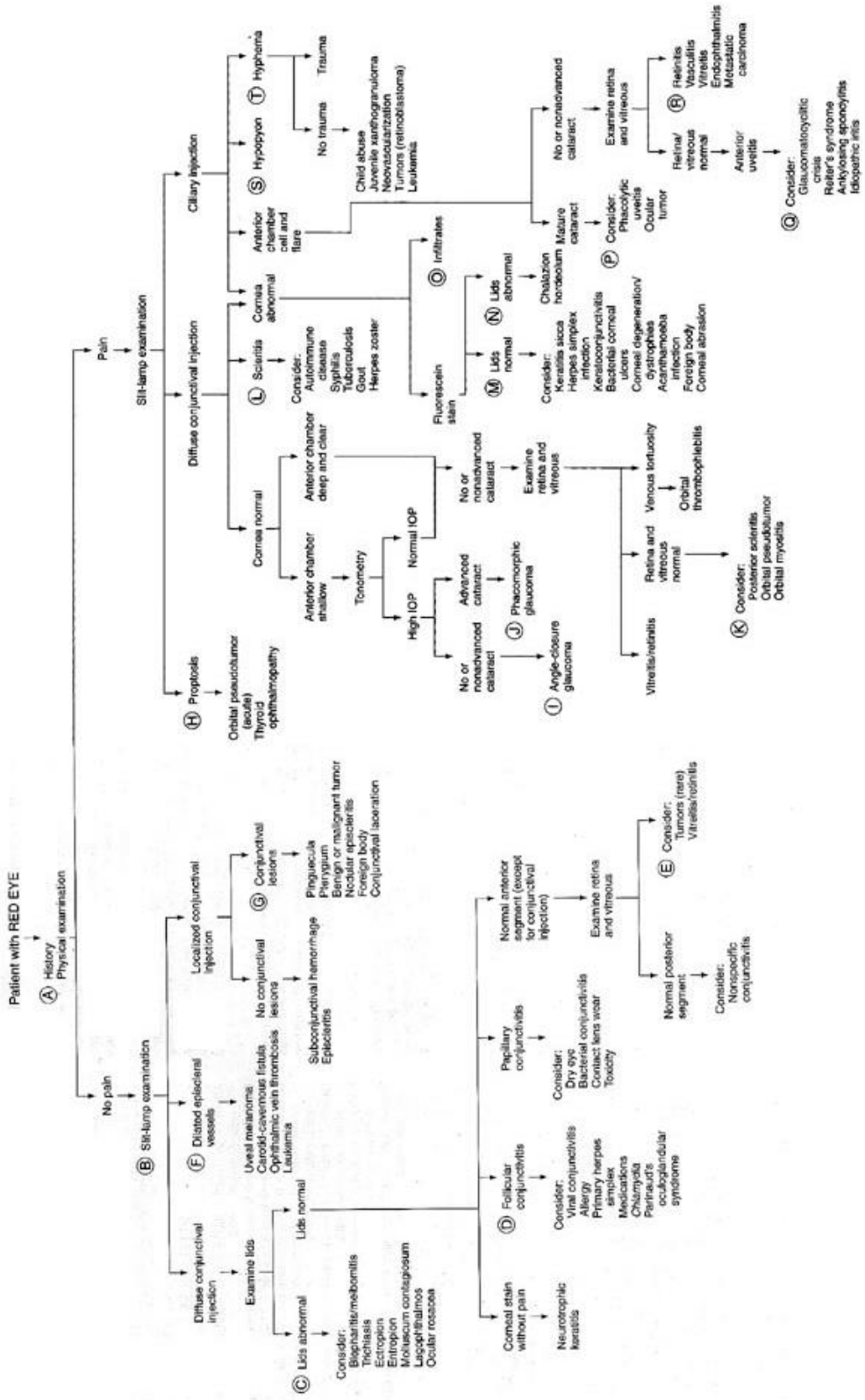
- This may indicate changes in your macular degeneration. If there are significant changes (conversion to wet AMD), the primary treatment is an intraocular injection and we do not have the capability to do this overnight. We can arrange for an evaluation in the morning.

"I have a new floater in my vision."

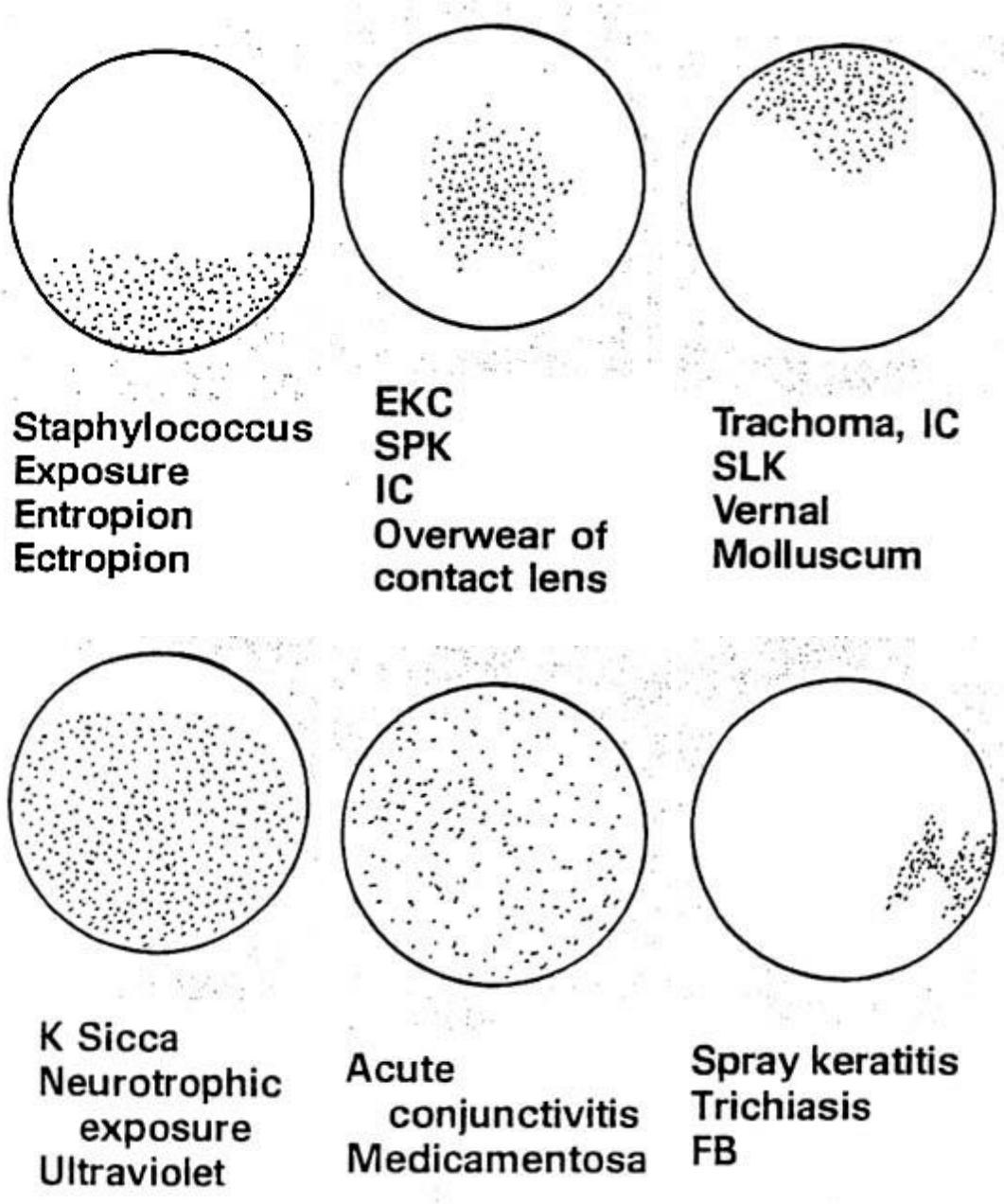
- I think you should be seen to evaluate this. If you can count the number of new floaters on 1 hand, we can arrange to see you in the morning. If there are more floaters than you can count, if you are having associated flashes, if there is a curtain over your vision, or if you have change in your vision, we should see you tonight.

Red Eye:

The following is from van Heuven WAJ, Zwaan J. *Decision Making in Ophthalmology: an Algorithmic Approach*. Mosby, 2000.



Superficial Keratitis - Differential Diagnosis Based on Distribution



Key:
EKC: epidemic keratoconjunctivitis
FB: foreign body
IC: inclusion conjunctivitis
SPK: superficial punctate keratitis
SLK: superficial limbal keratitis

Corneal Abrasion/Foreign Body

History: Mechanism of injury/tetanus status

Exam: Va/IOP/Slit lamp/evert eyelids/inspect fornices/measure dimension of lesion/DFE

Ancillary Studies: If there is a potential of intraocular foreign body, think about Echo or CT scan (1.5 mm fine cuts-0.006 mm3 metallic FB, 1.5 mm3 glass, may miss organic/wood)

Signs and Symptoms: Decreased Va; Photophobia; Cell & Flare; Corneal edema/ infiltration

Foreign body:

Irrigation: May want to try this first.

Bent Needle: Under low to medium magnification, stabilize your hand and hold the needle parallel to corneal surface as bevel faces the practitioner.

Rust ring: Complete removal of a rust ring is not necessary and doing so may damage additional tissue. As cells repopulate, the rust ring will move anteriorly and resolve.

Post procedure Care:

- Antibiotic (fluoroquinolone qid to 6x/day)
- +/- cycloplegia
- No patching
- Follow-up in 1-2 days (most epithelial defects heal in 24-48 hours)

Management: Topical anesthetic will make life easy for everybody. Use lid speculum if necessary.

Dirty (i.e. contact lens-induced or from a tree branch/organic matter, etc.)

No patching!
If there is infiltrate, treat as corneal ulcer
If there is no infiltrate, moxifloxacin or ofloxacin QID at minimum, if bad Q1 hour
Consider cycloplegic (will aid in pain control)
Monitor daily until there is complete resolution.

Clean

Antibiotic coverage polytrim QID vs erythromycin ointment TID

Patient Instructions: Signs and symptoms of infection; discussion of safety goggles if traumatic

Suggested smartphrase:

 # Corneal abrasion, * eye:** Secondary to ***. Measures ***mm (H) x *** (W) No underlying infiltrate or AC reaction to suggest progression to ulcer. ***Patient is a contact lens wearer which puts @HIM@ at risk for amoebic keratitis. Informed the patient that abrasions can be extremely painful until healed, but they typically heal quickly over the course of 2-3 days.

- Begin ***erythromycin ointment tid ***levofloxacin/ofloxacin drops four times a day in the *** eye for 5-7 days
- Cyclopentolate 0.25%: 1 drop *** eye 2 times per day
- Artificial tears as needed for comfort
- Discussed warning signs and symptoms for which to contact us, including increase in pain or redness, discharge, and decreasing vision
- Avoid contact lens wear until instructed by MD
- PO pain meds: Acetaminophen PO prn
- Will arrange for follow-up in general ophthalmology clinic within 3-7 days, depending on severity

Corneal Ulcer

History: Trauma, previous corneal abnormalities, CL wear (type of lens, solutions, wear time including sleeping), hot tub/lake exposure, previous corneal ulcer, nasal/oral/genital ulcerations, systemic diseases.

Exam:

- Check corneal sensation (decreased sensation can suggest herpetic keratitis).
- Measure the size and extent of the ulcer (stromal loss with an overlying epithelial defect) and infiltrate

Management: Infection is assumed to be bacterial until proven otherwise.

Criteria to note in order to evaluate the response to therapy:

1. Margin of infiltrate
2. Density
3. Hypopyon
4. Discharge
5. Symptoms: pain, etc.
6. Epithelial defect

Indication for Steroid (do not add on-call unless instructed by corneal fellow/faculty):

**general rule of thumb – add after 48 hrs of appropriate tx for gm pos, 72 hrs for gm neg*

1. To reduce inflammation after adequate coverage
2. Reduction of scar formation especially at or near visual axis
3. Tectonic changes: marginal thinning, etc.

<u>Treatment (see smartest EYE:Corneal ulcer):</u>

1. Cycloplegic
2. Topical antibiotic

   Low risk of visual loss <1mm, non-staining peripheral infiltrate, no thinning, minimal AC rxn and discharge
   ****must satisfy all above indications for fluoroquinolone monotherapy***

   Non CL: Fluoroquinolone QID to 6x/day

   CL: Fluoroquinolone Q2 hours-QID

   Borderline risk 1-1.5 mm diameter peripheral infiltrate, or any smaller infiltrate with epi defect, mild AC rxn, and moderate discharge

   Consider fortifieds as below

   Vision threatening

   Large, >1.5mm diameter ulcer, or any infiltrate with moderate to severe AC rxn, purulent discharge, or involving the visual axis

   - Fortified **tobramycin** or gentamicin (15 mg/ml) q1hr alternating with fortified cefazolin (50 mg/ml) or **vancomycin** (25 mg/ml) q1hr (*Bold preferred at UIHC)
   - Fluoroquinolone gtt q 5min x 3 doses, then q15min for 2-6 hrs, then q30min around the clock
   - Atypical mycobacterial: amikacin (10 mg/ml) gtt q2hr for 1 week then qid for 2 months
3. In follow up, treatment is adjusted according to the culture/sensitivity results. Abx gradually tapered as ulcer improves per cornea service (vs if no improvement re-culture vs confocal etc)

If patient has a positive fungal corneal culture:

*It is common to get call from micro-lab over the weekend re: culture results

1. Make sure patient is on topical anti-fungal
    a. topical natamycin 5% q2h while awake x 1 week, then qid
    b. amphotericin 0.15% as 2nd line (qid if donor rim culture positive, q1h if corneal culture is positive)
2. Make sure patient is on oral antifungal:
    a. fluconazole 200 mg BID
    b. will need baseline and intermittent liver enzyme monitoring
3. For EK (DSAEK/DMEK) patient: Follow-up with Cornea in 1 week for intracameral voriconazole
4. Email attending and fellow to inform them of the culture result

Atypical treatment regimens

Fungal:

Natamycin (50mg/ml) gtt q1-2hr WA, q2hr at night
Amphotericin B(1.5mg/ml) gtt q1hr (good for Candida)
Itraconazole po 400mg loading dose then 200 mg qd
Miconazole or clotrimazole (1-10mg/ml) gtt q1hr (for Aspergillus)

Acanthamoeba:

Chlorhexidine (CHX) 0.02% gtt q 1hr
Polyhexamethylene biguanide (PHMB) 0.02% gtt q 1hr
Itraconazole 400mg po x 1, then 200 mg po qd

Herpes Simplex Virus:

Acyclovir 400 mg PO 5x/day or Valtrex 500 mg PO TID for 21 days
Less preferred: Trifluorotymidine (Viroptic) 1% topical 9 times/day or Vidarabine (Vira-A) ung 5 times/day (can be very toxic to the epithelium)- maybe add "not typically used at UIHC"

Herpes Zoster Virus:

Acyclovir 800 mg PO 5x/day; famciclovir 500 mg tid; or valcyclovir 1000 mg PO tid for 7 to 10 days
If severe, acyclovir 5-10 mg/kg IV q8h for 5-10 days

Suggested smartphrase:

 # Corneal ulcer, * eye:** Secondary to ***. Most likely bacterial*** etiology given risk factors (***contact lens wearer, ***history of recent trauma, ***swimming pool/hot tub use). ***The ulcer is within the visual axis and thus is vision threatening.

The very severe nature of this infection was discussed with the patient. We discussed how even with impeccable treatment the infection may leave @HIM@ with poor vision in the affected eye. We discussed the importance of regular follow up and adherence to antibiotic therapy. We discussed how surgery may be needed in the future to help control the infection or to improve @HIS@ vision.

- Risk of vision loss:
    - low: small, peripheral ulcer w/o discharge or epi defect
    - medium/borderline: in between
    - high: in visual axis or >1-2mm
- Begin fortified vancomycin (25 mg/mL), {left/right:29306} eye, q1 hour around the clock
- Begin fortified tobramycin (1.4 mg/mL), {left/right:29306} eye, q1 hour around the clock, alternate with vancomycin
- Begin atropine, {left/right:29306} eye, two times a day OR cyclopentolate *** eye two times a day
- PO pain meds given: ***
- Photos in the left eye to document baseline
- Cold compresses over closed eyes for comfort
- ***Consider acyclovir if h/o HSV/zoster
- ***Recommend cessation of contact lens wear until further notice
- Corneal scrapings were performed today and sent to the microbiology lab
- Will discuss with cornea service and schedule follow-up accordingly (we will arrange for this)
- Discussed with patient to return immediately if increased pain, size of ulcer, or worsening of vision

How to Culture a Corneal Ulcer

When to culture:

- Infiltrate >1-2mm with an epithelial defect
- Central or paracentral ulcers
- Significant tissue loss
- Presence of hypopyon
- Unusual organisms suspected by history or examination
- Lack of response to empiric therapy
- Postoperative eye

Supplies:

- Please refer to http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Cornea-Culture/index.htm
- In Cornea Clinic, the first workroom (by front desk) has a small fridge in which you'll find:
    - 2 plates:
        - Blood agar plate (for aerobic bacteria)
        - Chocolate agar plate (for Hemophilus and N. Gonorrhea)
    - 5 tubes:
        - Thioglycolate broth – short tube of broth (for anaerobic bacteria)
        - Trypan Soy Broth (TSB) – tall tube of broth (for aerobic bacteria)
        - Potato dextrose – white slant tube (fungus)
        - Lowenstein-Jensen (aka. 7H11) – green slant tube (mycobacterium)
        - Pink viral media (for HSV; one eppendorf tube for the large swab)
    - 2 glass slides
        - 1 Gram stain
        - 1 Fungal stain
    - 8 sterile calcium alginate swabs
    - 1 sterile polyester tipped swab (for viral swab)
    - Specimen bag to carry the supplies to the ED
- In any of the cornea exam rooms, you'll find:
    - Topical anesthetic – should be in call bag
    - Calcium alginate swabs

Set Up:

1. Gather all the supplies listed above
2. Print patient labels (through EPIC can be printed at the Nurses' Station or in cornea clinic.
   ** to print labels: click on the "Epic" button in the top corner of the screen, choose "Patient Care", and then "Patient Labels".
   **alternatively can ask ED ancillary staff or RNs
3. Tape a label onto each agar plate, tube, and glass slide folder, and one on the specimen bag

Procedure

(http://webeye.ophth.uiowa.edu/eyeforum/tutorials/Cornea-Culture/index.htm)

*Easiest to lay tubes out in the order listed below and then recruit a helper (nurse/med student)

- Apply topical anesthesia
- HSV/viral media inoculation:
  - Use the dry, sterile polyester-tipped swab to swab the inferior fornix
  - Place the swab deep in the pink viral media, snap off the tip, and discard the handle.
  - Close the tube, leaving the swab tip in the tube.
- Gram and fungal stains:
  - Dip a calcium alginate swab in the TSB medium
  - Sample the corneal ulcer
  - Streak multiple "C" shapes across the slide
  - Discard the swab
  - Repeat for second slide
- Inoculate the blood and chocolate agar plates:
  - Dip a fresh, sterile calcium alginate swab into the TSB medium
  - Sample the corneal ulcer
  - Streak the surface of the blood agar plate, making several isolated "C" shapes without penetrating the agar itself
  - Repeat for the chocolate agar plate using a new calcium alginate swab dipped in TSB
- Inoculate the two slant cultures (Lowenstein-Jensen and potato dextrose):
  - Dip a fresh, sterile calcium alginate swab into the TSB medium
  - Sample the corneal ulcer
  - Streak the surface of the slant tube from base to apex
  - Repeat for the remaining slant using a new calcium alginate swab dipped in TSB
- Inoculate the two broth cultures (thioglycolate first, then TSB):
  - Dip a fresh, sterile calcium alginate swab into the TSB medium
  - Sample the corneal ulcer
  - Swirl the calcium alginate swab in the thioglycolate broth
  - Discard the swab
  - Dip a new, sterile calcium alginate swab into the TSB medium
  - Sample the corneal ulcer
  - Place the calcium alginate swab back into the TSB medium and swirl, inoculating and contaminating the TSB medium
- NOTE: It is critical to inoculate the TSB medium last. Contamination of the TSB medium before the other cultures have been inoculated may lead to decreased sensitivity and specificity of the corneal culture.
- Label each specimen with a patient label, place in the biohazard bag.

If Concerned about Acanthamoeba

*should have senior or fellow present

- Confocal prior to culture (unlikely to be done on-call)

Acanthamoeba testing

Corneal scrapings need to be sent to both of the following:

1. External PCR testing
2. Eye Pathology

For PCR Testing:

The PCR order is now part of the "Eye:Corneal Ulcer" Order set in EPIC. This test is sent to the Mayo Clinic.
In clinic:

- Collect corneal scrapings with a beaver blade and place in **1mL** of pink **viral transport media**, or sterile saline
- Fill out PCR order in "Eye:Corneal Ulcer" order set
- Place specimen in biohazard bag with printed order and collection label
- Transport to Specimen Collection center - located off Elevator E in main hospital on the 6th floor

For Eye Pathology:

- Collect corneal scrapings with a beaver blade and place in **1 ml** of blue **Saccommano fixative**
- Place "During Visit" eye pathology order. Specify concern for acanthamoeba in order comments.
- Place specimen in biohazard bag with specimen collection label
- Transport to collection basket for Eye Pathology pickup in the Soiled Laundry room across from UIHC Eye Clinic Minor Procedure rooms.

Send to the Lab

*in ED they do everything except place the SmartSet order

- Complete EPIC orders (see smartest EYE:CORNEAL ULCER) and print out labels (stickers) of the order requisite. The requisite sticker should be placed with the specimens in a biohazard bag. These labels can only be printed from the cornea workroom, nurse's station, or ER.
    - To print labels from EPIC after they have been ordered, click 'SnapShot' button on the left menu
    - At the top of 'SnapShot', search for the report called 'Specimen Collection' window (wrench this into your toolbar so it is easy to find next time, by clicking on the wrench next to search window)
    - Click the blue "print labels" link, by each order that appears in this window. Make sure the correct label printer is connected
    - After the stickers have been printed, click blue "collect specimen" by each order
- For HSV culture and PCR: Complete EPIC orders. A separate lab printout (outside lab) will print on paper. The culture and PCR will go in separate bags. They will eventually be sent to the hygienic lab through our micro lab.
- After hours, you need to bring the specimen to microbiology 6BT at elevator A. There are runners in the ED who can do this for you. Do not tube specimens, as they tend to break in transit.

Suggested smartphrase

Ophthalmology Minor Room / Clinic Procedure Note:

Surgical Service: Ophthalmology & Visual Sciences
Date Performed: @TD@

Attending Staff Surgeon: @ENCPROVNMTITLE@
Resident Surgeon: @ME@

Consent Obtained:
After reviewing the potential risks and benefits as well as the performance of the procedure with the patient, an informed verbal consent was obtained.

Anesthesia:
Topical

Complications:
The patient did not experience any complications.

Biopsy/Specimens:
None

Pre-operative Diagnosis: Corneal ulcer, *** eye
Post-operative Diagnosis: Corneal ulcer, *** eye
Procedure: Corneal scraping, *** eye

Description of Operation/Procedure:
After verbal consent was obtained, one drop of 0.5% proparacaine hydrochloride ophthalmic solution was instilled in the affected eye. Tear samples were obtained for herpes virus PCR. Sterile swabs soaked in TSB were used to obtain samples from the bed of the corneal ulcer and sent to microbiology for culture.

The procedure was concluded without complication.

Chemical Injury

Initial Therapy:

- Morgan lens (floor/ED nurses have these)
- Irrigate with 1L bags of NS until pH is normal
    - Sweep fornices with a cotton swab and check pH after each L
    - Hint: compare pH paper result with control (your own tears), may require several liters
    - Outcome related to duration of contact between the chemical (Alkali > acidic) and eye.
- Debridement of necrotic corneal/conj epithelium to allow proper re-epithelialization
    - Do not do this on your own – another case when your senior should be present

Exam - Check for epi defect, IOP, VA, perilimbal ischemia (whitening/lack of conjunctival vessels)
Amount of therapy dictated by degree of limbal ischemia – a judgment call

Medical Therapy - Wagoner's chemical injury protocol (see smartest EYE: Chemical Injury)

1. Grade the injury:
    a. Grade 1: mild epithelial disruption, little to no ischemia or stem cell loss
    b. Grade 2: subtotal loss of limbal stem cells and ischemia <1/2 of limbus
    c. Grade 3: total loss of limbal stem cells, preservation of conj epithelium and ischemia of 1/2 of limbus
    d. Grade 4: total loss of limbal stem cells, loss of proximal conj epithelium and extensive anterior seg damage
2. Acute phase (Days 0-7) therapy:
    a. All grades:
        i. Irrigation as above
        ii. Verify surface pH + irrigation PRN
        iii. Debride devitalized surface tissue + foreign material PRN
    b. Grade 1:
        i. +/- BCL (make sure the patient is going to come back)
        ii. Prophylactic abx four times a day
        iii. Steroids four times a day
        iv. Cycloplegia
    c. Grade 2 or worse (doxycycline+steroids+Na citrate limit metalloproteinases/PMN chemotaxis)
        i. Prokera thin
        ii. Systemic doxycycline 100mg two times a day
        iii. Steroids every hour to four times a day
        iv. Topical compounded sodium citrate 10% four times a day
        v. Prophylactic abx four times a day
        vi. Cycloplegia
        vii. If elevated IOP, IOP lowering agents
        viii. If associated dry eye, ASEDs or PF lubricants
    d. If ALKALI injury in grade 2 or worse:
        i. systemic ascorbate 2g two times a day PO
        ii. topical compounded sodium ascorbate 10% four times a day

3. Early repair phase (Days 7-21)
    a. Grade 2 or worse:
        i. Continue Pro-Kera, doxycycline, systemic and topical ascorbate, compounded citrate, and antibiotics until epithelialization is complete
        ii. Taper steroids as per level of inflammation (WATCH for stromal ulceration)
        iii. If epi wound healing failure:
        iv. LSC transplant + large (>15mm) semi-permanent/sutured/glued AMT
    b. If ANY stromal ulceration/Grade 3 or 4 injury:
        i. d/c topical steroids and add medroxyprogesterone (anti-collagenase w/o stromal melting like with steroids) every hour to four times a day
        ii. If progressive stromal ulceration with:
            1. No perf: glue
            2. <1.5mm perf: glue
            3. >1.5mm perf: tectonic keratoplasty with large AMT
4. Late repair phase (>21 days)
    a. Optimize surface
    b. Scleral contact lens as needed
    c. If persistent pannus: SK + LSCT with AMT
    d. If conj scarring or fornix foreshortening: mucous membrane transplant
    e. If subnormal vision: PK or lamellar keratoplasty
    f. If failed transplant: Kpro

Suggested smartphrase

 # Chemical injury, * eye:** Secondary to ***. No evidence of epithelial defect or limbal ischemia, and with preserved vision. pH ***, which is *** normal of 7-7.4 and thus merits irrigation to prevent further injury.

OR

Epithelial defect present on exam with limbal ischemia (extending *** clock hours). This is a Grade *** injury. This merits aggressive irrigation to prevent further injury, in addition to aggressive topical therapy to prevent further damage and hasten healing.

- Recommend immediate placement of Morgan lens and irrigation with 1L NS
- Will check pH after each liter until pH normalizes (7-7.4)
- All grades:
    Irrigation
    Verify surface pH + irrigation PRN
    Debride devitalized surface tissue + foreign material PRN
- Grade 1:
    BCL
    Prophylactic abx four times a day
    Steroids four times a day
    Cycloplegia
- Grade 2 or worse (doxycycline+steroids+Na citrate limit metalloproteinases/PMN chemotaxis)
    Prokera thin
    Systemic doxycycline 100mg two times a day
    Steroids every hour to four times a day
    Topical compounded sodium citrate 10% four times a day
    Prophylactic abx four times a day
    Cycloplegia
    If elevated IOP, IOP lowering agents
    If associated dry eye, ASEDs or PF lubricants
    If ALKALI injury in grade 2 or worse:
    - systemic ascorbate 2g two times a day PO
    - topical compounded sodium ascorbate 10% four times a day

Trauma

OPEN GLOBE

- First, confirm the globe is open—often reported to be an open globe on the outside but is not! (or vice versa)
- Look for RAPD by reverse before dilating good eye, this is helpful for prognosis
- Do not check IOP if there is concern for an open globe
- Call senior after confirmation of open globe or if there is any question
- Things to be done while waiting for senior
  - 400mg IV moxifloxacin or equivalent
  - IV zofran if there is any nausea (want to prevent valsalva)
  - Fox shield – no pressure on globe
  - Move to room 9
  - Strict bedrest (NO bathroom privileges)
  - Ask about last meal (make NPO), last tetanus shot (have ED update if needed)
  - Fill out consent, H&P, mark patient
  - Page anesthesia (3911; yes, this is listed as the code pager) – all cases will be general anesthesia, they will want to know a PMH, NPO status, Class B
  - I senior requests: Can place OR orders EYE OR: TRAUMA, and call main OR to ask for ETA: 3-6400 (schedule as class B priority)
  - Have ED facilitate bed request and call to bed board for admission
  - Admission orders (smart set – EYE:ADMIT TO OPTHALMOLOGY INPATIENT)

- Ocular trauma score:

Table 1.

Computational method for deriving the OTS score

Initial visual factor	Raw points	
A. Initial raw score (based on initial visual acuity)	NPL =	60
	PL or HM =	70
	1/200 to 19/200 =	80
	20/200 to 20/50 =	90
	≥ 20/40 =	100
B. Globe rupture		−23
C. Endophthalmitis		−17
D. Perforating injury		−14
E. Retinal detachment		−11
F. Relative afferent pupillary defect (RAPD)		−10
Raw score sum = sum of raw points		

Table 2.

Estimated probability of follow-up visual acuity category at 6 month

Raw score sum	OTS score	NPL	PL/HM	1/200–19/200	20/200 to 20/50	≥20/40
0–44	1	73%	17%	7%	2%	1%
45–65	2	28%	26%	18%	13%	15%
66–80	3	2%	11%	15%	28%	44%
81–91	4	1%	2%	2%	21%	74%
92–100	5	0%	1%	2%	5%	92%

NPL: nil perception of light; PL: perception of light; HM: hand movements

References:

1. Kuhn F, Maisiak R, Mann L, Mester V, Morris R, Witherspoon CD. The Ocular Trauma Score (OTS). *Ophthalmol Clin North Am*. 2002;15(2):163-165, vi. doi:10.1016/s0896-1549(02)00007-x
2. Scott R. The Ocular Trauma Score. *Community Eye Health*. 2015;28(91):44-45.

Suggested smartphrase:

 # Open globe injury, * eye:** Secondary to ***. @CAPHE@ sustained a ~***mm *** full-thickness laceration with***without prolapse of uveal tissue. ***Imaging demonstrates ***. ***No evidence of intraocular foreign body. ***No relative afferent pupillary defect. Intraocular pressure was deferred to avoid exacerbating @HIS@ injury. See ocular trauma score (OTS) below for estimated visual prognosis.

- Discussed the guarded visual prognosis with the patient and the risks, benefits, and alternatives of operative repair. @CAPHE@ would like to proceed with the operation.
- Consent signed for the procedure
- Fox shield over affected eye (to be worn at all times)
- IV anti-emetics and IV pain medication PRN to avoid valsalva which may worsen the injury
- ***Tetanus booster as indicated
- Moxifloxacin 400mg IV
- Strict NPO (last ate ***)
- Strict bedrest with bedside bathroom privileges

Admit to ***
Proceed with surgery class ***

Ocular trauma score:
Raw score:
- NLP = 60
- LP or HM = 70
- In between = 80
- 20/200 to 20/50 = 90
- 20/40 or better = 100

Minus:
- 23 for globe rupture
- 17 for endop
- 14 for perforating injury
- 11 for RD
- 10 for RAPD

Raw score sum:
- 0-44 = OTS 1
- 45-65 = OTS 2
- 66-80 = OTS 3
- 81-91 = OTS 4
- 92-100 = OTS 5

Probability at 6 months of NLP / LP or HM / 1/200-19/200 / 20/200 to 20/50 / 20/40 or better
- OTS 1: 73% / 17% / 7% / 2% / 1%
- OTS 2: 28% / 26% / 18% / 13% / 15%
- OTS 3: 2% / 11% / 15% / 28% / 44%
- OTS 4: 1% / 2% / 2% / 21% / 74%
- OTS5: 0% / 1% / 2% / 5% / 92%

Trauma

EYELID LACERATIONS

Step 0: Come Prepared

1. Sutures
    a. 5-0 fast absorbing gut for most skin closures
    b. 5-0 and 7-0 Vicryl for margin-involving lid lac
    c. 4-0 Vicryl on a P-3 needle for deep closure outside the lid where septum is not present
    d. Rarely 6-0 Prolene for eyelid skin closure
    e. 5-0 Prolene for brow and forehead skin closure
2. General surgery plastics tray from nurse's station (may already be in room 9)
    a. This contains your locking needle driver, Paufique forceps, a Desmarres retractor, suture scissors, Westcott scissors, etc.
    b. MUST be returned to the soiled utility room by our nurse's station when you're finished or soiled utility area in ED if it is the ED tray - ask charge nurse
3. 2% lidocaine with 1:100,000 epinephrine (can combine with 0.5% bupivacaine in a 1:1 mixture for longer anesthesia) – should be in call bag, if not get from nurses station
4. 3 or 5 cc syringe depending on how much local you will need
5. 20G needle to draw up the lido, 27G or 30G to inject it
6. Punctal dilator, Bowman probes (size 00 or 0) and 23G curved lacrimal cannula on a 3cc syringe filled with fluorescein-infused sterile saline if you fear canalicular involvement – there is a dilator, probe, and cannula in the general surgery tray (all in our nursing stations)
7. Topical 0.5% proparacaine
8. Betadine swabs (available in omnicell)
9. Sterile saline to irrigate and clean the wound (available in omnicell or ED)
10. Sterile gloves for you and your senior (available in omnicell or ED)
11. Sterile plastic adhesive drapes (available in the minor room; they have a circular opening that can be centered on your operative site)
12. Sterile gauze and Qtips (conveniently packaged together in our nurse's station or ED)
13. Sterile pads or towels to expand your sterile field
14. Erythromycin ophthalmic ointment (order from the ED for “now” and nurses will provide it)

Step 1: *ALWAYS* clear the globe

Step 2: History

- Patient age
- Mechanism of Injury:
    - What was the object that inflicted the injury?
    - Dog bites: Recommend dog be put down (the second bite is always worse than the first) and give antibiotics covering mixed flora (e.g. Streptococcal spp., Anaerobes, Pasteurella, and Gram Negative Rods)
        - Ampicillin/Sulbactam (Unasyn®): 1.5-3gm IV q6h [adults], 150-300mg/kg/d IV divided q6h [pediatrics]
        - Amoxicillin/Clavulanate (Augmentin®): 875mg/125mg PO bid [adults], 25mg/kg/d PO divided bid [pediatrics]
        - Meropenem: 500mg IV q8h [adults] with dose adjustment for CrCl < 51mL/min, 10mg/kg (max dose: 500mg) IV q8h [pediatrics]
        - Moxifloxacin: 400mg IV or PO qd [adults], contraindicated in pediatric

        - Clindamycin (misses GNR and Pasteurella): 600-900mg IV q8h or 300-450mg PO q6h [adults], 20-40mg/kg/d IV or 8-16mg/kg/d divided in 3 or 4 equal doses [pediatrics]
    - Is there a potential for retained foreign body (metal vs organic material)?
- Time lapse since injury occurred
- Last oral intake
- Last Tetanus shot

Step 3: Exam

- Take a picture for before and after, or to send to a senior/fellow as below
- Look for *RED FLAGS* that warrant senior/fellow involvement:
    - visible orbital fat - signifies septal violation concerning for damage to deeper structures
        - consider CT imaging
    - laceration of the eyelid margin - requires meticulous closure to avoid long-term sequela from lid margin notching
    - damage to the lacrimal system - shearing forces commonly damage the medial canthal structures
        - suspect with any laceration medial to puncta
        - confirm with probe or irrigation
        - call senior and then likely plastics fellow who will determine repair in ED vs OR, usually repair in the OR within 24-48 hours
    - *<u>*NOTE*</u>: If you feel uncomfortable, err on the side of caution - call your senior resident

Step 4: Repair

- Obtain consent (ask ED nurse or admins for procedure consent forms and patient stickers)
- Anesthetize (1 or 2% lidocaine with 1:100,000 epi in 3 or 5 cc syringe with 27 gauge needle)
- Explore wound
- Irrigate with copious amounts of sterile saline
- Anti-Sepsis: prep with 5% Betadine
- Prepare a sterile surgical field utilizing Mayo stand with sterile drape cloths (can then open and arrange instruments and suture), sterile gloves, mask, and sterile drape
- Close the wound
    - General Principles
        - Tissue is almost never missing
        - Strive for tension-free closure to avoid lagophthalmos/exposure keratopathy
        - Unless completely unavoidable, avoid making vertically-oriented suture passes as closing a horizontally-oriented wound with vertically-oriented suture passes can cause vertical cicatrization resulting in ectropion/lagophthalmos/exposure keratopathy
        - Cicatricial changes always pull the lower lid down—attempt to elevate the lower lid as much as possible during repair
        - *NEVER* suture the orbital septum
    - Suture selection:
        - Simple skin closure with 5-0 fast absorbing
            - close deep with 5-0 vicryl
            - margin involving laceration: 5-0 vicryl partial thickness bites to approximate tarsus, 6-0 or 7-0 vicryl vertical mattress at lid margin (one at Meibomian gland orifices, one at lash line)

        - consider patient expectations regarding scarring (avoid 5-0 Fast Gut when cosmetics are important)
        - patient reliability for follow-up (avoid non-absorbable sutures in patients unlikely to return for removal)
            - if sure patient will follow up, can consider 7-0 vicryl (this is absorbable) or 6-0 prolene
        - amount of tension (braided sutures are superior for wound closure on tension)
        - complexity of laceration/necessity of both deep and cutaneous closures (use 5-0 or 6-0 Vicryl for deep closures)
    - Suturing techniques
        - simple, interrupted closure is sufficient and preferable in most cases
        - place first suture around the middle of the wound, then continue to halve the remaining unclosed wound segments
        - for extensive lacerations, a running closure is more expedient
        - can use a combination of interrupted and running closures, with interrupted sutures placed at points of tension and locations where the laceration changes direction

Suture	Absorbability	Filament Type	Advantages	Disadvantages
5-0 Fast Gut	absorbable (1 week)	mono	infection less likely	more difficult to handle highly inflammatory
6-0 prolene	Non-absorbable	mono	Minimally inflammatory	Fragility, expense
7-0 Vicryl	absorbable (4-6 weeks)	braided	easy to handle, least inflammatory of absorbable sutures	infection and suture granuloma more likely
7-0 Nylon	non-absorbable	mono	least inflammatory, best aesthetic outcomes, infection less likely	requires follow-up for removal

    - Apply Erythromycin ophthalmic ointment to the wound
        - If patient has an Erythromycin allergy, can use Bacitracin ointment or Polysporin® (Bacitracin + Polymyxin B) ointment

Step 5: Post-closure cares/follow-up

- Apply Erythromycin (vs Bacitracin vs Polysporin®) ophthalmic ointment to the wound TID
- Discuss with fellow and arrange follow-up in Oculoplastics Clinic within 10 days
- Remove sutures (if Vicryl or Prolene were used) 6-10 days post-operatively

Step 6: Wound management/scar maintenance

- Avoid direct sunlight exposure for 1 year
- *Once wound is healed…* MASSAGE, MASSAGE, MASSAGE
- 20 strokes TID
- Topical Vitamin E or Mederma

Hyphema

Definition: blood in the anterior chamber

- Microhyphema = suspended cells only without layering
- 8-ball hyphema = clotted hyphema (dark color due to deoxygenated blood = aqueous not circulating)
- Total hyphema = blood filling all of AC but oxygenated/red = circulating aqueous

History: Mechanism & time of the injury (i.e. spontaneous vs. traumatic), use of antiplatelet or anticoagulant therapy, sickle cell (always suspect if African American)

Exam: r/o open-globe, VA, IOP, Slit lamp (note character, extent, color of hyphema, measure dimensions), check for NVI, DFE
*Avoid gonioscopy during the first week.

Ancillary Studies:

- Sickle cell work up in African American
- If you have no view to the back, a gentle B-scan is appropriate, but be very gentle!

Goals

1. Prevent secondary hemorrhage (greatest risk in first 5 days)
2. Control elevated IOP (occurs in about 1/3 of patients)
3. Minimize complications: corneal blood stain, optic atrophy, glaucomatous damage

Outpatient treatment

1. To see next day, then day 4 – monitor for re-bleed and IOP spike
2. Limited activity with head elevation as much as possible.
3. Atropine or cyclopentolate BID (for cycloplegia and prevention of pupillary block/synechiae)
4. Prednisolone acetate 1% QID at minimum
5. Control IOP as needed
6. Most of the techniques above are common teaching although a Cochrane review published in 2019 found no significant effect on short or long term visual outcomes with any of the mentioned interventions, in addition to aminocaproic or transexamic acid (pro-coagulants)

Indications for Surgery:

**Most hyphemas, including total hyphemas, should be treated medically for the first 4 days.

1. Microscopic corneal blood staining (at any time)
2. IOP >50 mmHg despite maximum medical mgmt for >5days, or >35 mmHg for 7 days (to prevent optic atrophy)
3. Total hyphema or >75% of AC present for 6 days with IOP >24 mmHg (to prevent corneal blood staining)
4. Hyphemas >50% retained longer than 8 days (to prevent peripheral anterior synechiae)
5. Sickle-cell trait or sickle-cell disease patients with hyphema of any size and IOP > 35 mmHg > 24 hours

Patient Instructions

1. Watch for decrease in vision (secondary hemorrhage) or pain (elevated IOP)
2. Avoid antiplatelet or anticoagulant
3. No strenuous activities for 2 weeks. Do not resume normal activities before 4 weeks after injury.

Suggested smartphrase:

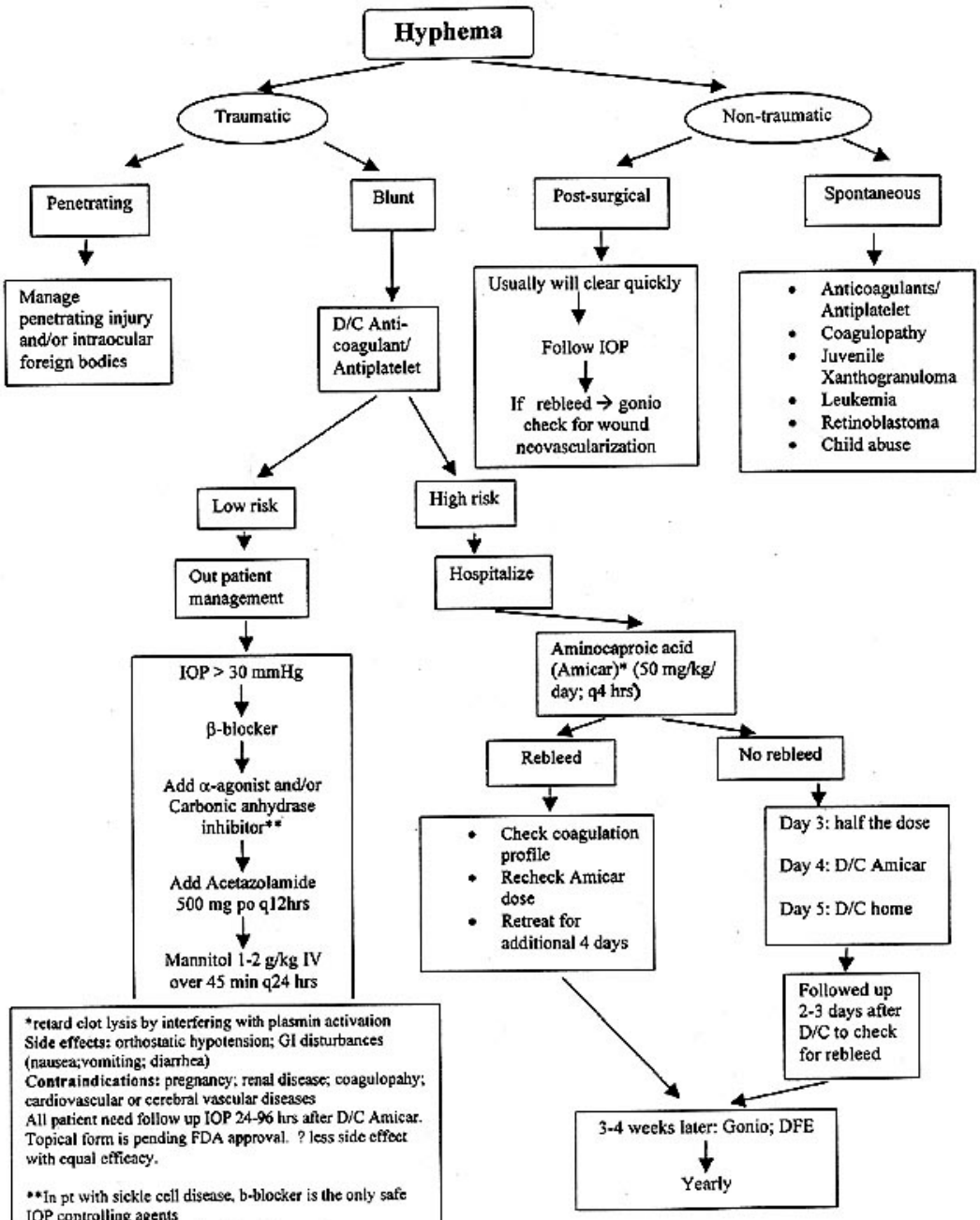
 # Hyphema, * eye:** Secondary to blunt trauma***. No evidence of open globe injury (normal visual acuity, intraocular pressure, lack of afferent pupillary defect and lack of vitreous hemorrhage all evidence against open globe injury). No personal or family hx of coagulopathy or sickle cell disease or trait. Not*** on anticoagulants.

- Recommended bed rest with bathroom privileges for 1 week
- Elevate head of bed to allow blood to settle (30 degrees)
- Cyclopentolate 1% bid to affected eye
- Avoid aspirin-containing products and NSAIDs (ibuprofen) unless medically necessary
- *** prednisolone acetate 1% (qid-q1h) to affected eye for iritis
- *** timolol 0.5% bid to affected eye for elevated intraocular pressure (no history of asthma)
- Discussed warning signs and symptoms for which to contact us, including sudden decrease in vision or increase in pain which may be a sign of a rebleed
-*** If African American: Sickle Cell workup should be performed within 24hrs.***

Follow-up in clinic in 1 day and also on day 4 ***vs***To be seen on the floor daily*** for pressure check

References:

1. Gottsch JD. Hyphema: diagnosis and management. Retina. 1990;10 Suppl 1:S65-71. PMID: 219138
2. Crouch ER Jr, Crouch ER. Management of traumatic hyphema: therapeutic options. J Pediatr Ophthalmol Strabismus. 1999 Sep-Oct;36(5):238-50. PMID: 10505828
3. Gharaibeh A, Savage HI, Scherer RW, Goldberg MF, Lindsley K. Medical interventions for traumatic hyphema. *Cochrane Database Syst Rev*. 2019;1:CD005431. doi:10.1002/14651858.CD005431.pub4


Hyphema
Traumatic
Non-traumatic
Penetrating
Blunt
Post-surgical
Spontaneous
Manage penetrating injury and/or intraocular foreign bodies
D/C Anti-coagulant/ Antiplatelet
Usually will clear quickly
Follow IOP
If rebleed → gonio check for wound neovascularization
Anticoagulants/ Antiplatelet
Coagulopathy
Juvenile Xanthogranuloma
Leukemia
Retinoblastoma
Child abuse
Low risk
High risk
Out patient management
Hospitalize
IOP > 30 mmHg
β-blocker
Add α-agonist and/or Carbonic anhydrase inhibitor**
Add Acetazolamide 500 mg po q12hrs
Mannitol 1-2 g/kg IV over 45 min q24 hrs
Aminocaproic acid (Amicar)* (50 mg/kg/ day; q4 hrs)
Rebleed
No rebleed
Check coagulation profile
Recheck Amicar dose
Retreat for additional 4 days
Day 3: half the dose
Day 4: D/C Amicar
Day 5: D/C home
Followed up 2-3 days after D/C to check for rebleed
3-4 weeks later: Gonio; DFE
Yearly
*retard clot lysis by interfering with plasmin activation
Side effects: orthostatic hypotension; GI disturbances (nausea;vomiting; diarrhea)
Contraindications: pregnancy; renal disease; coagulopahy; cardiovascular or cerebral vascular diseases
All patient need follow up IOP 24-96 hrs after D/C Amicar. Topical form is pending FDA approval. ? less side effect with equal efficacy.
**In pt with sickle cell disease, b-blocker is the only safe IOP controlling agents
CAI: dec AC pH; α-agonist: affect iris vasculature; epinephrine: dec O2 in AC and inc inflammation; latanoprost: inc inflammation; diuretic: volume contraction and acidosis; methazolamide 50 mg po q8hr may be needed (controversial)

ENDOPHTHALMITIS

*Important: MUST CALL PHARMACY FOR INTRAVITREAL ABX: 6-3040 (night/weekend) vs 4-6902 (clinic hours)

Categories:

1. Exogenous
   Post-operative: Acute < 6 weeks, Delayed > 6 weeks (0.1% post uncomplicated CE/IOL)
   Post-traumatic: Contiguous infections
2. Endogenous – need medicine or ID consult to aid in finding source

History: Intraocular surgery or injections, trauma, septicemia/systemic symptoms, IV drug abuse, microbial keratitis

Exam: VA/IOP/Slit lamp/DFE/echo

Signs and Symptoms: Decreased VA, photophobia, chemosis/lid edema, hypopyon (*non-shifting*; this implies the presence of fibrin which is less common in autoimmune hypopyon), corneal edema/infiltrate, vitreous cell, periphlebitis, inflammation greater than the usual clinical course

Differential Diagnosis: TASS, retained lens material, inflammatory conditions, aseptic endophthalmitis

Factors determining outcome:

- Time to diagnosis
- Time to treatment (hence, do an efficient exam and get the antibiotics to the vitreous ASAP)
    - If diagnosis known prior to patient arrival (ie outside provider) can have intra-vit abx ready
- Organisms
    - Acute post-operative: staph epidermidis
    - Delayed post-operative: Propionibacterium acnes
    - Bleb associated: Haemophilus or Streptococcus
    - Post-traumatic: Bacillus cereus

Preparation:

- Order set for microbiology (can use cornea order set)
    - Gram stain and culture plates/media (in cornea clinic fridge)
- Intra-vitreal antibiotics (call pharmacy ASAP, as noted above) and order as non-sterile casing
    - Ask them to send the medications to tube station 510 (eye clinic by the nurses station)
    - Vancomycin: 1mg/ 0.1 ml intravitreal (overfill syringe to 0.5 ml); 25mg/1.0 ml subconj
    - Ceftazidime: 2mg/0.1ml intravitreal; 25 mg/0.5ml subconj
    - PCN allergic: Gentamycin 200 mcg/0.1ml
- For vit tap – use 25 gauge needle
- For vit inject – use 30 gauge needle

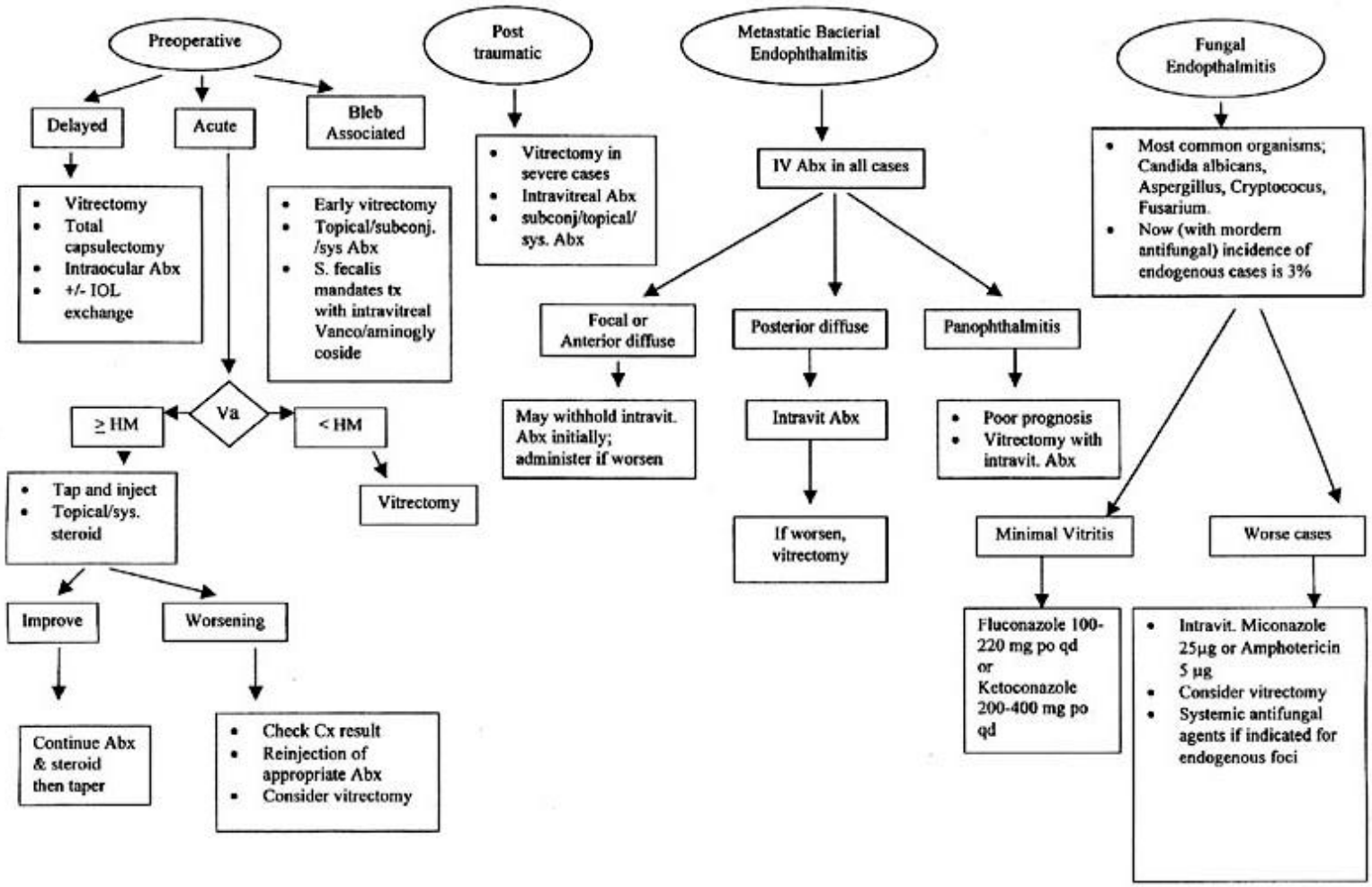
Management

Endophthalmitis Vitrectomy Study (EVS): pertains to cataract surgery, careful extrapolating to other patients

Patients: Endophthalmitis within 6 wks after CE

Results: HM or better: Tap and Inject
LP: immediate vitrectomy
IV antibiotics do not make any difference

Endophthalmitis



Classification of the Anterior Chamber Angle

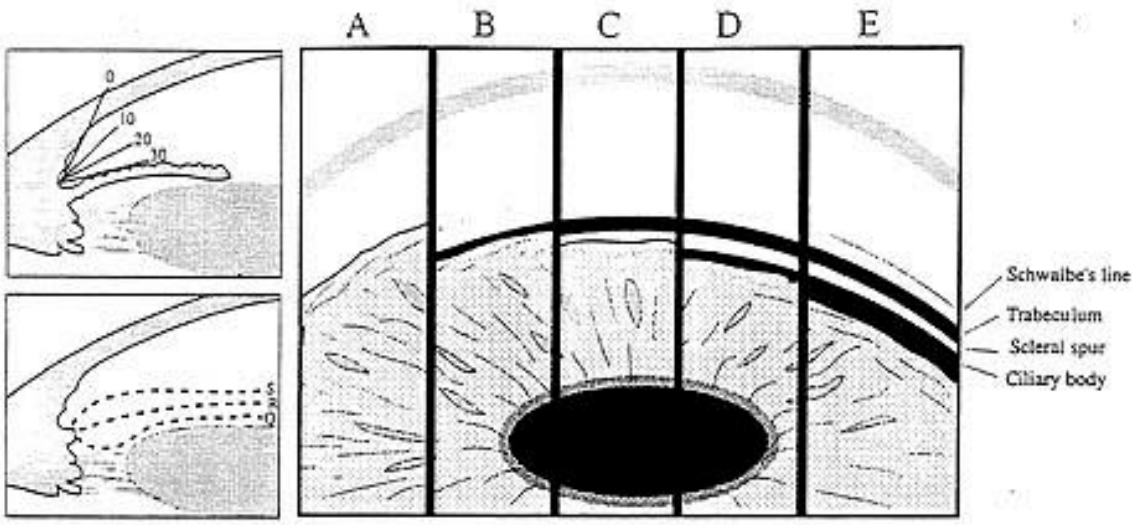


Figure A-7
Spaeth's classification of the anterior-chamber angle.

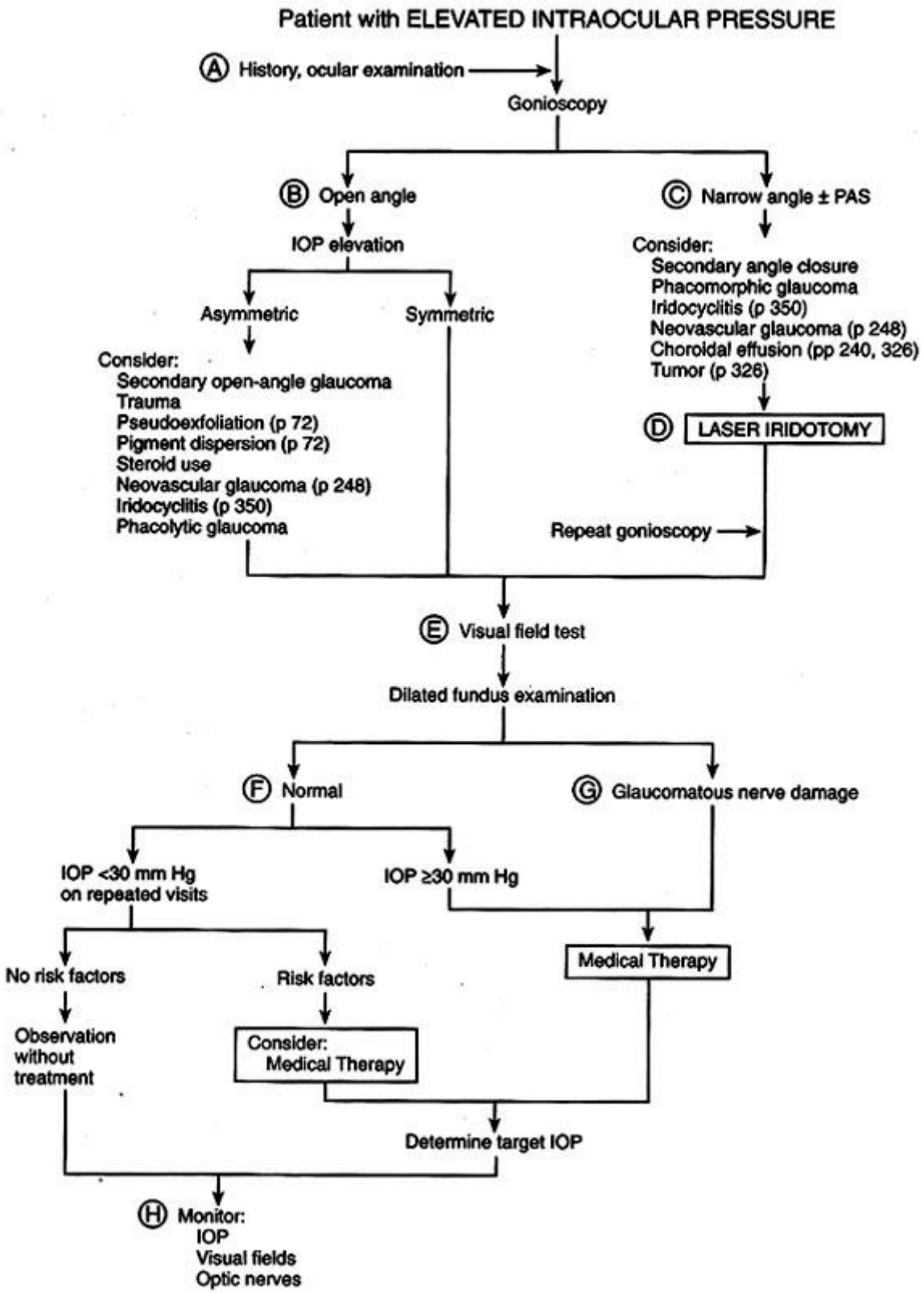
Spaeth System for Grading Angle Widths:
A (Anterior): iris inserts anterior to Schwalbe's line
B (Behind Schwalbe's line): anterior to posterior limits of the TM
C (Sclera): posterior to the sclera spur
D (Deep): into the ciliary body
E (Extremely deep): into the ciliary body

Angular Width:
Estimated angle (expressed in degrees) formed between a line tangential to the trabecular meshwork and a line tangential to the iris surface about one third of the way from the periphery

Iris configuration:
F: flat
S: steep curvature
P: plateau

Van Herrick System
(good for estimate but you should do gonioscopy exam whenever possible)

Grade of angle	*Depth of peripheral chamber*
4	≥ corneal thickness
3	¼ -1/2 corneal thickness
2	¼ corneal thickness
1	< ¼ corneal thickness
slit	Dangerously narrow



Reference:

1. van Heuven WAJ, Zwaan J. *Decision Making in Ophthalmology: an algorithmic approach.* Mosby, 2000. Used with permission from Mosby.

Laser Settings:

Argon LPI
Size: 50um
Duration: 0.02-0.2sec
Wavelength: Argon blue green
Power: 1W
Contact lens: Abraham, Wise

Pretreat: Pilocarpine 2% & Brimonidine Tartrate 0.2%, proparacaine
Post-treatment: Check IOP one hour after procedure
Rx: Prednisolone acetate (either 16d taper or QID x 4 days)
Follow-up: If needed in other eye: 2 weeks, otherwise 1 mo f/u

YAG LPI
Size: fixed
Duration: Fixed nanoseconds
Power: 1-2mJ
Wavelength: YAG
Contact lens: Abraham, Wise, Lasag CGI

YAG capsulotomy
Size: fixed
Duration: fixed
Power: 1.2-2mJ
Wavelength: YAG
Contact lens: Abraham YAG lens

Pretreat: dilate, Brimonidine Tartrate 0.2%, proparacaine
Post-treatment: Brimonidine Tartrate 0.2%
Follow-up: 1 mo

ALT
Size: 50um
Duration: 0.1sec
Power: 200-1200mW
Wavelength: Argon green or blue-green
Contact lens: Goldmann 3-mirror

SLT
Size: 400um
Duration: fixed
Energy: 0.5-1.2mJ
Wavelength: 532nm Nd:YAG
Contact lens: Goldmann 3-mirror or Latina

Pretreat: Brimonidine Tartrate 0.2%, Proparacaine HCl 0.5%
Post-treatment: Check IOP one hour after procedure
Rx: +/- Prednisolone acetate (either 16d taper or QID x 4 days)
Follow-up: 6 weeks

Argon Laser Iridoplasty
Size: 200-500um
Duration: 0.2-0.5sec
Power: 150-300mW
Wavelength: Argon blue-green
Contact lens: None, Goldmann 3-mirror

Transpupillary Cyclophotocoagulation
Size: 50-200um
Duration: 0.1-0.2sec
Power: 500-1000mW
Application: 3-5 per ciliary body process
Circumference treated: Up to 180 degrees

Endophotocoagulation
Size: Fixed 20-gauge probe
Duration: 0.1-0.2sec
Power: 500-1000mW
Application: 3-5 per ciliary body process
Circumference treated: 180-360 degrees

Noncontact Nd:YAG Transscleral Cyclophotocoagulation
Size: Fixed
Duration: 10-20msec
Power: 4-8 J
Applications: 32
Circumference treated: 360 degrees

Contact Nd:YAG Transscleral Cyclophotocoagulation
Size: Fixed, quartz probe
Duration: 0.5-0.7msec
Power: 4-9
Applications: 32
Circumference Treated: 360 degrees or 270 degrees, sparing superonasal quadrant

Contact Semiconductor Diode Laser Cyclophotocoagulation
Size: Fixed, quartz probe
Duration: 2 sec
Power: 1750-2000 mW
Applications: 17-24
Circumference Treated: 270-360 degrees

Laser Suture Lysis
Size: 50-100um
Duration: 0.02-0.05sec
Power: 250-500mW
Wavelength: Argon green, Krypton red
Contact lens: Hoskins, Ritch

Diabetic Retinopathy PRP:
Size: 200microns Superquad, 350microns Rodenstock, 500microns Pancake/Goldmann
Duration: 20ms (titrate as needed)
Power: 200mW
Increase: +50mW increments
Wavelength: Argon green
CL: Rodenstock, Pancake, Goldmann, Superquad

Macular Edema Focal Laser:
Size: 50-200um
Duration: 0.1sec
Power: 100mW
Increase: +50mW increments
Wavelength: Argon green
Contact lens: Goldmann, Yanuzzi, Pancake

Diffuse Macular Edema Laser Grid Treatment:
Size: 100-200um
Duration: 0.1sec
Power: 100mW
Increase: +50mW increments
Wavelength: Argon green
Contact lens: Goldmann, Yanuzzi, Pancake

BRVO Macular Edema Laser
Size: 100-200um
Duration: 0.1sec
Power: 100mW
Increase: +50mW increments
Wavelength: Argon green
Contact lens: Goldmann, Yanuzzi, Pancake

BRVO Neovascularization Laser
Size: 200-500um
Duration: 0.1sec
Power: 200mW
Increase: +50mW increments
Wavelength: Argon green
Contact lens: Rodenstock

CNVM Laser Photocoagulation
Size: 200-500um
Duration: 0.2-0.5sec
Power: 200mW
Increase: +50mW increments
Wavelength: Argon green, Krypton red
Contact lens: Yanuzzi, Pancake

Retinal Angioma Photocoagulation
Size: 200-500um
Duration: 0.2-0.5sec
Power: 180mW
Wavelength: Argon green, Dye yellow
Contact lens: Goldmann, Rodenstock

Retinal Telangiectasis Photocoagulation
Size: 200-500um
Duration: 0.2-0.5sec
Power: 150mW
Wavelength: Argon green, Dye yellow
Contact lens: Goldmann, Rodenstock

Juxtafoveal Retinal Telangiectasis
Size: 50-100um
Duration: 0.05-0.1 sec
Power: 150mW
Wavelength: Argon green
Contact lens: Goldmann

Choroidal Cavernous Hemangioma Photocoagulation
Size: 300-1000um
Duration: 0.2-0.5sec
Power: 150mW
Increase: +50mW increments
Wavelength: Argon green, Krypton red, Argon blue-green, Dye yellow
Contact lens: Rodenstock, Goldmann, Pancake

Retinal Break Treatment
Size: 200-400um
Duration: 0.1-0.2sec
Power: 150mW
Increase: +10-20mW increments
Wavelength: Argon green, Krypton red
Contact lens: Goldmann, 4-mirror, Panfundus

Retina Fundus Drawings

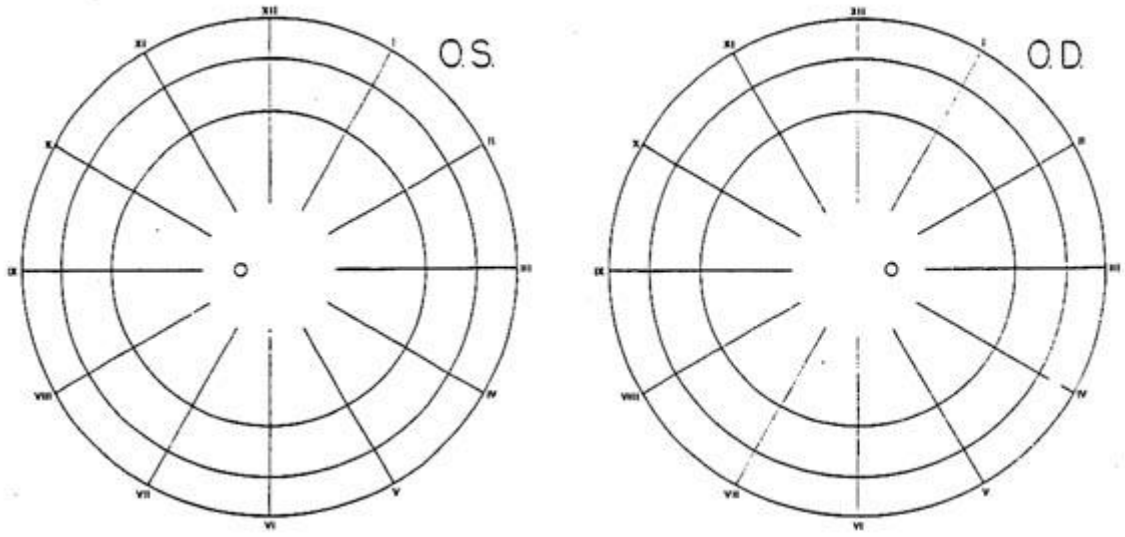


Chart contains three concentric circles. Inner circle represents equator, middle circle represents ora serrata, and outer circle represents region of ciliary processes. Band between middle and outer circles is pars plana of ciliary body. Small circle in center of chart represents disc.

Standard key to colors in fundus sketch
Blue – detached retina, macular, edema, retina veins
Red – attached retina, retinal arteries, hemorrhage in retina
Red Lined w/blue – retinal breaks
Black – retinal pigmentation, choroidal pigmentation when seen through attached retina
Brown – choroidal pigmentation seen through detached retina
Green – opacities in media, including vit hemorrhage, Weiss ring
Yellow – chorioretinal exudation

On call, you can use epic drawing tool or you can find fundus drawing paper at the retina front desk.

If you hand draw something on call that you would like to include in the chart, put the patient's sticker or identifying information on the paper and turn it into the nurses' station to be scanned.

Retina Studies

Diabetic Retinopathy Study (DRS):

Questions: Does PRP decrease severe visual loss (SVL = 20/800 or > 6 lines loss) in patients who meet high risk criterion (HRC)?

Results: >50% reduction in the rate of SVL in patients with HRC

Non Proliferative Diabetic Retinopathy (NPDR):

A. Mild: at least one microaneurysm (Heme/Ma < std. photo 2A) not met B,C,D

B. Moderate: Heme/MA std. photo 2A/ CWS/HE, VB and/or IRMA not met C,D

C. Severe (15% progress to PDR in 1 year): Heme/MA in all 4 quadrants or
VB in 2 or more quadrants > std. photo 6B or
IRMA > std. photo 8A in at least 1 quadrant

D. Very Severe (50% progress to PDR in 1 year): 2 or more of C above

Proliferative Diabetic Retinopathy (PDR):

A. Early: new blood vessels on the disc (NVD) or elsewhere (NVE) and definition not met by HRC

B. High risk = Any 1 of the following:

1. NVD > std photo 10A (1/3 - 1/2 DA)
2. Any NVD + vitreous hemorrhage
3. NVE ≥ ½ DA + vitreous hemorrhage

*if hemorrhage obscures visualization of the retina, then new vessels are assumed to cover that area not visualized.

Early Treatment Diabetic Retinopathy Study (ETDRS):

A. Defined Clinically Significant Macular Edema (CSME):

1. retinal thickening within 500 um (1/3 DD) of macular center *or*
2. hard exudate (HE) within 500 um of macular center with associated thickened retina *or*
3. retinal thickening at least 1 DA in size, at least part of which is within 1 DD of center

**VA is not included in the definition of CSME and FA is not required for diagnosis but will aid treatment. Macular laser treatment in CSME reduces risk of doubling of the visual angle over 3 year period. The goal is to prevent worsened not to improve vision in the future.*

B. Confirmed DRS that optimal timing for initiating PRP is at stage of high risk PDR

C. Aspirin use (650 mg Qday) was neither helpful nor harmful in diabetic retinopathy

D. Focal laser decreased vision loss from macular edema by 50% in patients with severe NPDR or early PDR with macular edema

Diabetic Retinopathy Vitrectomy Study (DRVS):

Results: Type I diabetes with severe vitreous hemorrhage benefits from early vitrectomy (1-6 months after onset of VH) as compared to late (1 year). No benefit for Type II or mixed.

Diabetes Control and Complications Trial (DCCT)

Results: Incidence of DR after 5 years was 50% less in patients with intensive blood sugar control vs. conventional therapy; patients with A1c <8% had reduced risk of DR; intensive control had a 2-3x increase in severe hypoglycemia; rapid normalization of blood glucose after prolonged hyperglycemia can lead to a rebound worsening of retinopathy

Bilateral Optic Disc Edema

Use “papilledema” only when secondary to elevated ICP
See images of papilledema grading posted by Drs. Pham and Wall
(https://eyerounds.org/cases/papilledema-grading.htm)

Grade 0 (Normal)

- radial arrangement of peripapillary nerve fiber layer without axon bundle tortuosity
- blurring of superior and inferior poles is disregarded
- rarely, a major vessel may be obscured (especially superior pole)

Grade 1 (early disc swelling)

- blurring of nasal border (obscured by swollen peripapillary nerve fiber layer)
- radial arrangement of nerve fiber layer is disrupted
- temporal margin is flat and distinct (especially within papillomacular bundle)
- subtle grayish halo around disc with a temporal gap

Grade 2 (early disc swelling)

- elevation of nasal circumference
- blurring of temporal margin
- complete halo
- concentric or radiating retino-choroidal folds may be present

Grade 3 (moderate)

- elevation of temporal circumference
- increased diameter of nerve head
- circumpapillary halo has irregular outer fringe with finger-like extensions
- elevated borders totally obscure $\geq$1 segments of the major retinal vessels

Grade 4 (severe)

- elevation of entire nerve with
- obliteration of cup OR
- compression of cup into a slit OR
- total obscuration of a segment of the central retinal artery or vein

Grade 5 (severe - transitional stage towards progressive atrophy)

- anterior expansion dominates over lateral expansion
- nerve assumes a smooth, dome-shaped protrusion
- narrow and smoothly demarcated halo
- major retinal vessels climb steeply over dome surface
- segments of vessels may or may not be obscured by overlying swollen axons

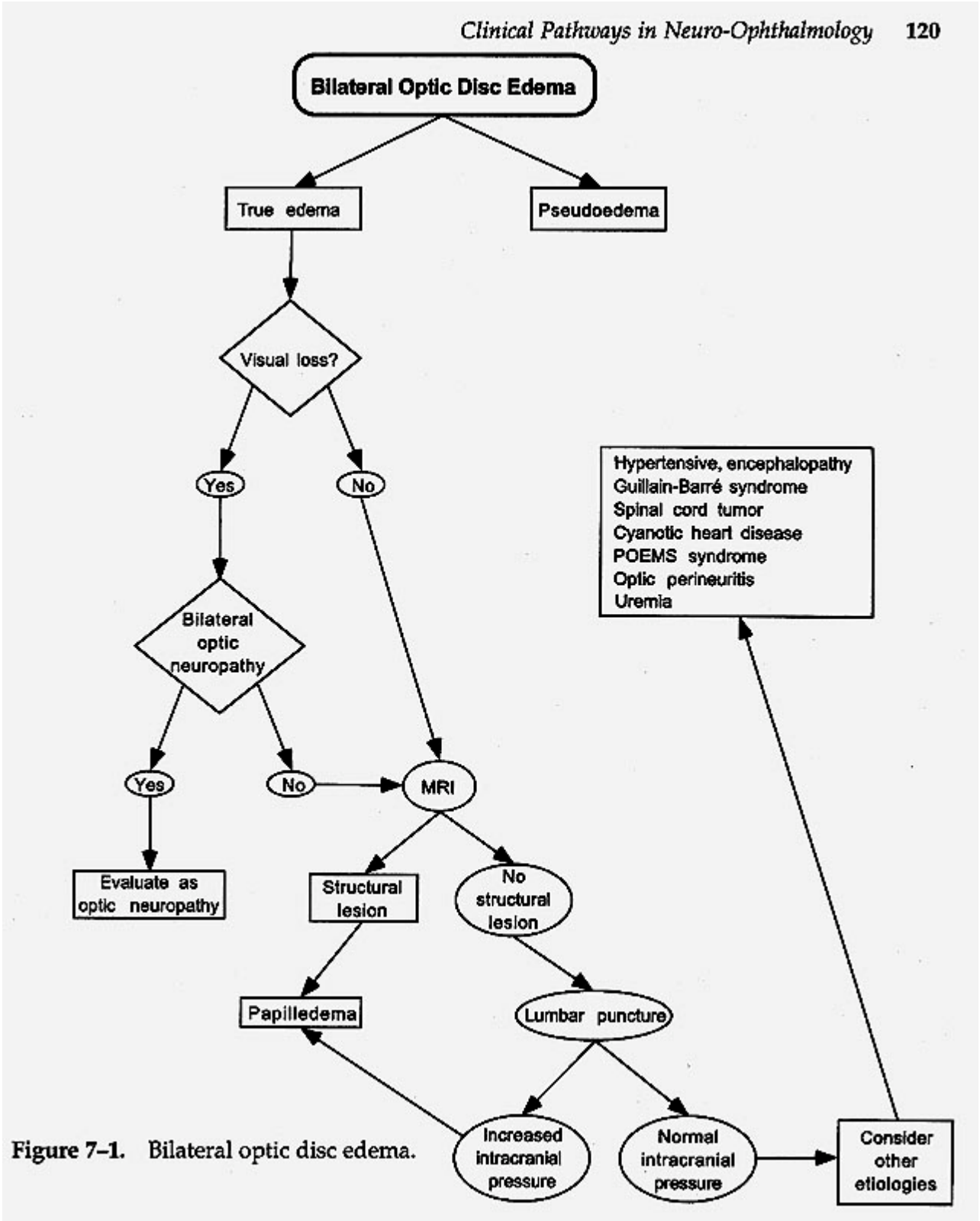


Figure 7–1. Bilateral optic disc edema.

From Lee AG, Brazis PW. *Clinical pathways in neuro-ophthalmology: an evidence-based approach*. Thieme, 1998

Idiopathic Intracranial Hypertension

Diagnosis - Modified Dandy Criteria:

1. Symptoms/signs of raised intracranial pressure - headache, nausea, vomiting, transient visual obscurations, disc edema
2. No localizing signs with the exception of abducens (sixth/6th) nerve palsy
3. The patient is awake and alert
4. Normal imaging (ideally MRI and MRV) except for signs of raised ICP including partially empty sella, dilated optic nerve sheaths, posterior globe flattening, or transverse venous sinus stenosis/collapse
5. CSF opening pressure of >20 cmH2O and normal CSF studies
6. No other explanation for raised ICP

Review of Systems:

1. Symptoms: weight changes, headaches, nausea, vomiting, transient visual changes, diplopia, photopsias, visual field defects, pulse-synchronous tinnitus
2. Medications: steroids, vitamin A derivatives (including ATRA; used for leukemia chemotherapy), tetracycline antibiotics, lithium
3. Other history: sleep apnea, personal or family history of thrombophilia

Work Up:

1. MRI brain with contrast, MRV head with contrast (note: do not need MRA head)
2. If patient is in ED, an LP may be performed provided that the CSF *opening pressure is measured with patient positioned in left lateral decubitus position.*
    a. CSF studies: CSF cell count, CSF protein, CSF glucose, and CSF cultures (aerobic and anerobic).
    b. For atypical presentation, contact neuro-oph fellow or faculty, to ask if further CSF studies (e.g., cytology, viral studies, etc) are needed
3. If patient is in ED and medically appropriate, consider holding off on LP and having it done under fluoroscopy by IR as outpatient (order for procedure and CSF studies will need to be placed on EPIC)

Treatment/Follow Up:

1. Contact senior, neuro-oph fellow, or neuro-oph faculty if fulminant presentation or significant vision loss at presentation (patient may need to be admitted for urgent intervention)
2. Discontinue any precipitating medications (e.g., tetracycline antibiotics)
3. Recommend weight loss if suspected idiopathic intracranial hypertension
4. Contact senior, neuro-oph fellow, or neuro-oph faculty to discuss starting acetazolamide versus at follow up and also to help facilitate the best time for follow-up in Neuro-Ophthalmology clinic

Neuro-Oph Imaging Studies

Updated as of 12/16/19 (Thurtell)

Thyroid Eye Disease

CT orbits without Contrast

Stroke

MRI brain w/o contrast (ADC and DWI)
MRA head/neck w/ contrast

Papilledema

MRI brain w/contrast
MRV head w/contrast
**sign elevated ICP = dilation of ON sheath, compressed pituitary/empty sella, posterior globe flattening, disc enhancement

Optic Neuritis

MRI orbits with contrast fat suppression (UIHC protocol will include sufficient brain imaging)
**write in comments concern for demylination
**look for additional MS lesions (perpendicular periventricular white matter lesions/Dawson's fingers; inc signal=white)

Unilateral Optic Neuropathy

MRI orbits w/contrast and fat suppression

Bilateral Optic Neuropathy and/or chiasmal syndrome

MRI orbits w/contrast (sella protocol) and fat suppression
+/- MRA head w/contrast to r/o aneurysm

Acute Painful Horner's syndrome

MRI neck (soft tissue) with fat suppression [Horner's protocol]
MRA head/neck w/contrast [Horner's protocol]

Acute third nerve palsy

MRI brain w/contrast
MRA head with contrast OR CTA head w/ ontrast

Multiple cranial nerve (CN) palsies

MRI brain w/contrast

Carotid-Cavernous Fistula

MRI brain w/contrast
MRA head w/contrast

Anisocoria, Giant Cell Arteritis and Diplopia Algorithms

Anisocoria that increases in dim light and diminishes in brighter light is either physiologic or caused by Horner's syndrome, a loss of sympathetic innervation to the dilator muscle.

Anisocoria that increases in bright light is indicative of a weak iris sphincter or parasympathetic lesion on the side that does not dilate well.

Figure from Focal points: Clinical modules for ophthalmologists: anisocoria, Vol. XXXI, Number 3. American Academy of Ophthalmology, 2013.

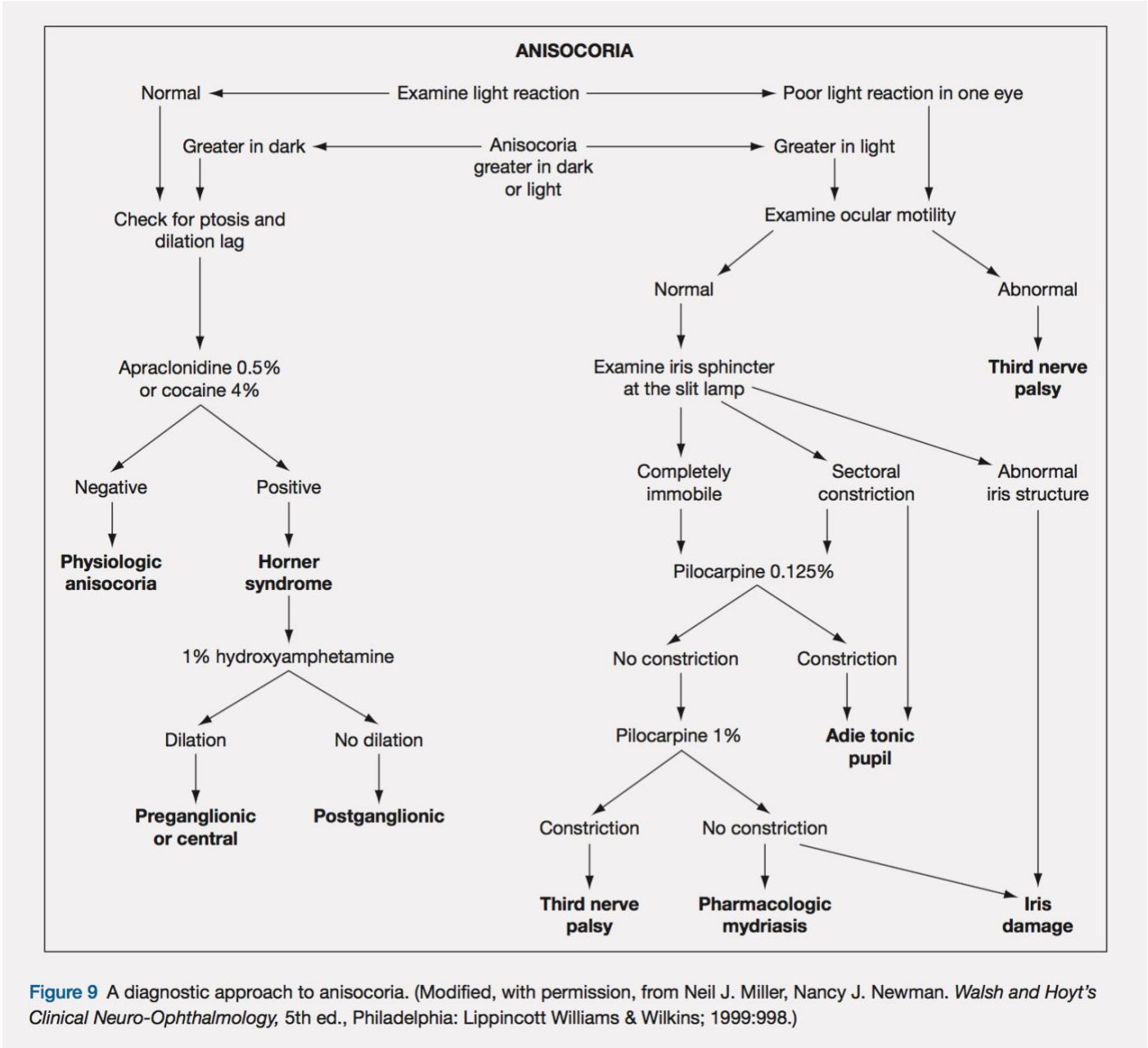


Figure 9 A diagnostic approach to anisocoria. (Modified, with permission, from Neil J. Miller, Nancy J. Newman. *Walsh and Hoyt's Clinical Neuro-Ophthalmology,* 5th ed., Philadelphia: Lippincott Williams & Wilkins; 1999:998.)

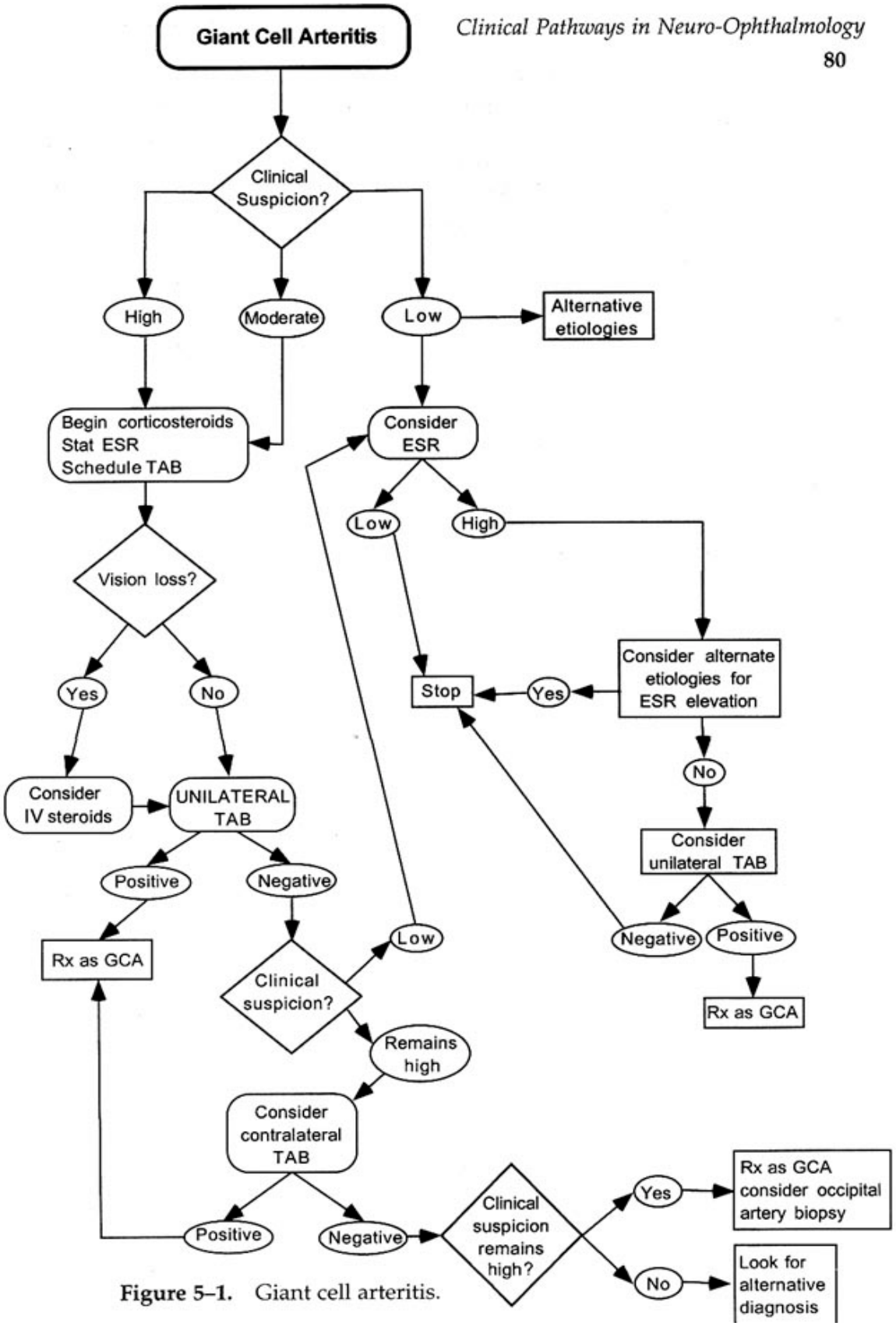
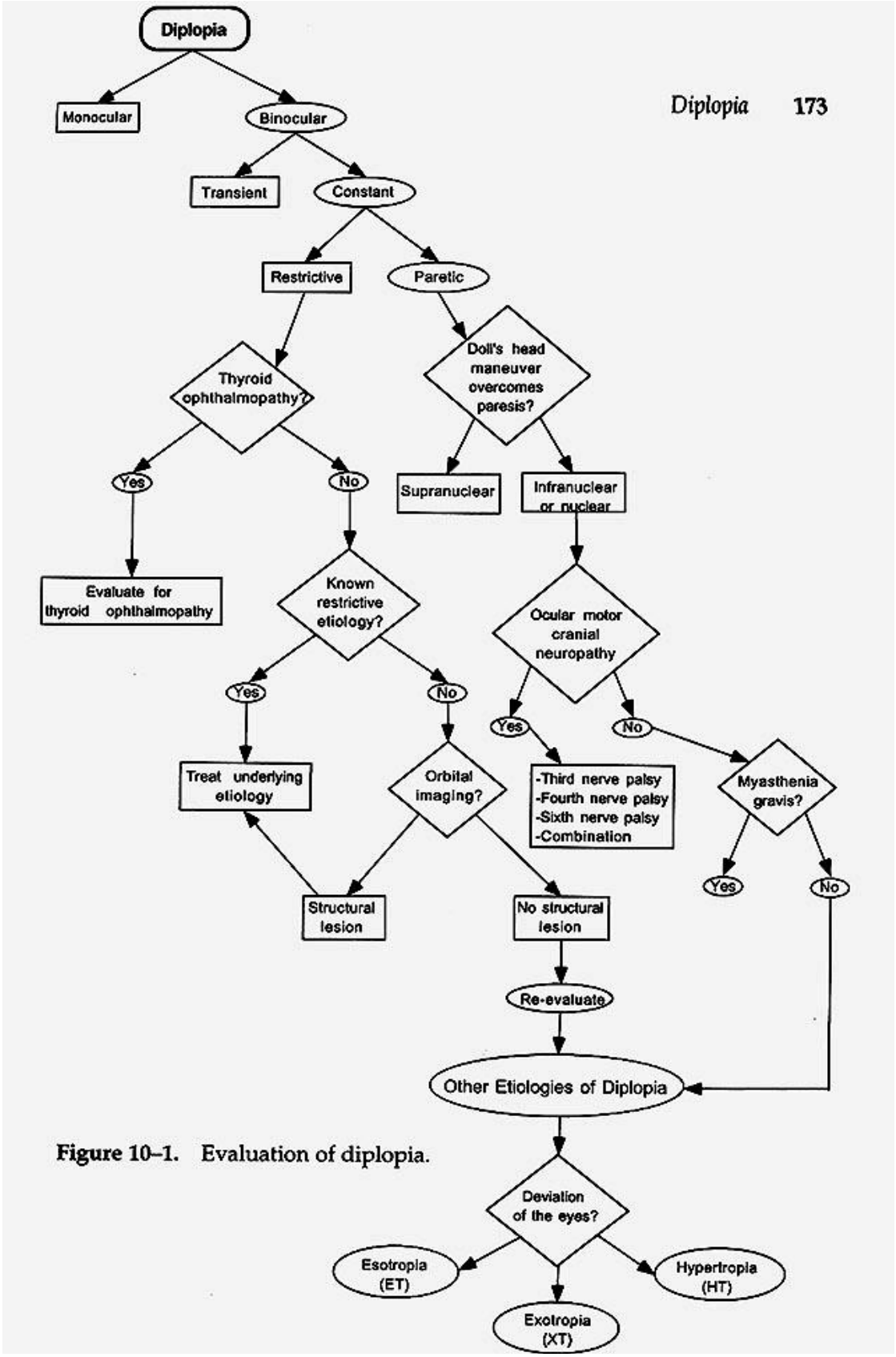


Figure 5–1. Giant cell arteritis.

fron Mosby, 2000.
Perr



Diplopia 173

Figure 10–1. Evaluation of diplopia.

From Lee AG, Brazis PW. *Clinical pathways in neuro-ophthalmology: an evidence-based approach*. Thieme, 1998. Permission to use this image is pending. If this request is denied, image will be deleted.

Dilating a Child

*** prior to seeing the child can place and inpatient rounding order for them to be at the bedside*

***Premies**: 2 months of age*

Cyclomydril (cyclopentolate/phenylephrine) 1 gtt x2, five min apart

***2 months**: 1 year*

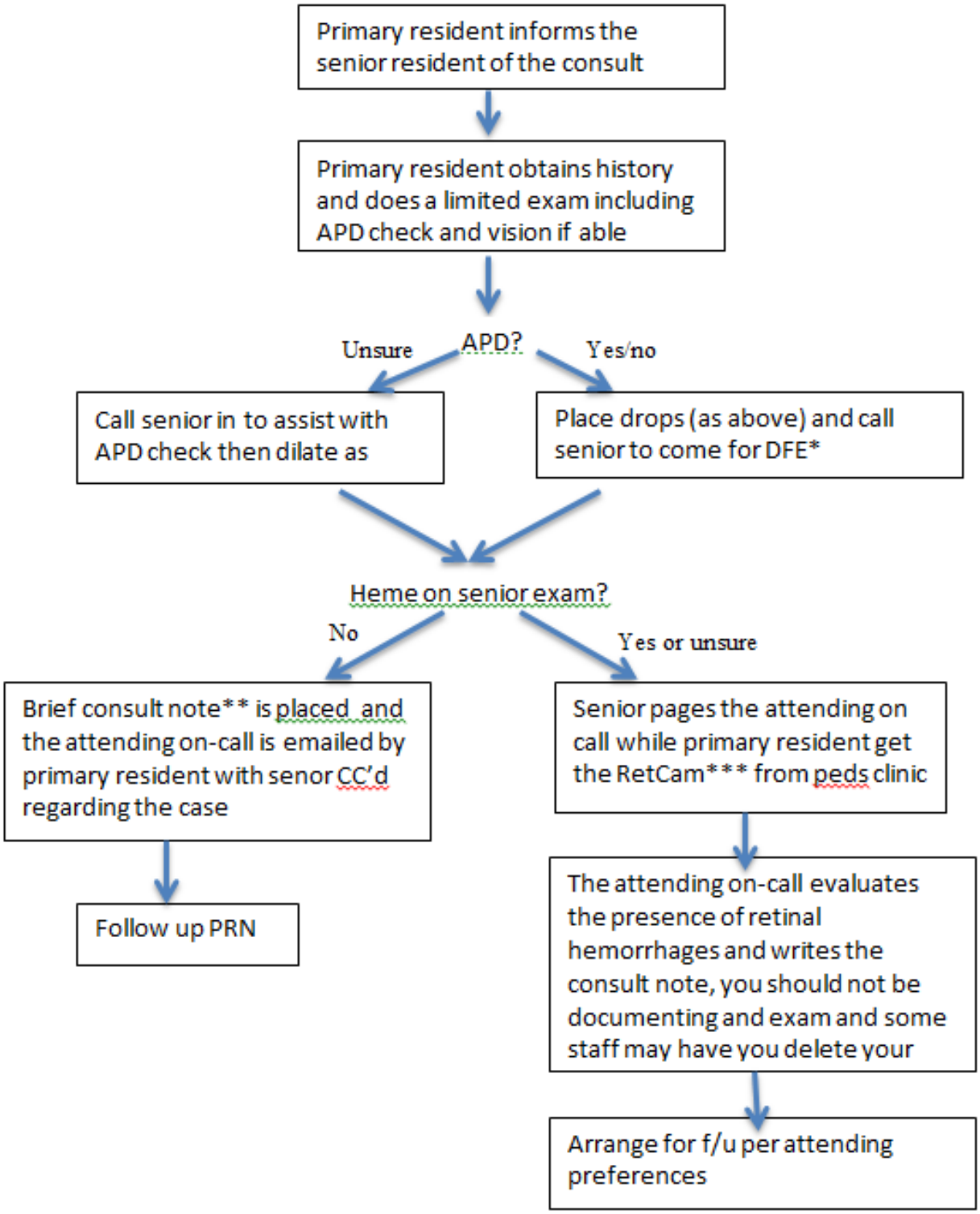
Cyclogyl 0.5% (cyclopentolate) 1 gtt x2, five min apart
+/- phenylephrine for dark irides

Over 1 year

Cyclogyl 1% (cyclopentolate) 1 gtt x2, five min apart
+/- phenylephrine for dark irides

Non-accidental Trauma Consult

Ophthalmology is often consulted to comment on the presence or absence of retinal hemorrhages in cases where child abuse is suspected. This can be highly sensitive and litigious. How to proceed:



***HINT:** children age six months or younger, a bundled exam using numbing drops and the Alphonso lid speculum is often needed

****DO NOT EVEN PEND A NOTE IN THESE PATIENT CHARTS – MUST BE DONE BY SENIOR OR STAFF**

******Using the Retcam***

For call purposes, the retcam is generally used for photo-documentation of positive findings in pediatric consults, particularly non-accidental trauma

The retcam is located in the peds procedure room. Make sure you have Genteal gel and proparacaine drops available. To use:

1. Power button below central unit of the computer
2. Press computer button to turn on computer itself
3. Turn on light source to the camera
4. Password is: Retcam12 (case sensitive)
5. Enter patient information, attending, select new session, ignore selecting eye
6. By convention, start with OD first
7. Save using either foot pedal or with mouse
8. End session and review to ensure images are adequate and save
9. Bring the RetCam to photography for them to transfer the images to the server

Postoperative Troubleshooting

General

It is a good idea to see all post-op patients who call.
Contact the attending surgeon if appropriate. Level of contact will vary between attendings so when in doubt ask senior resident

Cataract Extraction:

Be mindful of the possibility for endophthalmitis, elevated IOP, or Toxic Anterior Segment Syndrome (TASS)

Penetrating Keratoplasty:

Primary Graft Failure: occurs immediately post-op and reflects faulty donor tissue. High dose topical steroid but may need re-grafting

Secondary Graft Failure:

Rarely occurs within 2 wks but may occur as late as 20 yrs post PK
1/3 of grafts experience rejection but 1/3 of patient with rejection never report symptoms
Symptoms: decreased vision, mild pain, redness, photophobia
Signs: epithelial rejection line, sub-epithelial infiltrates, iritis (especially when accompanied by increased graft thickness), KP, endothelial rejection line (Khodadoust line), NV extending onto the graft
Treatment:

1. Topical steroid:
   Endothelial rejection: PF q1hr while awake; dexamethasone 0.1% ointment qhs
   Epithelial rejection: PF qid, or twice the current dose, whichever is more
2. Consider cycloplegic agents
3. Consider systemic steroid (PO or IV)
4. Control IOP if increased
5. Close f/u

Loose/broken sutures:

Suture can be cut with a bent needle (in Cornea clinic) Grasp knotted end with forceps and pull firmly
Vigamox or Zymar qid x 4 days
PF qid x 4 days then resume previous dose

Retina:

Take all eye or head pain seriously
Think about increased IOP, this should be ruled out before prescribing pain meds
Examine patient and discuss with senior or retina fellow at minimum

Plastics:

DCR/stenting: Ask the patient to tape the loose stent to the nose. Return to next plastic clinic
Conformers: if conformer falls out instruct patient to wash it up and attempt replacement on their own, otherwise arrange for follow up next day after informing plastics fellow

Glaucoma:

High IOP/flat chamber: aqueous misdirection, pupillary block, suprachoroidal hemorrhage
High IOP/normal chamber: tight suture, acute angle closure
Low IOP/flat chamber: wound/bleb leak, overfiltration

Post-op IOP spikes

Signs/symptoms:

Pain—usually achy that radiates to brow or around eye or headache, nausea/vomiting, red eye, corneal edema (resolves quickly with decrease in IOP), "halos" around lights from edema

Think etiology:

Pupillary block (phakic or not?--if the patient is aphakic you could still potentially get block from the anterior vitreous face); related to surgery: hyphema, endophthalmitis, ciliary body swelling (retinal laser), silicone oil, ciliary body or choroidal effusion; steroid induced --usually not before 3 weeks of use

Treatment:

Topicals: Cosopt
Brimonidine

Systemic:

Diamox 500 mg not sustained release for acute, can switch to sustained release once IOP is under control Can do IV if available
Mannitol (20%) 1g/kg
Methazolamide if cannot take diamox due to renal insufficiency

Procedures:

LPI – indicated for pupillary block only
Anterior chamber paracentesis
“Burp” wound

Things to Remember from Internship

(be thankful that we can consult services that manages these issues)

Pain

PO

Tylenol 500mg Q4-6 hours (limit 4g daily and up to 1g per dose without liver issues; limit 2g daily and 500mg per dose with liver issues)
Tylenol with codeine Q4-6 hours up to 2 tabs
Oxycodone/acetaminophen = Lortab = Vicodin doses: 5, 7.5, 10 comes with 500 mg Tylenol 1-2 tabs q4-6 hours (make sure not also taking regular Tylenol)
Oxycodone 5-10mg q4-6H (no Tylenol)
Longer acting: MS Contin (long acting oral morphine) or oxycontin (long-acting oxycodone)

IV

Morphine 1-2mg Q2-4H, this is a small dose
Dilaudid (Heavy D) 0.5 to 1mg Q2-4H – be careful of PCA (morphine then Dilaudid)

Nausea

Ondansetron (Zofran) 4mg Q4-8H PO or IV Compazine
Phenergan (IV can cause ischemia/necrosis)
Reglan (bowel motility agent)
Scopolamine patch
Dexamethasone (prior to leaving OR)

Sleep

Benadryl (watch out in the elderly) 25-50mg
Q6H prn Ambien 5-10mg QHS
Trazadone 25-50mg QHS

Agitation

Zyprexa (Zydis) 2.5-5mg Q6H
Quetiapine (Seroquel) 50mg
Lorazepam (Ativan) 0.5-1mg IV
Extreme agitation: Haldol 5mg/Ativan 2mg IM

Constipation

Colace/Senna (100mg BID/2mg Qday)
Milk of Magnesia
Miralax or Metamucil Dulcolax supp
Fleet enema
Magnesium citrate Golytely

Hyperglycemia

Novolog (good short acting) sliding scale (EPIC smartset under “ISS”)
NPH (better basal insulin for acute setting than Lantus)

Hypertension

Home meds taken?

IV for hypertensive urgency/emergency (would consult medicine; SBP>180)

B blockers: labetalol, metoprolol

Hydralazine (peripheral vasodilator): 10mg IV push to start

Hypotension

IV fluids: bolus NS (crystalloid) 500ml to 1L depending on cardiac and renal function

May need to intubate to resuscitate

ICU if needed

Driving with a Visual Impairment (as of 7/14/2015)

Mark E. Wilkinson, O.D.
Director, Vision Rehabilitation Service

Almost daily, individuals with visual impairments confront eye care professionals with questions concerning operating a motor vehicle.These individuals fall into three categories:

- Teenagers with congenital or acquired visual impairment
- Adults with congenital or acquired visual impairment who have never driven
- Adults with acquired visual impairment who will become non-drivers because of decreased visual acuity

Visual Field/Visual Acuity Standards for Driving

Illinois

Visual Acuity:

▪ ≥ 20/40 in one or both eyes	No restrictions
▪ 20/41-20/70 in one or both eyes	No driving when headlights are required
▪ 20/71 – 20/100 in one or both eyes	Bioptic telescope required unless living in a town with a population of 3000 or less - Must achieve 20/40 or better with no more than a 3x telescope - Requires a vision specialist statement indicating the individual has had the telescope a minimum of 60 days and has been trained to use the telescope when driving - Requires a behind the wheel test - Must be approved by a medical review board - No night driving allowed with a bioptic telescope
▪ < 20/100 in one or both eyes	License denied

Visual Field: (uninterrupted is not specified)

▪ ≥ 140 degrees binocular or monocular	No restrictions
▪ 139 -105 degrees binocular with at least one eye having a monocular field of at least 70 degrees temporal and 35 degrees nasal	Vehicle must have left and right outside mirrors
▪ < 105 degrees binocular or monocular	License denied

Illinois uses a vision standard for driving. This standard states that it is the individual's legal responsibility to notify the Illinois Secretary of State's office within 10 days of becoming aware that they have reduced visual acuity or visual field limitations that may disqualify them from further driving.

Iowa

Visual Acuity: (Bioptic Telescopes not allowed to achieve the visual acuity standards noted)

- ≥ 20/40 in one or both eyes — No restrictions
- 20/41-20/70 in one or both eyes — No driving when headlights are required
  - Behind the wheel testing can be requested via discretionary review process to gain privilege to drive when headlights are required.
- 20/71 – 20/199 in one or both eyes — Discretionary issuance
  - Requires a vision specialist statement indicating the individual is visually competent to drive
  - Requires a behind the wheel test
  - The behind the wheel testing is used to determine maximum speed, distance from home and whether ok to drive when headlights are required
  - If VA < 20/100, must also be approved by a medical review board
  - If VA is <20/100 in the left eye, will be required to have a left and right outside mirror
- ≤ 20/200 in one or both eyes — License denied

Visual Field: (uninterrupted is not specified)

- ≥ 140 degrees binocular — No restrictions
- < 140 degrees but ≥110 degrees binocular or ≥100 degrees monocular — Will be required to have a left and right outside mirror
- <110 degrees binocular or <100 degrees monocular, but ≥75 degrees monocular or binocular — Discretionary issuance
  - Requires a vision specialist statement indicating the individual is visually competent to drive
  - Requires a behind the wheel test
- <75 degrees binocular or monocular — Discretionary issuance
  - Requires a vision specialist statement indicating the individual is visually competent to drive
  - Requires a behind the wheel test
  - Must also be approved by a medical review board
- <20 degrees binocular or monocular — License denied

Iowa uses a vision standard for licensure. This standard states that the individual is legally qualified to drive, until their license comes up for renewal, regardless of whether their visual acuity or visual field becomes impaired during the interval between licensing renewal. Although individuals with acquired visual impairments are legally qualified to drive until their license is up for renewal, civil liability exposure exists if they continue to drive with the knowledge that they would no longer visually qualify to drive, if they attempted to renew their license. If the Iowa Department of Transportation becomes aware that a person has experienced a decrease in their visual acuity or visual field, the DOT will arrange for a re-evaluation to see if the person is capable of continuing to safely operate a motor vehicle.

Iowa Dark Window Exemption

Effective July 4, 2012
ADMINISTRATIVE RULE 761-450.7(3)
The dark window exemptions will no longer be granted from the minimum standard of transparency. A motor vehicle fitted with a front windshield, a front side window or a front side wing window with less than 70 percent but not less than 35 percent light transmittance before July 4, 2012, may continue to be maintained and operated after July 4, 2012, so long as the vehicle continues to be used for the transport of a passenger or operator and the dark window exemption which documented a medical need for such reduced transparency, was signed by the person's physician before July 4, 2012. The exemption must be carried at all times in the vehicle to which it applies. At such time the vehicle is no longer used for the transport of the passenger or operator that is the subject of the exemption, the exemption expires and may not be used on any replacement vehicle purchased after July 3, 2012. The owner of the vehicle to which the exemption applied must return the vehicle to conformance with the minimum standard of transparency within 60 days of expiration of the exemption.

Missouri

Visual Acuity:

- ≥ 20/40 in one or both eyes — No restrictions
- 20/41-20/160 in one or both eyes — Discretionary issuance
- < 20/160 in one or both eyes — License denied

Bioptic Telescopes: Not allowed to achieve the visual acuity standards noted above

Visual Field: (uninterrupted is not specified)

- ≥55 degrees in each eye or 85 degrees monocular — No restrictions
- 70-109 degrees binocular or monocular — Discretionary issuance
- <70 degrees binocular or monocular — License denied

Missouri uses a vision standard for licensure. This standard states that the individual is legally qualified to drive, until their license comes up for renewal, regardless of whether their visual acuity or visual field becomes impaired during the interval between licensing renewal. Although individuals with acquired visual impairments are legally qualified to drive until their license is up for renewal, civil liability exposure exists, if they continue to drive with the knowledge that they would no longer visually qualify to drive, if they attempted to renew their license. If the Missouri Motor Vehicle Department becomes aware that a person has experienced a decrease in their visual acuity or visual field, the DOT will arrange for a re-evaluation to see if the person is capable of continuing to safely operate a motor vehicle.

Minnesota

Visual Acuity:

- ≥ 20/40 in one or both eyes — No restrictions
- 20/41-20/70 in one or both eyes — Speed restrictions
  - May also have time of day and radius from home restrictions
- 20/71 - 20/99 in one or both eyes — Discretionary issuance
  - Requires a vision specialist statement indicating the individual is visually competent to drive
  - Requires a behind the wheel test
  - May have speed, time of day and radius from home restrictions
- ≤ 20/100 — License denied

Bioptic Telescopes: Not currently allowed to achieve the visual acuity standards noted above

Visual Field: (uninterrupted is not specified)

- ≥ 105 degrees binocular or monocular — No restrictions
- < 105 degrees binocular or monocular — Discretionary issuance
  - vehicle may require left and right outside mirrors, in addition to speed, radius from home and time of day restrictions
- <100 degrees binocular or monocular — License denied

Minnesota uses a vision standard for driving. This standard states that it is the individual's legal responsibility to notify the Minnesota Driver and Vehicle Services office when they becoming aware that they have reduced visual acuity or visual field limitations that may disqualify them from further driving.

Nebraska

Visual Acuity:

- ≥ 20/40 in one or both eyes — No restrictions
- 20/41-20/60 in one or both eyes — No driving when headlights are required
- 20/60-20/70 — If blind in fellow eye, license will be denied
- 20/70 in one or both eyes — No driving when headlights are required and speed limitations
- < 20/71 in one or both eyes — License denied

Bioptic Telescopes: Are allowed to achieve the visual acuity standards noted above

Visual Field: (uninterrupted is specified)

- ≥ 140 degrees binocular or monocular — No restrictions
- 1390120 degrees binocular or monocular — Vehicle must have left and right outside mirrors
- 100-119 degrees binocular or monocular — No driving when headlights are required - Radius from home and speed limitations
- < 100 degrees binocular or monocular — License denied

Nebraska uses a vision standard for licensure. This standard states that the individual is legally qualified to drive, until their license comes up for renewal, regardless of whether their visual acuity or visual field becomes impaired during the interval between licensing renewal. Although individuals with acquired visual impairments are legally qualified to drive until their license is up for renewal, civil liability exposure exists, if they continue to drive with the knowledge that they would no longer visually qualify to drive, if they attempted to renew their license. If the Nebraska Department of Motor Vehicles becomes aware that a person has experienced a decrease in their visual acuity or visual field, the DOT will arrange for a re-evaluation to see if the person is capable of continuing to safely operate a motor vehicle.

South Dakota

Visual Acuity:

- ≥ 20/40 in one or both eyes — No restrictions if fellow eye is at least 20/50
  - If fellow eye less than 20/60, left and right outside mirrors required
- 20/41-20/60 in one or both eyes — Discretionary issuance
  - Requires a vision specialist statement indicating the individual is visually competent to drive
  - May result in speed, time of day and radius from home restrictions
- < 20/60 in one or both eyes — License denied

Bioptic Telescopes: Not allowed to achieve the visual acuity standards noted above

Visual Field:

- Not considered

South Dakota uses a vision standard for licensure. This standard states that the individual is legally qualified to drive, until their license comes up for renewal, regardless of whether their visual acuity or visual field becomes impaired during the interval between licensing renewal. Although individuals with acquired visual impairments are legally qualified to drive until their license is up for renewal, civil liability exposure exists, if they continue to drive with the knowledge that they would no longer visually qualify to drive, if they attempted to renew their license. If the South Dakota Department of Public Safety becomes aware that a person has experienced a decrease in their visual acuity or visual field, the DOT will arrange for a re-evaluation to see if the person is capable of continuing to safely operate a motor vehicle.

Wisconsin

Visual Acuity:

- ≥ 20/40 in one or both eyes — No restrictions
- 20/41-20/100 in one or both eyes — Discretionary issuance
  - Requires a vision specialist statement of visual acuity
  - May require a behind the wheel test
  - May result in speed, time of day and radius from home restrictions
- < 20/100 in one or both eyes — License denied

Bioptic Telescopes: Not allowed to achieve the visual acuity standards noted above

Visual Field: (uninterrupted is not specified)

- ≥ 140 degrees binocular — No restrictions
- 139-40 degrees binocular or monocular — Discretionary issuance
  - Requires a vision specialist statement of visual field
  - May require a behind the wheel test
  - May result in speed, time of day and radius from home restrictions
- < 40 degrees binocular or monocular — License denied

Wisconsin uses a vision standard for licensure. This standard states that the individual is legally qualified to drive, until their license comes up for renewal, regardless of whether their visual acuity or visual field becomes impaired during the interval between licensing renewal. Although individuals with acquired visual impairments are legally qualified to drive until their license is up for renewal, civil liability exposure exists, if they continue to drive with the knowledge that they would no longer visually qualify to drive, if they attempted to renew their license. If the Wisconsin Department of Transportation becomes aware that a person has experienced a decrease in their visual acuity or visual field, the DOT will arrange for a re-evaluation to see if the person is capable of continuing to safely operate a motor vehicle.

Additional Information

- The DOT does make accommodations for the functionally illiterate. An auditory, computer generated voice, test can be provided or the individual can bring someone with them to read the test.

- As part of the author's work up, we ask the following questions: Do you drive? If yes, what type of driving do you do? Do problems with your sight cause you to be fearful when you are driving? During the past 6 months, have you made any driving errors? Is your driving ability affected by your vision?

- For individuals that are visually impaired who wish to be licensed or to have the privileges of his or her license expanded, a letter from a vision specialist is required and must state, "It is my professional opinion that (patient name) has the visual ability to operate a motor vehicle". The author would also recommend that the letter state "I am requesting that a hearing officer provide (patient name) with a behind the wheel evaluation to see if he/she can acquire/maintain the privilege of operating a motor vehicle".

- A letter can replace the Vision Specialist Form 430032 (Iowa) if all of the information from the departmental vision form is included. This information includes:

1. The patient's full name and address
2. Visual acuity OD, OS, and OU, both uncorrected, corrected, and with new prescription when appropriate.
3. The visual fields for the right and left eye measure nasally and temporally.

4. A statement concerning whether the eye specialist feels the individual is visually competent to drive
5. A statement concerning privileges, whether they be general, daylight only, or limited
6. If limited, the amount of limitations
7. Should vision be rechecked sooner than 2 years
8. The date of the examination, which needs to be within 30 days of the individual's attempt to be licensed or re-licensed.

- The Iowa DOT does allows eye care practitioners (MD, DO and OD) to report to the department the identity of a person who has a physical or mental condition which may render that person incompetent to operate a motor vehicle safely. The physician is to make reasonable efforts to notify the person in writing of the nature and reason for the report to the DOT. The physician has no duty to make a report or to warn third parties. The reporting physician is immune from any liabilities, civil or criminal, which may otherwise be incurred or imposed as a result of the report.

- The author feels it is important for the practitioner to counsel those individuals, whose vision has decreased significantly from the time they were licensed, about their increased potential for personal liability if they are involved in an accident. For those individuals whose vision changes after they are licensed, the author would recommend that they be re-evaluated by the DOT to see if they are still capable of continue to safely operate a motor vehicle.

Generic Names, Brand names & Cap Colors

Glaucoma Drops:
Carbonic anhydrase inhibitors (CAIs): ORANGE CAP
Brinzolamide (Azopt)
Dorzolamide (Truspot)
Alpha adrenergic agonists: PURPLE CAP
Brimonidine (Alphagan)

Prostaglandin analogues: TURQUOISE/TEAL/"GREEN" CAP
Latanoprost (Xalatan)
Travoprost (Travatan)
Bimatoprost (Lumigan)
Beta-blockers: YELLOW CAP
Timolol (Timoptic)

Combination Drugs:
Timolol-Dorzolamide (Cosopt): BLUE/WHITE CAP
Timolol-Brimonidine (Combigan): NAVY CAP

Other drops:
Antibiotics: TAN CAP
Steroids: PINK OR WHITE CAP
NSAIDs: GRAY CAP
Mydriatics: RED CAP
Miotics: GREEN CAP

Basic Phrases in Spanish

CASE HISTORY

Good Morning Good Afternoon	Buenos Dias Buenos Tardes
My name is… I only speak a little Spanish. Please limit your answers to yes or no when possible.	Mi nombre es… Solamente hablo un poco de Espanol. Por favor limite sus respuestas a si o no cuando es possible.
How are you? What is your name? Please write your address here… How old are you?	Como estas? Como se llama? Por favor escriba su direccion aqui. Cuantos anos tiene usted?
Have you been here before? How long ago? When was your last eye exam?	Ha estado aqui antes? Hace cuanto tiempo? Cuando fue su ultimo examen de los ojos?
What is the reason for your visit?	Cual es la razon de su visita?
Do you use glasses or contacts? Do you have glasses or contacts? Do you use them for seeing far away or for up close? Have you noticed any changes in your vision? Which eye? Both? Do you have problems seeing at a distance? Do you have problems seeing while reading? How long has it been since you noticed this problem? Show me at what distance you read.	Usa espejuelos o lentes de contacto? Tiene gafas o lentes de contacto? Los ua para ver de lejos o de cerca? Ha notado combios en la vista? En cual ojo? Los dos? Tiene problemas para ver de los lejos? Tiene problemas para ver para leer? Hace cuanto tiempo que nota este problema? Muestreme a que distancia usted puede leer?
Do you get headaches? In the morning, afternoon, or everning? When you read? At work, or at school? Show me in what part of your head.	Tiene dolores de cabeza? Por la manana, tarde o la noche? Cuando lee? En el trabajo o en la escuela? Muestreme en que parte de la cabeza.
Do you get pain in your eyes? Always? Sometimes? Since when did it begin? Has it become worse? During the morning? In the afternoon? At night?	Tiene dolor en los ojos? Siempre? A veces? Hace cuanto tiempo que empezo? Se ha puesto peor? Por la manana? Por la tarde? Por la noche?
Do your eyes ever burn? Do your eyes ever itch? Do your eyes ever tear?	Alguna vez le arden los ojos? Alguna vez le pican los ojos? Alguna vez le lloran los ojos?
Have you ever injured your eyes?	Alguna vez se ha lastimado los ojos?
In what eye? Was it a blow to the eye? A cut? Did something enter the eye?	En cual ojo? Los dos? Fue un golpe al ojo? Una cortadura? O algo que le entro en el ojo?
Have you ever had eye surgery? When? For cataracts? Myopia? For something that entered the eye? Strabismus?	Ha sido operada de la vista? Cuando? Para cataratas? Miopia? Por algo que le entro en el ojo? Estrabismo?
Have you ever had any disease in the eye? Glaucoma? Cataracts? Infection?	Ha tenido alguna enfermedad de los ojos? Glaucoma? Cataratas? Infeccion?

When was your last medical exam?	Cuando fue su ultimo examen medico?
Are you taking any medications?	Esta tomando alguna medicina?
Please write the name here.	Por favor escriba el nombre aque.
How long have you taken it?	Hace cuanto tiemp la toma?
What do you take it for?	Para que la toma?
Do you have any allergies to any medications?	Tiene alergias a alguna medicina?
Which one?	Cual?
Is there a possibility that you are pregnant?	Es posible que esta embarazada?
Do you take contraceptives?	Esta tomando anticonceptivos?
Do you have or ever have had:	Usted tiene o ha tenido:
Diabetes	Diabetes
Kidney problems	Problemas con los rinones
Thyroid problems	Problemas con la tiroides
High blood pressure	Alta presion
Do you have sinus problems?	Tiene sinusitis?
Visual Acuity	
Cover your left/right eye.	Cubra su ojo izquierdo/derecho.
Please read the smallest letters you can see.	Por favor lea las letras mas pequenas que pueda ver.
How many fingers?	Cuantos dedos?
Is the hand moving?	Se mueve la mano?
Do you see the light?	Ve la luz?
Where?	Donde?
Color Plates	
Please tell me what you see.	Por favor diagame lo que vea.
Stereo	
Global Stereopsis	
What do you see on the right side?	Que ve en el lado derecho?
Local Stereopsis	
Which circle is closer to you?	Cual circulo se ve mas cerca a usted?
In number one, two…	En el numero uno, dos, tres, cuatro, cinco, seis, siete, ocho, nueve, diez
NPC	
Please fixate on this and tell if it doubles.	Por favor fije su vista en la letra y digame si se ve doble.
Now tell me when you see one.	Ahora digame cuando vea uno.
Pupillary distance	
Pleae look at my open eye.	Por favor mire mi ojo que esta abierto.
Near point of Accommodation	
Please look at these letters and tell me when they blur.	Por favor mire estas letras y digame cuando se pongan borrosas.
Cover Test	
Look at the right light.	Mire la luz roja.
Please look at the letter.	Por favor mire la letra.
Confrontation Fields	
Please cover your left/right eye and look at my nose.	Por favor cubra su ojo izquierda/derecho y mire mi nariz.
Tell me when you first see this.	Digame cuando primero vea esto.
EOMs	
Please follow my light with your eyes without moving your head.	Por favor siga mi luz con los ojos sin mover la cabeza.
Pupillary Reflexes	
Please look straight ahead and ignore my light.	Por favor mire hacia adelante e ignore mi luz.

Keratometry

Place your chin here.	Ponga la barbilla aqui.
Place your forehead here.	Ponga la frente aqui.
Look into the center on the instrument.	Mire al centro del instrumento.
Keep both eyes open.	Mantenga los dos ojos abiertos.

Retinoscopy

Look at the letter E.	Mire la letra E.
Don not look at my light.	No mire la luz.
Keep both eyes open.	Mantenga los dos ojos abiertos.

Subjective

Read the smallest line of letters you can see.	Lea la linea le letra mas pequenas que pueda ver.
Which one is better, one or two?	

Balance

Looking only at the top line, which is better, one or two?	Mirando solamente a de arriba cual es mejor, uno or dos?

Cross-cylinder fused

Which group of lines are darker, the vertical or horizontal one?	Cual grupo de lineas esta mas oscuro, las verticales o las horizontales?

NRA/PRA

Keep this line of letters clear.	Mantenga esta linea de letras clara.
Say "blurry" when it first blurs.	Diga "borroso" cuando se ponga borroso.
Can you clear it completely?	Puede aclararlo completamente?

Lateral/Vertical Phorias

Do you see this second line of letters?	Vez esta segunda linea de letras?
Is it to the right or to the left?	Esta a la derecha o izquierda?
Or is it directly underneath?	O esta directamente debejo?
Tell me when it is directly underneath.	Digame cuando esta exactamente debajo.
Keep this line of letters clear.	Mantenga esta linea de letras clara.
Do you see the second line?	Vez esta segunda linea?

Is it on the top or bottom?	Esta arriba or abajo?
Or is it next to it?	O esta al lado?

Lateral/Vertical Vergences

Keep this line of letter clear.	Mantenga esta linea de letras clara.
Say "blurry" when it first blurs.	Diga "borroso" cuando se ponga borroso.
Say "two" when it breaks into two.	Diga "dos" cuando se rompen en dos.
Say "one" when they become one.	Diga "uno" cuando se ponen uno otra vez.

Biomicroscopy

I am going to examine the front of the eye.	Voy a examinar el frente del ojo.
Close your eyes.	Cierre sus ojos.
Open your eyes more.	Abre los ojos mas.
I am going to examine the lids.	Voy a examinar los palpardos.
Look down.	Mira abajo.
Look up.	Mira arriba.

Internals

I would like to dilate your pupils in order to examine the inside of your eyes.	Me gustaria dilatar las pupilas para examinar dentro de los ojos.
You will not be able to see up close for a couple of hours, is that a problem?	No podra ver de cerca durante unas horas,esta bien?
I am going to put drops in your eyes.	Le voy a poner gotas en los ojos.
Look at the red light.	Mira la luz roja.
Look up and to the right.	Mira arriba y a la derecha.
Look up and to the left.	Mira arriba y a la izquierda.
Look down and to the right.	Mira abajo y a la derecha.
Look down and to the left.	Mira abajo y a la izquierda.

Abbreviations

#

2xIOL secondary IOL
2xOAG secondary open angle glaucoma
4x 4 prism diopter test
5FU 5-fluorouracil

A

A scan 1 dimensional U/S exam of length of eye
A/V arteriole/venule ratio (normally 2:3)
A1 Atropine 1%
ABK aphakic bullous keratopathy
ABMD anterior basement membrane dystrophy
AC anterior chamber, accommodative convergence
AC/A accomodative convergence to accommodation ratio
ACE angiotensin converting enzyme
ACh Acetylcholine
ACIOL anterior chamber intraocular lens implant
AD autosomal dominant
AFB Acid Fast Bacilli AG
Amsler grid
AI accommodative insufficiency
AIBSE acute idiopathic blind spot enlargement
AIDS acquired immune deficiency syndrome
AION anterior ischemic optic neuropathy
AK astigmatic keratotomy, actinic keratosis
ALK automated lamellar keratoplasty
ALT argon laser trabeculoplasty
AMD age-related macular degeneration
AMP acid mucopolysaccharide
AMPPE acute multifocal placoid pigment epitheliopathy
AN1 autosomal dominant familial aniridia
AN2 sporadic nonfamilial aniridia and Wilms' tumor (Miller's Syndrome, WAGR)
AN3 autosomal recessive aniridia (Gillespie's Syndrome)
ANA anti-nuclear antibodies
ANCA antineutrophil cytoplasmic antibodies
ANGAU acute nongranulomatous anterior uveitis
Ap applanation tonometry (Goldmann – slit lamp)
APD afferent pupillary defect (Marcus-Gunn)
APUD amine precursor uptake and decarboxylation system
AR autorefraction, autosomal recessive
ARC abnormal retinal correspondence
ARI aldose reductase inhibitor
ARMD age-related macular degeneration

ARN acute retinal necrosis
ARNS Atropine retinoscopy
ARP Argyle Robertson Pupil
AS ankylosing spondylitis
ASB apostilb
ASC anterior subcapsular cataract
astig astigmatism
AT artificial tears
ATR astig against the rule astigmatism
AVM arterio-venous malformation
AZT azidothymidine (Zidovudine)

B

B scan 2 dimensional U/S exam of eye
BAT Brightness Acuity Tester
BCC basal cell carcinoma
BCG Bacille Calmette-Guerin
BD base down
BDR background diabetic retinopathy
BDUMP syndrome Bilateral diffuse uveal melanocytic proliferation
BI base in
BKS Barraquer-Krumeich-Swinger procedure
BLL brow, lids, lashes
BM basement membrane
BMT Benign mixed tumor
BO base out
BRAO branch retinal artery occlusion
BRB blood-retinal barrier
BRVO branch retinal vein occlusion
BSS balanced salt solution
BTX Botulinum toxin
BU base up
BUN blood urea nitrogen
BVOS Branch Vein Occlusion Study

C

c-r chorioretinal
c/d cup to disc ratio
C/F cell/flare
CA carcinoma
CAGE cut-down, annoyed, guilty, eye-opener (ETOH screening)
CAI carbonic anhydrase inhibitor
CAR Cancer-Associated Retinopathy syndrome
CB ciliary body
CCF carotid cavernous sinus fistula
CE cataract extraction

CEA carcinoembryonic antigen
CF count fingers, cystic fibrosis
cGy centiGrey
CHARGE association of anomalies: colobomatous microphthalmos, heart defects, choanal atresia, retarded growth, genital anomalies, and ear anomalies or deafness
CHED congenital hereditary endothelial dystrophy
CHRPE congenital hypertrophy of the RPE
CHSD congenital hereditary stromal dystrophy
CI convergence insufficiency
CIN conjunctival intraepithelial neoplasia
cipro ciprofloxacin
CL contact lenses
clr clear
CME cystoid macular edema
CMV cytomegalovirus
CN cranial nerve
CNS central nervous system
CNV choroidal neovascularization (CVNM, SRNVM)
CNVM choroidal neovascular membrane (CNV, SRNVM)
CO corneal opacity (WHO: trachoma)
COAG chronic open angle glaucoma
COM center of macula
COMS Collaborative Ocular Melanoma Study
conj conjunctiva, conjunctivitis
CPA cerebellar-pontine angle
CPEO chronic progressive external ophthalmoplegia
CPS central posterior synechiae
CRA central retinal artery
CRAO central retinal artery occlusion
CREST calcinosis, Raynaud's phenomenon, esophageal symptoms, scleroderma, and telangiectasia
CRNS Cyclogel retinoscopy
CRV central retinal vein
CRVO central retinal vein occlusion
CS cortical spoking, cavernous sinus
CSA cyclosporine A
CSC central serous chorioretinopathy
CSF cerebrospinal fluid
CSME clinically significant macular edema
CSNB congenital stationary night blindness
CSR Central serous retinopathy
CT computed tomography (CAT scan)
CTL contact lens (es)
CVP central venous pressure
CWS cottonwool spot
cyl cylinder

D

D&C deep & clear
D&Q deep and quiet
D/N distance and at near
D250, D500 Diamox 250mg, Diamox 500mg
DALK deep anterior lamellar keratoplasty
DAST Drug Abuse Screening Test
dB decibel
DC dermatochalasis, discharge
DCCT Diabetes Control and Complications Trial
DCR dacryocystorhinostomy
DD disc diameter
DDI Didanosine
DDT dye disappearance test
DES Dry Eye Syndrome, disc edges sharp
DLEK deep lamellar endothelial keratoplasty
DM diabetes mellitus, descemets membrane
DME diabetic macular edema
DR diabetic retinopathy
DRS Duane's Retraction Syndrome, Diabetic Retinopathy Study
DS diopter (s) sphere
DSEK descemets stripping endothelial keratoplasty
DUSN Diffuse unilateral subacute neuroretinitis DVD dissociated vertical deviation
DVM delayed visual maturation
DVSG Diabetic Vitrectomy Study Group

E

E esophoria
E' E at near
E(T) intermittent esotropia
EBMD epithelial basement membrane dystrophy
EBV Epstein-Barr virus
ECA external carotid artery
ECCE extracapsular cataract extraction
ED epithelial defect
EDTA ethylenediaminetetraacetate
EKC epidemic keratoconjunctivitis
ELISA enzyme-linked immunosorbent assay
EM electron microscopy
EMP epimacular proliferation
EOG electrooculogram
EOMI extraocular muscles intact
Epi epikeratophakia
ERD electroretinogram
ERM epiretinal membrane
ERP Early Receptor Potential

ESR erythrocyte sedimentation rate
ET esotropia
ET' ET at near
ETDRS Early Treatment Diabetic Retinopathy Study
ETOH ethanol
EUA exam under anesthesia
EXCIMER excited dimer laser ext externals (same as BLL)

F

F rate of aqueous formation F&F fix and follow
FA fluorescein angiogram
FAZ foveal avascular zone
FB foreign body
FEV see FEVR
FEVR familial exudative vitreoretinopathy
FHI Fuch's heterochromic iridocyclitis
FNAB fine needle aspiration biopsy
FP fundus photos
FPD fibrous proliferations on or within 1 disc diameter of disc margin
FPE fibrous proliferations elsewhere, not FPD
FSH flame-shaped hemorrhage
FTA--ABS fluorescent treponemal antibody absorption test
FTC full to confrontation
FTCF full to counting fingers
FTHM full to hand motion

G

GA geographic atrophy
GAG glycosaminoglycan
GC gonococcus
GCA Giant Cell Arteritis
GCL ganglion cell layer
GCM good, central and maintained
GCNM good, central, not maintained gent gentamicin
GFE gas fluid exchange
GMS Gomori Methenamine Silver stain
gonio gonioscopy
GPC giant papillary conjunctivitis
Gy Grey

H

H/Ma hemorrhages or microaneurysms, or both
HA hand applanation (tonometry), homatropine, headache
HA2, HA5 homatropine 2%, homatropine 5%
HBID hereditary benign intraepithelial dyskeratosis
HE hard exudate

HEDS Herpetic Eye Disease Study
HIV human immunodeficiency virus
HKM hyperopic keratomileusis
HM hand motion
HPF palpebral fissure width
HPV human papilloma virus
HRC high risk characteristics
HRNS Homatropine retinoscopy
HSV herpes simplex virus
HVF Humphrey Visual Field
HZO Herpes Zoster Ophthalmicus
HZV Herpes Zoster virus

I

IBD inflammatory bowel disease
ICA internal carotid artery
ICCE intracapsular cataract extraction
ICE iridocorneal endothelial syndrome
ICG indocyanine green
ICP intracranial pressure
ICSC Idiopathic Central Serous Chorioretinopathy (CSR)
IDDM insulin-dependent DM
IK interstitial keratitis
ILM internal limiting membrane
IN inferonasal
INL inner nuclear layer
INO internuclear ophthalmoplegia
IO inferior oblique
IOFB intraocular foreign body
IOL intraocular lens implant
ION ischemic optic neuropathy
IOP intraocular pressure
IPL inner plexiform layer
IR inferior rectus
IRMA intraretinal microvascular abnormality
IT inferotemporal
IVFA intravenous fluorescein angiography

J

J Jaeger point
JRA juvenile rheumatic arthritis
JXG juvenile xanthogranuloma

K

K cornea, keratometry
K, sicca keratoconjunctivitis sicca

KA keratoacanthoma
KC keratoconus
KCS keratoconjunctivitis sicca
KG keratoglobus
KP keratic precipitate
KS Kaposi's sarcoma

L

LASE laser adjustable synthetic epikeratoplasty
LASER light amplification by stimulated emission of radiation
LASIK laser in-situ keratomileusis
LE left eye
LGV lymphogranuloma venereum
LHT left hypertropia
LISN Leber's Idiopathic Stellate Neuroretinitis
LK lamellar keratoplasty
LLL left lower lid LM light microscopy
LN lymph node
LP light perception
LR lateral rectus
LSD lysergic acid diethylamide
LTD largest tumor diameter
LTG low tension glaucoma
LTK laser thermal keratoplasty
LTP laser trabeculoplasty
LUL left upper lid
Lx lensectomy

M

M macula, Mydriacyl MA
macroaneurysm
MD macular degeneration
MDF Map-Dot-Fingerprint Dystrophy
ME macular edema
MELAS Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis and Stroke like Episodes
MEN IIB Multiple Endocrine Neoplasia Syndrome IIB
MERRF myoclonic epilepsy with ragged red fibers
MEWDS multifocal evanescent white dot syndrome
MG myasthenia gravis
MHA-TP micro-hemagglutination--Treponema pallidum
MHC Major Histocompatibility Complex
mito mitochondria
MKM middle limiting membrane
mlg malignant
MLM middle limiting membrane
MM malignant melanoma, multiple myeloma

MMC mitomycin C
MMG mixed mechanism glaucoma
Motcc motility with correction
Motsc motility without correction
MP membrane peel
MPS Macular Photocoagulation Study
MR manifest refraction, medial rectus
MRD margin-reflex distance
MRI magnetic resonance imaging
MS multiple sclerosis
MVL moderate visual loss

N

N/S neosynephrine
NAG narrow angle glaucoma
NCT noncontact tonometry
NEI National Eye Institute
neo neovascularization
NF neurofibromatosis (e.g. NF1. NF2)
NFL nerve fiber layer
NIDDM non-insulin-dependent DM
NLD nasolacrimal duct
NLP no light perception
NPDR nonproliferative diabetic retinopathy
NPH normal pressure hydrocephalus
NRC normal retinal correspondence
NS nuclear sclerosis
NTG normal tension glaucoma
NVA neovascularization of the angle
NVD neovascularization of the disc
NVE neovascularization elsewhere
NVG neovascular glaucoma
NVI neovascularization of the iris (rubeosis)

O

OA overaction (as in muscles IO, SO, MR, LR, SR, IR), ophthalmic artery
OAT ornithine keto-acid aminotransferase
OCP ocular cicatricial pemphigoid
OD oculus dexter (right eye)
ODM ophthalmodynamometry
OHS Ocular Histoplasmosis Syndrome
OIS ocular ischemic syndrome
OKN optokinetic nystagmus
ON optic nerve, optic neuritis, optic neuropathy
ONH optic nerve head (disc)
ONL outer nuclear layer

ONSD optic nerve sheath decompression
OP oscillatory potentials
OPG ocular pneumoplethysmography
OPL outer plexiform layer
Ortho-K orthokeratology
OS oculus sinister (left eye)
OU oculus uterque (each eye individually)

P

P&I probe and irrigate
P1, P2, P4 Pilocarpine 1%, 2%, 4%
PAM primary acquired melanosis, potential acuity meter
PAN polyarteritis nodosa, preauricular node
PARK photorefractive astigmatic keratectomy
PAS peripheral anterior synechia
PAS periodic acid Schiff base stain
PBK pseudophakic bullous keratopathy
PC posterior capsule, posterior chamber
PCIOL posterior chamber intraocular lens implant
PCP pneumocystis carinii pneumonia, primary care provider
PD prism diopters, interpupillary distance
PDGF platelet-derived growth factor
PDR proliferative diabetic retinopathy
PDS pigmentary dispersion syndrome
Pe episcleral venous pressure
PED pigment epithelial detachment
PEE punctate epithelial erosions
PERG pattern electroretinogram
PERRLA pupils equally round and reactive to light and accommodation
PEX pseudoexfoliation
PF Pred Forte
PH pinhole
phaco phacoemulsification
PHPV persistent hyperplastic primary vitreous
PI peripheral iridotomy, peripheral iridectomy
pilo pilocarpine
PK penetrating keratoplasty (PKP)
PKP penetrating keratoplasty (PK)
pl plano
PMMA polymethylmethacrylate
POAG primary open angle glaucoma
POHS presumed ocular histoplasmosis syndrome
PORN progressive outer retinal necrosis “you will know it when you see it”
PP pars planitis
PPD posterior polymorphous dystrophy, purified protein derivative
PPL pars plana lensectomy

PPMD posterior polymorphous dystrophy (PPD)
PPV pars plana vitrectomy (same as TPPV)
PPVP posterior precortical vitreous pocket
PRK photorefractive keratectomy
PRP panretinal photocoagulation
PS posterior synechia
PSC posterior subcapsular cataract
PSR proliferative sickle retinopathy
PSS progressive systemic sclerosis
PTK phototherapeutic keratectomy
PVD posterior vitreous detachment
PVR proliferative vitreoretinopathy
PXE pseudoxanthoma elasticum
PXF/PXS pseudoexfoliation syndrome

R

R&R recess resect
RA Rheumatoid Arthritis
RAPD relative afferent pupillary defect
RB retinoblastoma
RBP retinal binding protein
RD retinal detachment
RE right eye
RES recurrent erosion syndrome
RF rheumatoid factor
rhabdo rhabdomyosarcoma
RHT right hypertropia
RK radial keratotomy
RLF retrolental fibroplasia (now ROP)
RLL right lower lid
RNS dilated retinoscopy
ROP retinopathy of prematurity (was RLF)
RP retinitis pigmentosa
RPE retinal pigment epithelium
RPED (see PED)
RRD rhegmatogenous RD
RT retinal thickening, retinal tear
RUL right upper lid
SAH subarachnoid hemorrhage
SB scleral buckle
SBEB scleral buckle with encircling band
SCC squamous cell carcinoma
SCH subconjunctival hemorrhage
SDH subdural hematoma
SE soft exudates (CWS), side effects
SEI subepithelial infiltrates

SK seborrheid keratosis
SLACH soft lens-associated corneal hypoxia syndrome
SLE slit lamp exam or systemic lupus erythematosis
SLK superior limbic keratoconjunctivitis
SN superonasal
SO superior oblique, sympathetic ophthalmia
SPCAS short posterior ciliary arteries
SPEP serum protein electrophoresis
sph spherical correction
SPK superficial punctate keratitis
SR superior rectus
srf subretinal fluid
SRK Sanders-Retzlaff-Kraff formula
SRNVM subretinal neovascular membrane
SRT Sorbinil Retinopathy Study
SS scleral spur
ST superotemporal
SVL severe visual loss
SVP spontaneous venous pulsations

T

Tl longitudinal relaxation time: time required for the next bulk magnetization to realign itself along the original axis.
T1/2 Timoptic 0.5%
T2 transverse relaxation time: mean relaxation time based on the interaction of hydrogen nuclei within a given tissue.
TA temporal arteritis (GCA)
TAB temporal artery biopsy
TB tuberculosis
TCN tetracycline
TEM transmission electron microcopy
TF trachomatous inflammation-follicular TGF
transforming growth factor
TI trachomatous inflammation, transillumination
TM trabecular meshwork
tobra tobramycin
Tp tonopen
TPPV trans pars plana vitrectomy
Trab trabeculectomy
TRD tractional RD
TRIC Trachoma Inclusion Conjunctivitis
TS tuberous sclerosis, Tay-Sach's disease, trachomatous scarring (WHO)
TT trachomatous trichiasis
TVO transient visual obscuration

U

UA underaction (as in muscles)
UGH Uveitis, Glaucoma, Hyphema syndrome
URI upper respiratory tract infection
UV ultraviolet light

V

VA visual acuity
VAcc visual acuity with correction
vanco vancomycin
VAsc visual acuity without correction
VB venous beading
VDRL Venereal Disease Research Laboratory
VECP visually evoked cortical potentials
VEP visual evoked potentials
VER visual evoked response
VF visual fields
VH vitreous hemorrhage
VKH Vogt-Koyanagi-Harada Syndrome/Disease
VPF vertical palpebral fissure height
VRNF von Recklinghausen's Neurofibromatosis (NF-1)
Vx vitrectomy
VZ varicella-zoster

W

w/u workup
W4D Worth-4-Dot test
WAGR Wilms' tumor, aniridia, genitourinary anomalies, and mental retardation
WESDR Wisconsin Epidemiologic Study of Diabetic Retinopathy
WHO World Health Organization
WNL within normal limits
WRx prescription of corrective lenses currently worn
WTR astig with the rule astigmatism

X

X exophoria
X' X at near
X(T) intermittent exotropia
XLM external limiting membrane
XRT radiation therapy
XT exotropia XT' XT
at near

Y

YAG yttrium-aluminum-garnet laser