

In The Name of GOD



RED EYE

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Introduction

- Rapid and accurate triage is the most critical consideration in the approach to the red and painful eye.
- Critical conditions are time sensitive and can rapidly lead to progressive visual loss without immediate intervention in the ED.

Differential Considerations

- The diagnostic approach to the red or painful eye typically begins with categorization into traumatic and nontraumatic causes.
- Patients almost always can report whether or not their eye was injured—even indirectly, such as injury from reflected sunlight.

Traumatic pain and redness.....

- ▶ Traumatic pain and redness can be caused **by caustic fluids and solid materials**, low-velocity contact with a host of materials that can fall or be rubbed into the eye, **higher velocity blunt-force** impacts to the orbit or globe, or potentially penetrating injuries.
- ▶ Caustic contamination is discussed under **critical** diagnoses.
- ▶ Other traumatic complications that must be considered early in the course of care include retrobulbar hematoma, abscess, or emphysema with orbital compartment syndrome and suspicion of an open globe from either blunt or penetrating trauma.

Triage...

- ▶ The first triage question for any eye complaint should be,

“Did anything get in your eye?”

If so, attempt to identify the nature of the substance or foreign body.

- ▶ Specifically, this question seeks to quickly identify eyes that may have been exposed to a caustic substance.
- ▶ Patients exposed to acids, alkalis, and other caustic substances require rapid decontamination before additional evaluation to potentially prevent permanent loss of visual acuity.

Nontraumatic pain and redness...

- ▶ Causes of nontraumatic pain and redness are diverse but are mostly infectious and inflammatory, although these may be due to processes intrinsic to the globe and adjacent structures, neurologic conditions, or be due to ocular manifestations of systemic illness (e.g., giant-cell arteritis).
- ▶ Nontraumatic eye complaints require a more detailed history than would be necessary following a known traumatic etiology.

BOX 18.1 Pivotal Findings More Likely Associated With a Serious Diagnosis in Patients With a Red or Painful Eye

Severe ocular pain

Persistently blurred vision

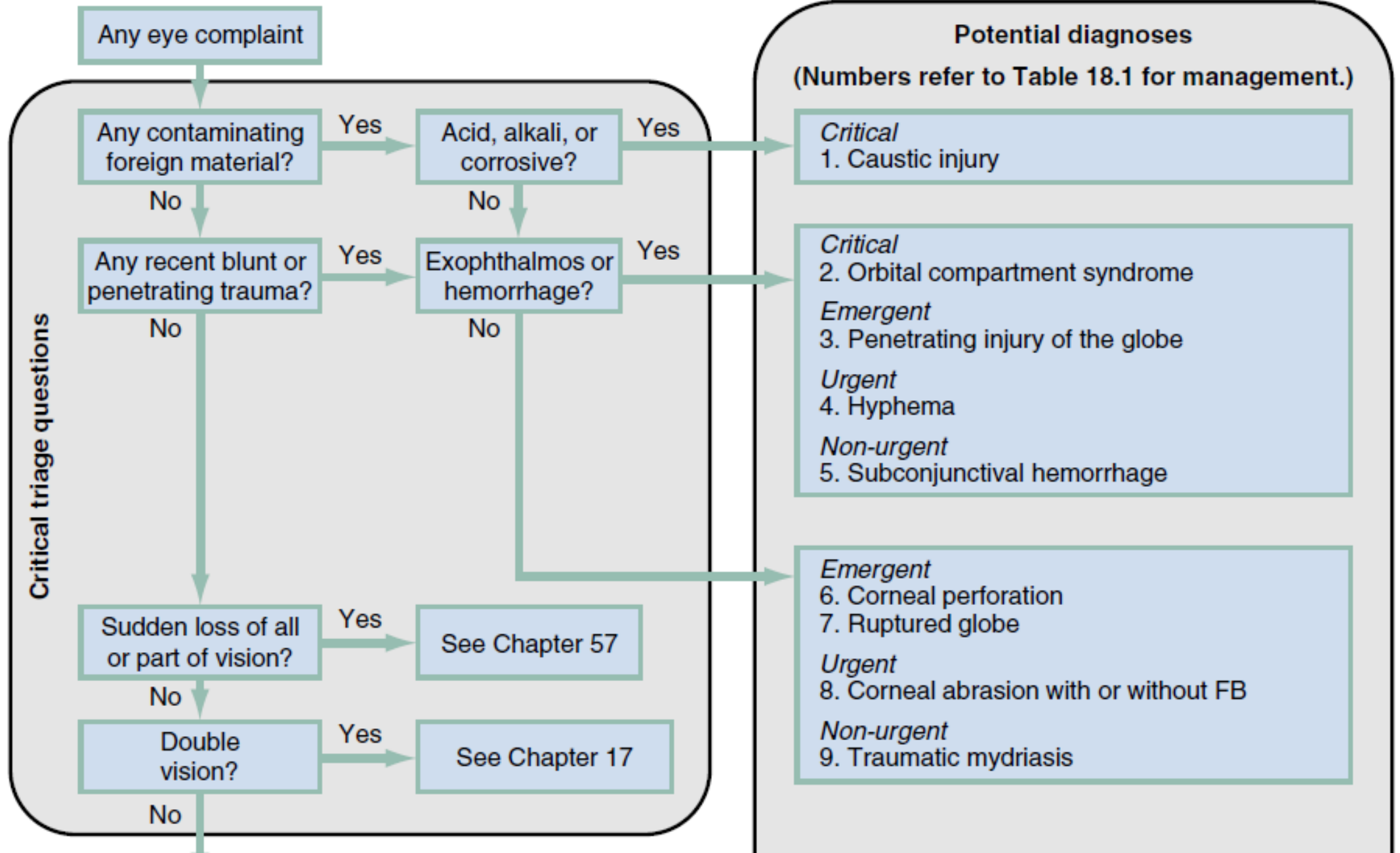
Exophthalmos (proptosis)

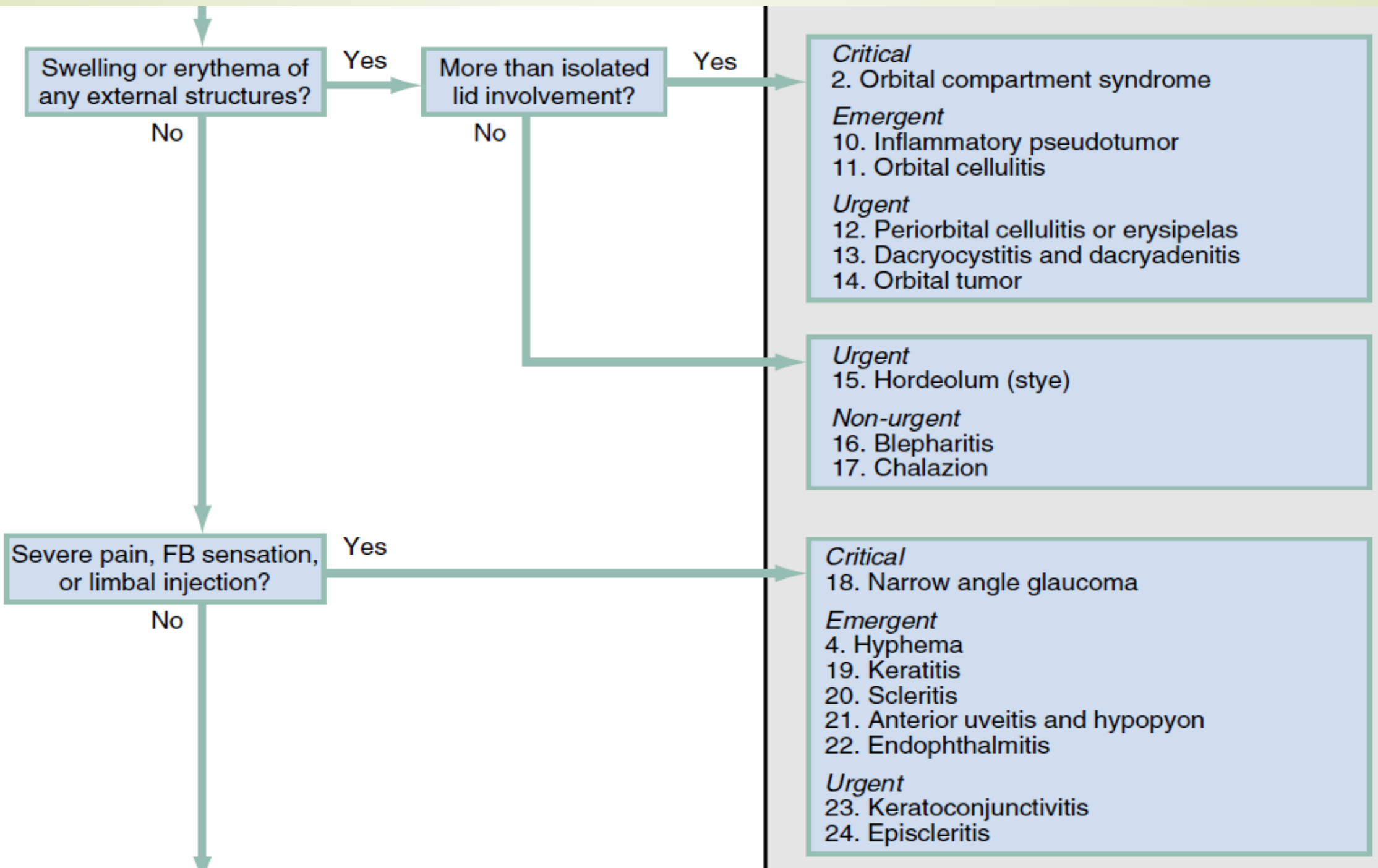
Reduced ocular light reflection

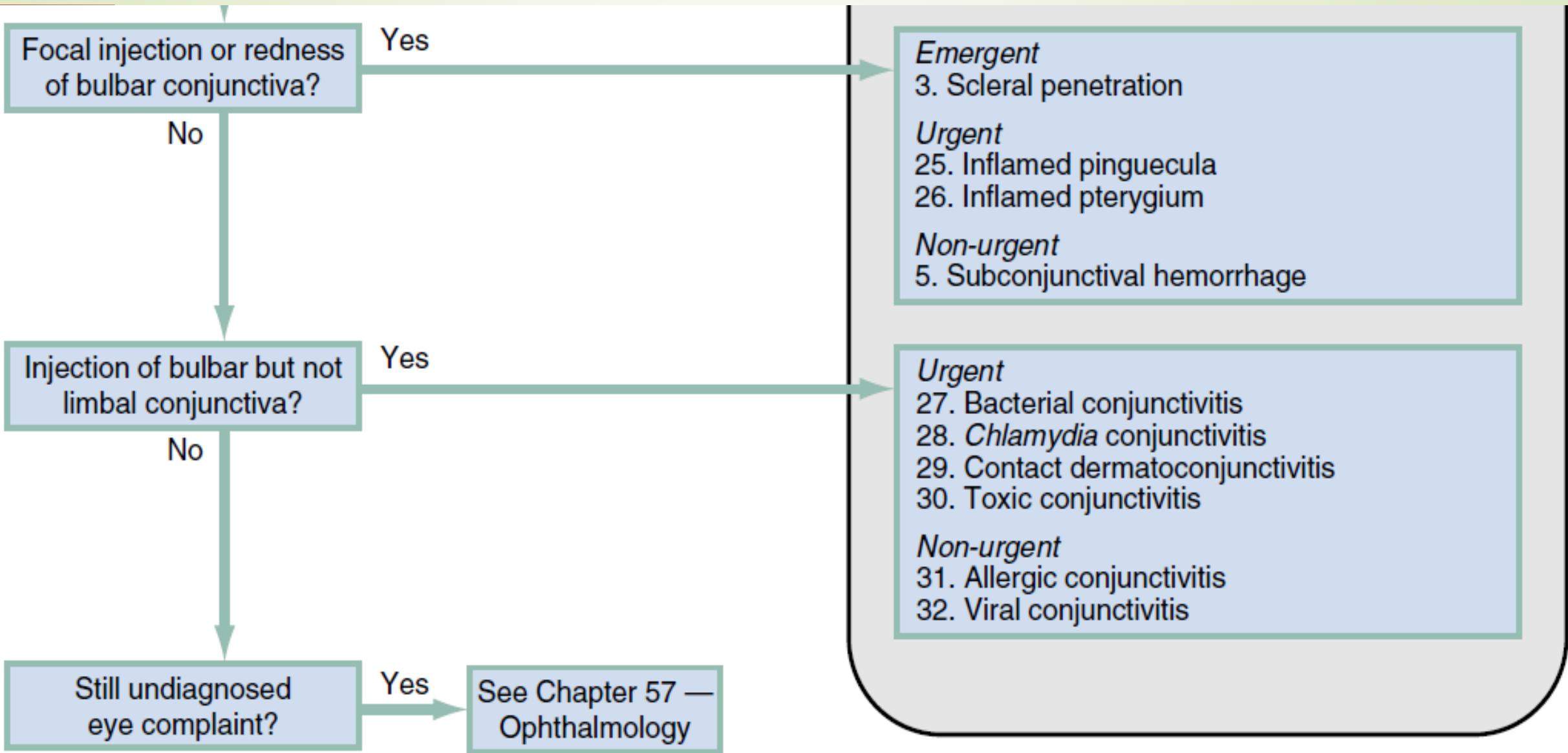
Corneal epithelial defect or opacity

Limbal injection (also known as *ciliary flush*)

Pupil unreactive to a direct light stimulus







Critical causes of Red eye...

TABLE 18.1 Management Algorithm for Red Eyes Extended From Diagnostic Algorithm in Fig. 18.8^a

Potential Diagnosis	Key Findings	Management	Consultation	Disposition
1. Caustic injury		<p>Immediate and copious irrigation with tap water or sterile normal saline until tear-film pH = 7.</p> <hr/> <p>Solids: Lift particles out with dry swab before irrigation</p> <hr/> <p>Acids: Minimum of 2 L and 20 min</p> <hr/> <p>Alkalis: Minimum of 4 L and 40 min</p>	<p>Ophthalmologist must come to ED if there is any abnormal visual acuity or objective finding on examination after sufficient irrigation, with exception of expected injection of conjunctiva secondary to treatment.</p>	<p>Discharge only if tear film pH = 7 and no abnormal findings on examination except conjunctival injection; then ophthalmologist can reevaluate next day.</p>
2. Orbital compartment syndrome	Exophthalmos (proptosis), decreased visual acuity, painful or limited ocular mobility, and increased IOP	<p>Measure IOP, unless the possibility of a ruptured globe. IOP >30 mm Hg may necessitate lateral canthotomy and cantholysis in ED.</p>	<p>IOP >20 mm Hg may be surgical emergency, may add medications used in glaucoma #18 to decrease IOP before decompression in ED. Obtain axial CT of brain and axial and coronal CT of orbits and sinuses. Consider POCUS</p>	<p>Admit all cases of retrobulbar pathology causing increased IOP. Others might be candidates for discharge depending on the cause of the problem.</p>

TABLE 18.1 Management Algorithm for Red Eyes Extended From Diagnostic Algorithm in Fig. 18.8^a

Potential Diagnosis	Key Findings	Management	Consultation	Disposition
3. Penetrating injury of the globe	Localized redness at site of entry plus possible teardrop pupil, blood in anterior chamber or loss of red reflex	Protect the eye from further pressure, provide pain relief, and prevent vomiting. Parenteral antibiotic and tetanus prophylaxis.	Ophthalmologist must come to ED if there is any concern for globe penetration.	Admit for continuation of antibiotics and possible procedural intervention.
4. Hyphema	<p>Pain, decreased visual acuity, gross or microscopic blood in anterior chamber, may be associated with dilated and fixed pupil following blunt trauma</p> <p>Graded by amount of blood:</p> <ul style="list-style-type: none"> • Percentage of vertical diameter of anterior chamber when blood layers with patient in upright position • Microhyphema shows no layering and only suspended red blood cells 	First, rule out open globe. May require POCUS if cannot visualize posterior structures. Measure IOP unless the possibility of a ruptured globe. IOP >30 mm Hg may require acute treatment as in glaucoma (see #18). If IOP >20 mm Hg and no iridodialysis, may use cycloplegic to prevent iris motion.	Discuss findings and use of antifibrinolytics and steroids, other medical therapy, best disposition, and follow-up examination by ophthalmologist within 2 days. Some patients (e.g., those with sickle cell disease/trait, coagulopathy) may be admitted for observation, bed rest, head elevation, and frequent medication administration.	Most patients can be discharged with careful instructions to return for any increased pain or change in vision. Patients should decrease physical activity and sleep with an eye shield in place. Eyes should be left open while awake so that any change in vision can be immediately recognized. PO NSAIDs or narcotics should be given for analgesia.

TABLE 18.1 Management Algorithm for Red Eyes Extended From Diagnostic Algorithm in Fig. 18.8^a—cont'd

5. Subconjunctival hemorrhage	Red blood beneath clear conjunctival membrane	Exclude coagulopathy or thrombocytopenia, if indicated by history.	None required if no concerns for underlying ocular pathology and no acute complications.	Reassure patient that discoloration should resolve over 2–3 weeks.
6. Corneal perforation	Direct visualization of full-thickness injury or positive Seidel's test	Protect eye from further pressure, provide pain relief, and prevent vomiting. Administer parenteral antibiotic and tetanus prophylaxis.	Ophthalmologist must come to ED to evaluate.	Admit for continuation of antibiotics and procedural intervention.
7. Ruptured globe	Misshapen cornea or globe following trauma	Protect eye from further pressure, provide pain relief, and prevent vomiting. Parenteral antibiotic and tetanus prophylaxis.	Ophthalmologist must come to ED to evaluate.	Admit for continuation of antibiotics and procedural intervention.
8. Corneal abrasion	History of direct trauma or foreign body plus direct visualization of defect in the corneal epithelium using white light, or fluorescein and blue light; any surrounding corneal edema indicates a concomitant keratitis (see #19)	Antibiotic prophylaxis with polymyxin-B/trimethoprim solution 1 drop every 3 h while awake and erythromycin ointment while sleeping. If contact lens wearer, consider fluoroquinolone	Discuss plan for follow-up in 1–3 days.	May discharge if no other findings. No patch.

TABLE 18.1 Management Algorithm for Red Eyes Extended
From Diagnostic Algorithm in Fig. 18.8^a

Potential Diagnosis	Key Findings	Management	Consultation	Disposition
18. Narrow angle glaucoma	Sudden-onset eye pain and blurred vision that may be associated with frontal headache, nausea, and vomiting; anterior eye may manifest shallow or closed angle between iris and cornea, pupil fixed at midsize, or limbal injection of conjunctiva	<p>Administer medications below in ED if IOP >30 mm Hg</p> <p>Decrease production of aqueous humor:</p> <ul style="list-style-type: none"> • Timolol 0.5% 1 drop • Apraclonidine 1% 1 drop • Dorzolamide 2% 1 drops or if sickle cell disease or trait, then methazolamide 50 mg PO <p>Decrease inflammation:</p> <ul style="list-style-type: none"> • Prednisolone 1% 1 drop every 15 min four times <p>Constrict pupil:</p> <ul style="list-style-type: none"> • Pilocarpine 1%–2% 1 drop after IOP <50, then repeat in 15 min <p>Consider establishing osmotic gradient:</p> <ul style="list-style-type: none"> • Mannitol 2 g/kg IV 	Discuss any IOP >20 mm Hg with ophthalmologist.	Based on findings and discussion with consultant, which primarily depends on speed of onset and response to treatment.



Thank you
for your
attention