Eye Disorders

Patrick Sarte

• Anatomy of the Eye
• Uveitis
• Scleritis vs. Episcleritis
• Glaucoma
• Retinal Findings
• Eyelids
Anatomy of the Eye

Anatomy of the Eye
Anatomy of the Eye

- Optic disc
- Fovea
- Venous
- Canal
- Cornea
- Fovea
- Macula
- Optic Nerve
- Retina
- Lens
- Pupil
- Iris

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A 26-year-old woman is evaluated for a 3-day history of pain and redness of the left eye. She also notes increased pain when looking at bright objects with that eye. Her symptoms have been progressively worsening since onset. Medical history is unremarkable, although she reports generalized fatigue, chronic low back pain, and stiffness over the past several months. The back pain awakens her at night and improves throughout the day with activity. Her only medication is as-needed ibuprofen for her back pain, which provides some relief.

On physical examination, temperature is normal, blood pressure is 126/64 mm Hg, and pulse rate is 54/min. BMI is 27. On ophthalmologic examination, extraocular muscle movements and visual acuity are normal. There is pronounced redness of the sclera surrounding the border where it meets the cornea in the left eye. The left pupil is constricted, and there is photophobia with illumination of the left eye. The right eye is normal. The physical examination is normal except for tenderness to palpation over the buttocks in the region of the sacroiliac joints.

Which of the following is the most likely diagnosis?

A. Corneal ulcer
B. Episcleritis
C. Scleritis
D. Uveitis

**Uveitis**

- Uveitis is characterized by unilateral eye pain, photophobia, and ciliary flush
- it is commonly associated with autoimmune disorders, arthritides associated with HLA-B27 antigen, infection, malignancy, and sarcoidosis.
25 yo female presents for evaluation of recurrent, bilateral eye pain and redness. Symptoms began several months ago without a specific inciting event. With each episode, she has deep or boring pain that is constant and has awakened her from sleep. She has had photophobia, tearing, and decreased vision during the episodes. Vital signs are normal. Visual acuity is 20/20 bilaterally. There is photophobia. The pupils are equal, round, and reactive to light. Extraocular movements are intact but painful. The corneas appear clear. On the lateral aspect of both eyes, there is a localized area of raised erythema, with superficial blood vessels coursing over the top of erythema, but no white sclera visible between the blood vessels. There is no discharge or crusting of the lids.

Which of the following is the most likely diagnosis regarding her eyes?

A. Episcleritis
B. Scleritis
C. Subconjunctival hematoma (hemorrhage)
D. Uveitis
E. Viral conjunctivitis

Scleritis

• Scleritis is a serious eye condition that can lead to permanent visual loss or globe rupture
• Urgent Ophthalmology consultation is required.
• In general, patients with a severely painful, red eye should be considered to have a sight-threatening condition.
Scleritis vs. Episcleritis

<table>
<thead>
<tr>
<th>Scleritis</th>
<th>Episcleritis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painful</td>
<td>Painless</td>
</tr>
<tr>
<td>Associated with risk of vision loss</td>
<td>Not associated with risk of vision loss</td>
</tr>
</tbody>
</table>

A 28-year-old woman is evaluated for bilateral eye pain and redness of 3 months' duration, which has recently worsened. She describes the pain as deep and constant and notes that it worsens at night. She also reports photophobia. She does not wear contact lenses. She has tried several types of over-the-counter eye drops without improvement in her symptoms. She is otherwise healthy and takes no medications.

On physical examination, the patient is afebrile, blood pressure is 100/62 mm Hg, and pulse rate is 94/min. BMI is 24. Ophthalmologic examination shows diffuse redness bilaterally, sparing the lids and iris. Visual acuity is normal. A nondilated funduscopic examination is unremarkable. The remainder of the examination is normal.

Which of the following is the most likely diagnosis?
A. Episcleritis
B. Keratoconjunctivitis sicca
C. Scleritis
D. Subconjunctival hemorrhage
A 32-year-old woman is evaluated for a 4-week history of eye symptoms. She notes redness of both eyes with itchiness and irritation. There is a watery discharge and mild crusting, mostly in the morning. Vision is normal, and she notes no other symptoms except for intermittent sneezing. She has not had contact with anyone who has similar symptoms or is ill. She does not wear contact lenses. Medical history is remarkable for hypothyroidism. Her medications are levothyroxine and an oral contraceptive.

On physical examination, she is afebrile, blood pressure is 124/60 mm Hg, and pulse rate is 62/min. Skin examination is normal. There is redness with edematous swelling of the conjunctivae in both eyes. A watery discharge is present, and there is mild swelling of the upper eyelids bilaterally. Visual acuity is normal. The remainder of the physical examination is normal.

Which of the following is the most likely diagnosis?
A. Allergic conjunctivitis
B. Bacterial conjunctivitis
C. Blepharitis
D. Viral conjunctivitis
A 50-year-old man is evaluated for a 1-year history of reduced vision in both eyes. Over the course of this time, he has noticed a decrease in peripheral vision, most apparent when driving his car. He has no eye pain, redness, or other symptoms. He wears only reading glasses and does not wear contact lenses. Medical history is remarkable for hypertension and hyperlipidemia. He has a 35-pack-year smoking history and is a current smoker. Medications are losartan and simvastatin.

On physical examination, temperature is normal, blood pressure is 138/88 mm Hg, and pulse rate is 84/min. BMI is 32. The eyes appear normal upon inspection. There is mild loss of peripheral vision on clinical visual field testing. Funduscopic examination findings are shown. Intraocular pressure is 35 mm Hg bilaterally. The remainder of the examination is unremarkable.

Which of the following is the most likely diagnosis?

A. Ophthalmic artery occlusion
B. Optic neuritis
C. Papilledema
D. Primary open angle glaucoma

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**Glaucoma**

- Glaucoma is optic neuropathy with increased ocular pressure.
  - Primary open angle glaucoma is progressive and painless
  - Acute closed angle glaucoma is painful and risks blindness

Patients have progressive visual loss (peripheral) and sometimes report seeing halos around lights at night.

Physical exam findings are a cup to disk ratio of >0.5 and IOP >21 mmHg (pain occurs with IOP>40 mmHg)

The USPSTF found insufficient evidence to recommend for or against screening adults for glaucoma. . . or visual acuity.

American Academy of Ophthalmology recommends comprehensive exam q1-2 years for persons >65 years.
Risk Factors for Glaucoma

Age > 40
Race
Family History
Diabetes mellitus
HTN
Hypothyroidism
Myopia

Normal angle
- Trabecular meshwork
  - Fluid drains out of eye

Closed angle
- Iris
  - Blockage
- Lens
  - Fluid can’t drain well
Trabecular meshwork

Schlemm’s canal

Iris

Lens

OPEN ANGLE GLAUCOMA

Ciliary body

Aqueous flow

Trabecular meshwork

Schlemm’s canal

Iris

Ciliary body

CLOSED ANGLE GLAUCOMA

Aqueous flow
Glaucoma

- Treatment is to decrease production or increase flow of aqueous humor.

- Patients with angle closure glaucoma should avoid medications that can cause mydriasis (pupillary dilation) such as decongestants, anticholinergic agents, adrenergic agents, antidepressants, antipsychotic agents, and motion-sickness medications.

### Drug Treatments for Open Angle Glaucoma

<table>
<thead>
<tr>
<th>Agent</th>
<th>Mechanism of Action</th>
<th>Systemic Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-blockers (timolol)</td>
<td>Decreases inflow</td>
<td>Bradycardia, heart block, bronchoconstriction, decreased libido, central nervous system depression, mood swings</td>
</tr>
<tr>
<td>Nonselective adrenergic agonists (epinephrine)</td>
<td>Decreases inflow and increases outflow</td>
<td>Hypertension, headaches, extrasystole</td>
</tr>
<tr>
<td>Selective α₂-adrenergic agonists (brimonidine)</td>
<td>Decreases inflow and increases outflow</td>
<td>Hypotension, vasovagal attack, dry mouth, fatigue, insomnia, depression, syncope, dizziness, anxiety</td>
</tr>
<tr>
<td>Parasympathomimetic agents (pilocarpine, echothiophate iodide)</td>
<td>Increases outflow</td>
<td>Increased salivation, increased gastric secretions, abdominal cramps, urinary frequency, shock</td>
</tr>
<tr>
<td>Oral carbonic anhydrase inhibitors (acetazolamide)</td>
<td>Decreases inflow</td>
<td>Acidosis, depression, malaise, bursitis, paresthesias, numbness, blood decreases, diarrhea, weight loss, kidney stones, loss of libido, bone marrow suppression, hypokalemia, bad taste, increased serum urate level</td>
</tr>
<tr>
<td>Topical carbonic anhydrase inhibitors (dorzolamide)</td>
<td>Decreases inflow</td>
<td>Lower incidence of systemic effects compared with oral carbonic anhydrase inhibitors</td>
</tr>
<tr>
<td>Prostaglandin analogues (latanoprost)</td>
<td>Increases outflow</td>
<td>Flu-like symptoms, joint and muscle pain</td>
</tr>
<tr>
<td>Hyperosmotic agents (mannitol)</td>
<td>Reduces vitreous and aqueous volume</td>
<td>Headache, heart failure, expansion of blood volume, nausea, vomiting, diarrhea, electrolyte disturbance, kidney failure</td>
</tr>
</tbody>
</table>
A 20-year-old woman is evaluated for a 3-day history of pain, swelling, and redness of the right eye. She cannot open her eye because of the swelling. One week ago, she developed a fever with sinus congestion and postnasal drainage. Except for a continued subjective fever, these symptoms have resolved. She has no history of eye trauma or surgery. She takes no medications.

On physical examination, temperature is 38.0 °C (100.4 °F), blood pressure is 100/62 mm Hg, and pulse rate is 88/min. BMI is 23. Examination of the right eye shows red and edematous upper and lower lids with conjunctival erythema. Pupillary reflex to light is intact. Inspection reveals no foreign bodies. She is unable to move her eye. A limited funduscopic examination is normal. The left eye is normal, and the remainder of the physical examination is unremarkable.

Which of the following is the most likely diagnosis?

A. Blepharitis  
B. Endophthalmitis  
C. Orbital cellulitis  
D. Preseptal cellulitis
A 55-year-old man is evaluated for a 1-day history of seeing flashing lights, "squiggly" lines, and floating objects in his left eye followed by loss of vision at the outer periphery of the eye shortly after having breakfast this morning. He now describes seeing what looks like a curtain coming down in that location. He has myopia requiring prescription glasses.

On physical examination, vital signs are normal. Vision in the right eye is 20/100 uncorrected and 20/40 with glasses. Vision in the left eye is 20/100 uncorrected and 20/40 with glasses. Pupils are equally reactive to light and accommodation. There is no conjunctival injection. Findings on funduscopic examination are shown.

Which of the following is the most likely diagnosis?

A. Central retinal artery occlusion
B. Central retinal vein occlusion
C. Ocular migraine
D. Retinal detachment
E. Temporal arteritis
A 60-year-old man is evaluated for new-onset monocular cloudy vision of the left eye that began 4 hours ago. He has type 2 diabetes mellitus and coronary artery disease. His current medications are aspirin, simvastatin, lisinopril, metoprolol, and metformin.

On physical examination, vital signs are normal. When a light is shined into his left eye it is not reactive, but shining a light in his right eye causes his left pupil to contract (left afferent pupillary defect). The visual acuity of the right eye is 20/30, that of the left eye is 20/120. Retinal findings are shown :. The remainder of the examination is normal.

Which of the following is the most likely diagnosis?
A. Acute angle closure glaucoma
B. Central retinal artery occlusion
C. Central retinal vein occlusion
D. Retinal detachment
Roth Spots

Hypertensive Retinopathy
CMV Retinitis

Extensive hard exudate

Cotton wool spots
Toxoplasmosis

Diabetic Retinopathy
DIABETIC RETINOPATHY

- HEMORRHAGES
- ABNORMAL GROWTH OF BLOOD VESSELS
- ANEURYSM
- "COTTON WOOL" SPOTS
- HARD EXUDATES

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Age-Related Macular Degeneration

• Age-related macular degeneration is a leading cause of vision loss amongst the elderly.
• Wet AMD, which often involves only one eye, results in severe visual loss.
• Risk factors for developing AMD are advanced age, family history, smoking, and cardiovascular disease.
• Smoking cessation decreases the risk for developing AMD and should be recommended to all patients who smoke.
Blepharitis
HORDEOLUM
INFECTION OF THE GLANDS OF THE EYELID
INTERNAL MEBIONIAN GLAND
EXTERNAL (STYE) GLAND OF ZIGS OR MOLL

NO! STAY BACK! IT HURTS!

CHALAZION
STERILE, CHRONIC INFLAMMATION THAT RESULTS FROM A BLOCKED MEBIONIAN GLAND
MAY DEVELOP FROM AN INTERNAL HORDEOLUM

Dude, take a chalazion pill.

REDNESS, ACUTELY TENDER
HARD, NOT TENDER