The Red Eye

Stephanie Chan, BEng
Joshua Teichman, MD

CASE 1
A 40-year-old woman presents with a unilateral red eye and complains of pain, a foreign body sensation and decreased vision. Fluorescein staining and cobalt blue lighting of the eye is shown.

CASE 2
A 30-year-old man previously diagnosed with inflammatory bowel disease presents with a two day history of a unilateral red eye and complains of pain, photophobia and decreased vision.
CASE 3
A 25-year-old man presents with bilateral red eyes and complains of pain, discharge and a foreign body sensation for the past three days. Preauricular lymph nodes are palpable. Fluorescein staining and cobalt blue lighting of the conjunctiva is shown.

CASE 4
A 30-year-old woman presents with a red eye after having it scratched by her baby daughter two hours ago. She complains of pain and tearing. Fluorescein staining and cobalt blue lighting of the cornea is shown.

CASE 5
A 75-year-old man presents with a red eye, severe pain, photophobia, tearing, and decreased vision. He thinks he may have scratched his eye with a used eyedrop bottle nine days ago, but did not seek medical treatment at the time.

CASE 6
A 55-year-old paper mill worker presents with a red eye and severe pain following a workplace incident where chlorine entered his eye.
CASE 1 DIAGNOSIS:
HERPES SIMPLEX VIRUS KERATITIS
Herpes Simplex Virus (HSV) Keratitis classically presents as corneal ulcers with a dendritic pattern, easily seen with fluorescein staining and cobalt blue lighting. Patients often present with a red eye, pain, photophobia, tearing and decreased vision. Patients may also have vesicular skin lesions. HSV is treated with topical antivirals; it is important to remember that the use of corticosteroids is generally contraindicated. Patients should be referred to an ophthalmologist for possible dendritic debridement, topical antivirals, and to monitor for complications including increased intraocular pressure, uveitis and very rarely retinitis.

CASE 2 DIAGNOSIS:
IRITIS
The slit beam of light highlights a shower of white blood cells in the anterior chamber, indicative of inflammation. There are also keratic precipitates present inferiorly on the corneal endothelium and adhesions between the iris and lens (synechiae). While intraocular inflammation may be caused by infection, neoplasm, trauma and surgery, it is often autoimmune or idiopathic in nature.

Acute anterior uveitis, or iritis/iridocyclitis, is characterized by inflammation of the iris and ciliary body and is usually unilateral. Patients will often complain of pain, photophobia and blurry vision. Inspection typically reveals “ciliary flush”, or conjunctival redness most prominent around the limbus. While iritis is often idiopathic, it has been linked to HLA-B27.

Patients with this HLA type may also suffer from seronegative arthropathies, including ankylosing spondylitis, psoriatic arthritis, inflammatory bowel disease and reactive arthritis. It can be helpful at times to ask relevant questions surrounding these disorders.

CASE 3 DIAGNOSIS:
FOLLICULAR CONJUNCTIVITIS
Conjunctival follicles, as seen in this picture, with preauricular lymphadenopathy are characteristic of a viral conjunctivitis.

Conjunctivitis has numerous etiologies, including atopy/allergy, bacteria, viruses and lice. It is characterized by generalized hyperaemia, which is often less marked around the limbus (contrast with iritis). Patients often complain of pain, a scratching or burning sensation, and discharge. Purulent or profuse exudate is usually indicative of a bacterial pathogen. Bacterial conjunctivitis is treated with topical or systemic antibiotics depending on the case. Allergic conjunctivitis is characterized by itching and is often treated with cold compresses, artificial tears and topical or oral antihistamines. Follicular conjunctivitis has its own differential diagnosis, which is almost exclusively viral in nature. An important type of viral conjunctivitis is Epidemic Keratoconjunctivitis (EKC), a highly contagious disease caused by specific serotypes of human adenoviruses. When dealing with EKC, precautions such as handwashing and cleaning of equipment should be taken by healthcare professionals and patients to avoid spread.

CASE 4 DIAGNOSIS:
CORNEAL ABRASION
The fluorescein staining and cobalt blue lighting clearly show an area of de-epithelization indicating a corneal abrasion.

Corneal abrasions are painful and patients complain of foreign body sensation. They are generally treated with topical antibiotics to prevent infection and clear within a few days. Additionally, abrasions caused by organic materials, such as tree branches or fingernails, should be treated with a fluoroquinolone. Anti-pseudomonal coverage is important in contact lens wearers. Patching of the eye is not usually indicated and is contraindicated in contact lens wearers.

CASE 5 DIAGNOSIS:
CORNEAL ULCER
This picture shows a severe corneal ulcer with corneal opacity and pus filling the anterior chamber (hypopyon) inferiorly.

Corneal ulcers may present similarly to abrasions. When examining the eye with a slit-lamp, the involved area in an abrasion remains relatively clear and the details of the iris remain visible. Conversely, the details of the iris are lost when looking at it through an opaque corneal ulcer.

Important causes of corneal ulcers include corneal abrasions, foreign bodies, and use of contact lenses. The ulcer is typically cultured and treated with topical antibiotics. Corneal ulcers require urgent referral to an ophthalmologist in order to prevent serious complications such as corneal perforation and endophthalmitis.
CASE 6 DIAGNOSIS:
CHEMICAL KERATOCONJUNCTIVITIS

This picture shows generalized inflammation of the conjunctiva and cornea. When exposure to chemical agents occurs, the eye must be continuously irrigated for at least 30 minutes and the fornices must be swept to remove any remaining particulate material. Urgent referral to an ophthalmologist is warranted, and depending on the severity, it may be treated with artificial tears, antibiotic ointment, and control of the intraocular pressure and pain.

REFERENCES

Author Biographies
Stephanie Chan completed her Bachelor in Engineering at McMaster University and is currently a second-year medical student at the Michael G. DeGroote School of Medicine at McMaster University.
Dr. Joshua Teichman completed his medical degree at the University of Western Ontario and is currently a third-year resident in the Division of Ophthalmology, Department of Surgery at McMaster University.