Eye Health Center of Troy

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Medicine Resident Teaching Series: Red Eyes Int

Anatomy: I think all internal medicine residents should have a basic understanding of the anatomy and physiology of the eye to understand the most eye common conditions that are seen in an internal medicine setting.

Eye Socket: aka orbit (check) the bony socket housing the eyeball.
Adenexa: Eyelids and conjunctiva (check).

Layers of Eye
Outer layer: Sclera and Cornea. Sclera is the white of the eyeball and the cornea is the transparent anterior portion of the eyeball. The function of sclera to provide a protective barrier for ocular contents and to provide a surface for the ocular muscles to insert. Penetrating injuries to eye commonly result in rupture of sclera and often the first thing to do is to repair the sclera so that infection does not travel retrograde into the body.

Cornea is the anterior transparent part of sclera. It is transparent to light and is the most important refractive surface of the eye. It is here that the light first refracts (bends) to enter the eye. It allows the light to enter the eye and at the same time acts like a powerful lens that concentrates and focuses the light on the retina. The idea when performing the commonly known LASIK surgery is to change the curvature of the cornea in order for the light to bend differently and focus at a predetermined point and thus to alter the refractive error of the patient to his/her advantage.

Middle layer: Uvea. Anterior uvea is the iris and ciliary body. Posterior uvea is the choroid. Iris is like a diaphragm with the pupil in the center. The dilator and the constrictor muscles in the iris are constantly in a flux to regulate the amount of light that enters the eye. Iris is attached to the ciliary body posteriorly. Ciliary body produces aqueous and ciliary muscles allow accommodation. Ciliary body extends posteriorly into choroid. Choroid is highly vascular and provides the blood supply to the outer layers of retina. Practical relevance of ciliary body lies in the fact that it produces aqueous and has relevance in glaucoma. Most common cause of primary open angle glaucoma is not excess aqueous production but deficient outflow mechanism. Another term that one may commonly hear is the trabecular meshwork. This is the spongy tissue between the peripheral cornea and the iris and allows aqueous to drain. In primary open angle glaucoma, the sponginess of the trabecular meshwork is lost because of inherent problems with the mucopolysaccharides. In angle closure the trabecular meshwork is anatomically narrow because the iris is crowded on it. I will use the analogy of poor drainage in a house - it may be from something blocking the

the drain pipe on the inside (like in open angle glaucoma) or from something pushing on the drain pipe from outside (like in closed or narrow angle glaucoma).

Inner layer: Retina is the neural surface of the eye where the light energy is converted by rods and cones to electrochemical energy for neural transmission to the visual cortex. There is a potential space between inner and outer retina. Retinal detachment happens when there is a separation between inner and outer retina. Macular degeneration happens when the rapidly regenerating rods and cones do not recycle as rapidly and the waste product, lipofuscin, accumulates (dry macular degeneration) and starts an inflammatory cascade leading to vascular proliferation (wet macular degeneration). Glaucoma leads to optic neuropathy and ultimately atrophy of neural retinal layer.