Anisocoria

Definition

Unequal pupil sizes (usually ≥1 mm difference).

An afferent pupillary defect (APD) (even with total blindness in one eye) alone does not pro- duce anisocoria (i.e. an APD together with anisocoria indicates two separate lesions).

Evaluation

1. history is critically important. Check for exposure to drugs that affect pupillary size, trauma. Look at old photos (e.g. driver's license) for physiologic anisocoria

2. Pupillary exam

3. a non-contrast CT is usually not helpful and can provide a false sense of security.

Differential diagnosis

1. physiologic anisocoria: occurs in ≈ 20% of population (more common in people with a light iris). Familial and nonfamilial varieties exist. The difference in pupils is usually <0.4 mm. The inequal- ity is the same in a light and dark room (or slightly worse in the dark)

2. pharmacologic pupil: the most common cause of sudden onset of anisocoria

a) mydriatics (pupillary dilators):

● sympathomimetics (stimulate the dilator pupillae): usually cause only 1–2 mm of dilation, may react slightly to light. Includes: phenylephrine, clonidine, naphazoline (an ingredient in OTC eye drops for allergies), eye contact with cocaine, certain plants (e.g. jimsonweed)

● parasympatholytics (inhibit the sphincter pupillae): cause maximal dilation (up to 8 mm) that does not react to light. Includes: tropicamide, atropine, scopolamine (including patches for motion sickness), certain plants (e.g. deadly nightshade)

b) miotics (pupillary constrictors): pilocarpine, organophosphates (pesticides), flea powders containing anticholinesterase

3. Horner's syndrome: interruption of sympathetics to pupilodilator. The abnormal pupil is the smaller (miotic) pupil. If there is ptosis it will be on the side of the small pupil.

4. third nerve palsy. If there is ptosis, it will be on the side of the large pupil

a) oculomotor neuropathy ("peripheral" neuropathy of the third nerve): usually spares the pupil.

Etiologies: DM (usually resolves in ≈ 8 weeks), EtOH…

b) third nerve compression: tends not to spare pupil (i.e. pupil is dilated). Produces loss of para-sympathetic tone. Etiologies include:

● aneurysm:

p-comm (the most common aneurysm to cause this) basilar bifurcation (occasionally compresses the posterior III nerve)

● uncal herniation:

● tumor

● cavernous sinus lesions: including cavernous internal carotid aneurysm, carotid-caver- nous fistula, cavernous sinus tumors

5. Adie’s pupil (AKA tonic pupil):

6. local trauma to the eye: traumatic iridoplegia. Injury to the pupillary sphincter muscle may produce mydriasis or less often miosis, shape may be irregular.

7. pontine lesions

8. eye prosthesis (artificial eye) AKA pseudoanisocoria

9. occasionally some patients have anisocoria that occurs only during migraine [1)].

10. iritis

11. keratitis or corneal abrasion

1)
Kawasaki A. Physiology, assessment, and disorders of the pupil. Curr Opin Ophthalmol. 1999; 10:394–400