ANISOCORIA IN SEIZURE ACTIVITY

Problems with earlier reports and with generalizations about pupil reactions to seizure activity at any given time. Small amounts of anisocoria are difficult to attribute to focal seizure activity.

1. Simple anisocoria not taken into consideration. 20% of patients have 0.4 mm or more of anisocoria at any given time. Small amounts of anisocoria are difficult to attribute to focal seizure activity.

2. Observations made at time of seizures - no comment on pupils during seizure free status.

3. Seizures are not all that commonly seen by neurologists and when they do see a seizure spend their time looking at things other than pupils.

4. Seizures are almost never seen by neuro-ophthalmologists in a clinical setting.

5. These asymmetries may be subtle and easily overlooked. It is easier to see anisocoria in children who have large pupils and whose parents look at them a lot when they are seizing.

What can seizures tell us about pupil activity? In general they point broadly to areas of the brain that have sympathetic excitatory or inhibitory activity.

Earlier clinical reports and observations:

Gowers (1881) said that pupils tended to be mictic in the tonic phase and become dilated in the clonic phase. In the post-ictal state the pupils constrict again.

Spiller and Posey (1906) repeat Growers observations. They emphasize that pupils do not remain dilated post-ictally and that with feigned seizures using Belladonna drops in the eyes would leave the patient dilated post-ictally.

Penfield and Jasper (1954) were not much interested in the pupil except to say that in hallucinatory, visual or seizure that originated in the supplementary motor cortex were associated with rapid bilateral pupil dilation. Even under their controlled surgical conditions it was difficult to see what the pupils were doing.

Port (1966) 6 cases of postictal or late ictal anisocoria associated with adverse seizures -- larger pupil ipsilateral to the adverse eye movement. "Sluggish" reaction to light in some of the larger pupils -- not consistently.

Walsh and Hoyt (1969) Cases of children who have brief spells of anisocoria without clear lateralization of seizure activity.


Jammes (1980) Six patients with petit mal epilepsy induced by hyperventilation. 282 episodes per subject. Bilateral dilation of pupils. Light reaction was blocked during all spells.

Gadoth (1981) Single patient -- right sided focal seizures with transient right pupil enlargement and left frontal EEG focus.

CONCLUSIONS

1. It is difficult to ascribe significance to short-lived pupillary asymmetries.

2. The early miosis seen by Gowers in the tonic phase of seizures is probably largely missed by current day epileptologists since he was seeing a lot more untreated epilepsy and probably personally saw a great many more seizures than we are likely to.

3. Bilateral pupillary dilation is the rule during major motor and petit mal seizures.

4. The dilation is probably due to both sympathetic stimulation and parasympathetic inhibition. The miosis post-ictally probably represents the miosis of sleep.

5. Transient, days to weeks-long unilateral miosis, associated with ptosis, may rarely occur in association with temporal lobe lesions but the laterality of the lesion and these clinical findings is uncertain. Neuroanatomic connections between the temporal lobe and hypothalamus include fornix, stria terminals, medial forebrain bundle and the ventral amygdalofugal tract. Unilateral small pupils that respond to light and near are not due to sphincter "spasm".

6. Unilateral pupillary dilation is due either to inhibition of the ipsilateral pupil sphincter or excitation of the contralateral sphincter.
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