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A few words on accommodative disorders

Accommodation is the automatic process of changing focal length when gaze shifts. This permits to keep the object of interest in focus. While accommodation naturally decreases with age, accommodation can also be altered by disruption of its neuroregulation, be it in central or peripheral pathways.

Many patients with cerebral inflammation (encephalitis) and significant head trauma develop accommodation failure, usually in combination with a loss of convergence. But even a relatively minor systemic illness, such as the flu or other viral syndrome, can provoke a mild and transient insufficiency of accommodation. These patients may notice tired eyes or blurry vision with reading for prolonged periods at the same time as systemic symptoms of acute illness, like fever, headache, and myalgias. In such cases, the mild accommodative insufficiency resolves along with the other symptoms of illness. Another common scenario of accommodative insufficiency is head injury, particu-

larly in post-concussion syndrome. In these patients, the poor accommodation may never recover.

In the absence of pre-existing cerebral damage (inflammation, trauma, haemorrhage), an acute onset of severe and bilateral loss of accommodation may be the first signal of an underlying serious condition. It is important to carefully examine the pupils in the event of acute bilateral accommodative failure. Often there is accompanying pupillary involvement and the pupils are large and poorly reactive to light stimulation.

Pathologies that cause acute bilateral accommodative and pupillary failure include acute hydrocephalus, midbrain tumor and acute neuropathy like paraneoplastic autonomic neuropathy or antiGQ1b antibody syndrome. And don't forget that botulism, in its earliest stages, can also present in this way so be sure to ask about gastrointestinal symptoms.

Accommodative loss in only one eye is nearly always accompanied by unilateral mydriasis. This is because the neural impulses for accommodation and for pupillary constriction are carried in the same peripheral nerve pathway. In such cases, a third nerve palsy or tonic pupil are common causes.

Here is a typical scenario: A 30-year-old woman complains of sudden difficulty reading out of her right eye. She has to hold the near test card about 2 feet from her right eye to be able to read it compared to 6 inches from her left eye. In addition, her right pupil is slightly larger than the left pupil and shows a slow response to light. The ocular motility and eyelid examination are normal. In this patient, the cause of her unilateral accommodative failure is an acute Adie's tonic pupil.

In some patients, accommodation is not insufficient but rather excessive. This is generally the case of accommodative spasm. In this condition, the patient has a transient or permanent state of too much accommodation. The symptoms include visual blur, especially at distance, and brow ache. The clinical sign of accommodative spasm is pseudomyopia, in which the manifest refraction reveals greater myopia compared to the cycloplegic refraction as well as a preference by the patient for the manifest refraction (more minus

lenses) in order to have good vision. Because accommodation often occurs as one part of the near reflex triad (accommodation, pupillary constriction, and ocular convergence), when accommodation goes into spasm, often the whole triad goes into spasm.

In such a case, when a patient is asked to focus on a near stimulus then in addition to the pseudomyopia, there is also convergence spasm which causes esotropia and an intense bilateral pupillary miosis. When accommodative spasm follows head trauma, the condition is persistent, and the patient needs the appropriate minus lens correction.

In terms of neurologic conditions associated with accommodative spasm, cerebellar and posterior fossa lesions are increasingly recognized but most commonly, accommodative spasm is encountered as a functional disorder.

The take home message is that for the pre-presbyopic patient who presents an acute dysfunction of accommodation (failure or spasm) in both eyes, an MRI of the head is probably needed to rule out pathology of central pathways.