An adult patient with double vision

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Case History:

A 27-year old Nepali man presented with a four-day history of fever, vomiting and horizontal diplopia. There was no history of trauma. The photographs below show the patient looking at the distance (Figure 1) and to the left (Figure 2).

Figure 1.

Figure 2.

Question

1. State the abnormality.
2. What is the diagnosis?
3. What are the possible causes?

Answer

1. Incomitant esotropia
2. Left 6th cranial nerve palsy
3. Mastoiditis, otitis media, sinusitis, and cellulitis

Discussion

Esotropia

Figure 1 shows that the patient has esotropia of the left eye or what is commonly known as a squint or strabismus. The squint is an inward squint (synonyms include convergent squint or esodeviation of the eye). Esotropia is a condition where either one or both eyes are turned inward. Congenital esotropia, often seen in infants below six years old, may give rise to amblyopia. Accommodative esotropia is common among patients with moderate amounts of hypermetropia or hyperopia. Esotropias can be concomitant, where the degree of deviation is independent of the direction of the gaze, or incomitant, where the degree of deviation is influenced by the direction of the gaze. This patient had incomitant esotropia as the squint was revealed when he was asked to look to the left (Figure 2). A comprehensive step-by-step approach to a patient presenting with a squint has been described extensively in literature.[1]

When the patient looked to the left, there was a loss of conjugate eye movement. The right eye turned to the left, indicating a functional medial rectus muscle (supplied by the third cranial nerve or oculomotor nerve). However, the left eye remained fixed indicating left lateral rectus palsy (supplied by the sixth cranial nerve or abducens nerve), leading to horizontal diplopia.

Neuroanatomy of the abducens nerve

The abducens nerve, on each side, arises in the pons in close proximity to the floor of the fourth ventricle and exits the brain stem at the pontomedullary sulcus. It then ascends superiorly towards the cavernous sinus before traversing it and entering the orbit via the superior orbital fissure. It terminates at the ocular surface of the ipsilateral lateral rectus muscle.[2,3] It is responsible for lateral horizontal ocular movement.

The abducens nerve has the distinction of having the longest subarachnoid course of all cranial nerves and by virtue of this, is also vulnerable to many possible insults along its course. In addition, unlike the oculomotor nerve, the abducens nerve passes through the cavernous sinus proper instead of being embedded within the dura of the cavernous sinus' wall. Due to its unique position, the abducens nerve is also the most vulnerable to diseases affecting the cavernous sinus compared with the other nerves innervating extraocular muscles.[3]

Clinical findings and causes of isolated sixth cranial nerve palsy

Patients with solitary abducens nerve palsy present with binocular horizontal diplopia (double images located side-by-side horizontally) and esotropia on primary gaze. In addition, the patient may complain of headache or may turn his or her head to one side in order to minimise the discomfort caused by diplopia.

There are many causes of isolated ipsilateral abducens nerve palsy. Raised intracranial pressure from any cause should be ruled out, particularly in young patients presenting with symptoms such as headache, vomiting, blurred vision and altered consciousness. The elevated intracranial pressure causes the brain stem to displace inferiorly and stretches the abducens nerve. Lesions involving the subarachnoid space (for example tumours, infection, bleeding, inflammation and cavernous sinus lesions) may cause abducens nerve palsy. Congenital causes are rare. Systemic diseases such as diabetes mellitus and hypertension are common causes of solitary sixth cranial nerve palsy.[4] A study in Nepal involving 44 men with isolated sixth cranial nerve palsy found that 56.8% of the cases are idiopathic (most likely viral infection), followed by uncontrolled diabetes mellitus.[5]

Laboratory investigations found that the patient had leucocytosis. A contrast-enhanced computed tomography (CECT) revealed thrombosis of the superior sagittal sinus, the left transverse sinus and the left sigmoid sinus. There was no evidence of leptomeningeal enhancement, space-occupying lesions or mass effect. This suggests that an infective process causing the thrombosis is the likely cause of the isolated sixth nerve palsy. Possible causes of infections causing thrombosis in the various cerebral venous sinuses in this patient include infective spread from nearby structures such as mastoiditis, otitis media, sinusitis, and cellulitis. More than 100 causes of cerebral venous sinus thrombosis have been extensively described in literature. However, in 20-25% of cases, no cause could be identified despite extensive investigation.[6] The patient was treated with antibiotics to cover possible infection and anticoagulant while awaiting investigations to rule out hypercoagulable conditions.

References

1. Rutstein RP, Cogen MS, Cotter, SA, et al. Optometric clinical practice guideline care of the patient with strabismus: Esotropia and Exotropia. Lindbergh Blvd. St. Louis: American Optometric Association; 2011.
2. Evans NM. Ophthalmology. 2nd ed. Oxford University Press Inc; 1995.
3. Depper MH, Truwitt CL, Dreisbach JN, et al. Isolated Abducent Nerve Palsy: MRI Imaging Findings. Am J Roent.1993;160:837-41.
4. Savino NJ, Hilliker JK, Casell

GH. Chronic sicth nerve palsies. Are they really harbingers of serious intracranial disease? Arch Ophthalmol. 1982;100:1442-4.

5. Shakya S, Agrawal JP, Ray P. Profile of isolated sixth cranial nerve palsy: A hospital based study. J Neuroscience. 2004;1:32-5.

6. Kimber J. Cerebral venous sinus thrombosis. Q J Med. 2002;95:137-