

# Hemifield slide phenomenon in a patient with bitemporal hemianopia

Tak-Chuen Ko, FRCS, FCOphthHK, Patrick K.W. Wu, FRCS, FCOphthHK, Bonny K.K. Lo, BSc Health Sci (Orthoptics)

Department of Ophthalmology, Tung Wah Eastern Hospital, Hong Kong, China.

*Correspondence and reprint requests:*

Tak-Chuen Ko, Department of Ophthalmology, Tung Wah Eastern Hospital, Hong Kong, China.

## Abstract

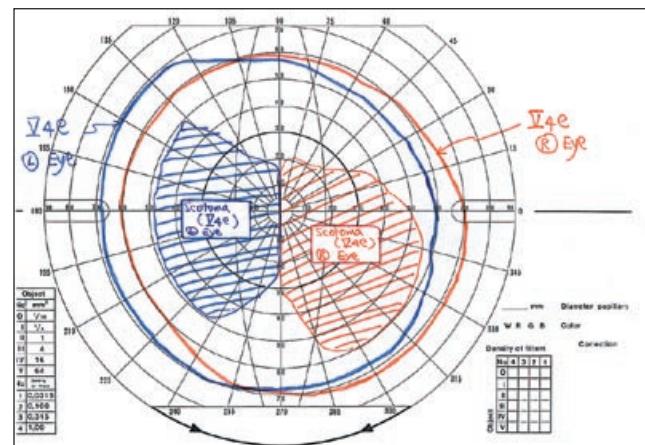
Pituitary tumor is by far the most common perichiasmatic tumor. It can compress the chiasm resulting in visual field defect, classically bitemporal hemianopia. A dense bitemporal hemianopic scotoma can cause hemifield slide phenomenon. This brief report describes a patient with this phenomenon resulting in nonparetic diplopia. With orthoptic training, double vision was successfully eliminated; single vision was restored with a nearly full binocular field.

**Key words:** Pituitary tumor, Bitemporal hemianopia, Hemifield slide

## Case report

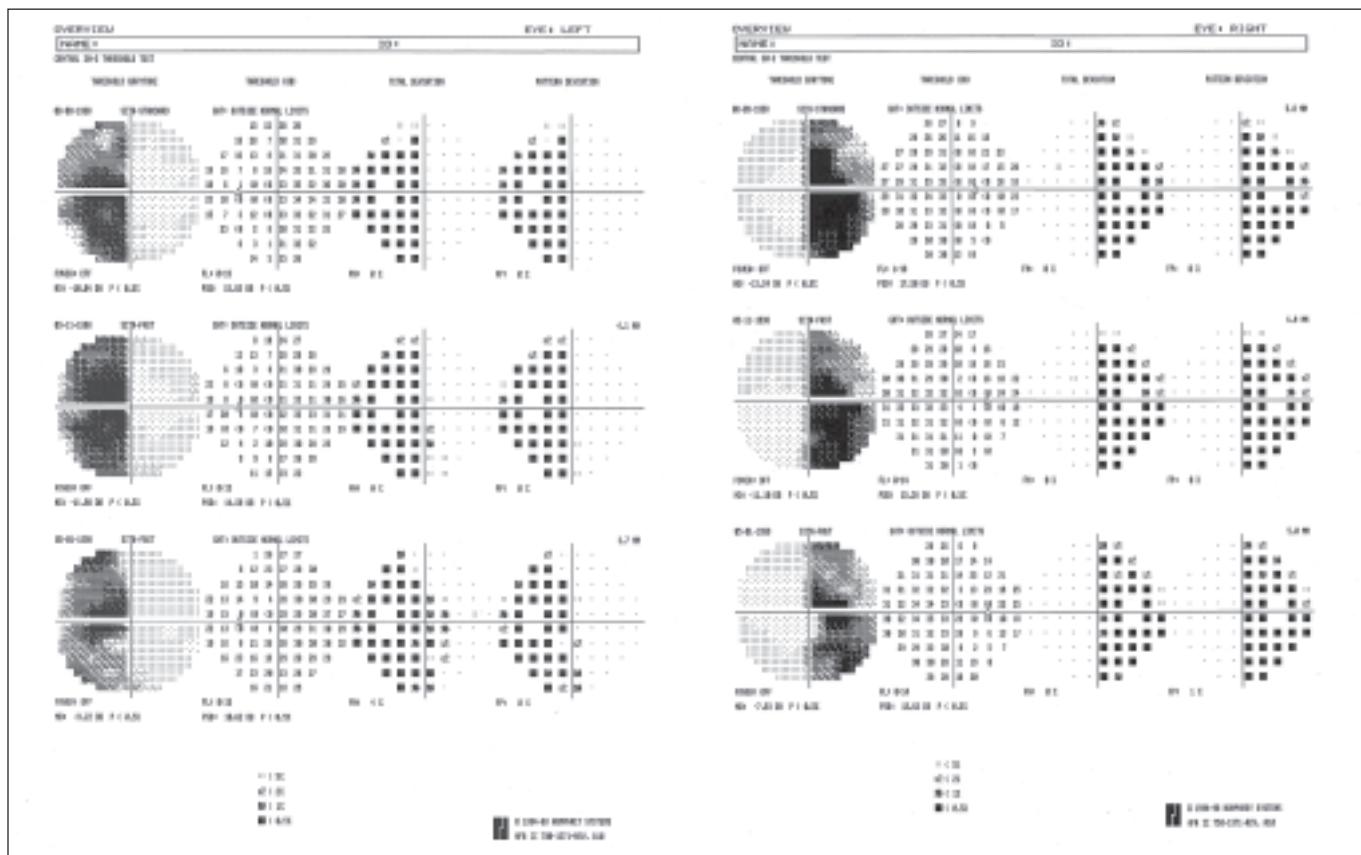
A 29-year-old gentlemen presented with progressive blurring of vision over both eyes for 1 month. Physical examination revealed subnormal visual acuity of the left eye (6/9 in the right eye and 6/24 in the left eye) and mild temporal disc pallor was noticed in both eyes. No other abnormalities were detected.

Visual field testing (Goldman) showed bitemporal hemianopia (**Figure 1**). Computed tomography and magnetic resonance imaging of the brain and pituitary fossa showed a pituitary macroadenoma extending into the suprasellar cistern, compressing on the optic chiasm. The patient was referred to a neurosurgeon and excision of the tumor was performed. Histologic examination of the tumor was consistent with pituitary adenoma.



**Figure 1. Visual field on presentation.**

At subsequent follow-up visits, the patient complained of double vision, especially when reading, which became persistent after reading for 15 minutes. Cover test showed straight eyes at both distant and near fixation. Alternate cover test with prisms showed  $2^\Delta$  exophoria at distance and variable exophoria at near fixation up to  $6^\Delta$ . Maddox wing testing showed  $2^\Delta$  exophoria at near fixation. When a prism was used to neutralize his phoria, he found that part of the image disappeared. On further examination, it was found that the patient's near point of convergence had receded to 14 cm, which was worse than other subjects of his age. Binocular visual acuity was 6/18 without prism and 6/12 with  $1^\Delta$  base-in (BI) prism. The patient noticed momentary fusion with  $1^\Delta$  BI Fresnel prism in front of the right eye. However, he still complained of intermittent diplopia on reading. His serial visual fields are shown in **Figure 2**. The diagnosis was bitemporal hemianopia with hemifield slide phenomenon.



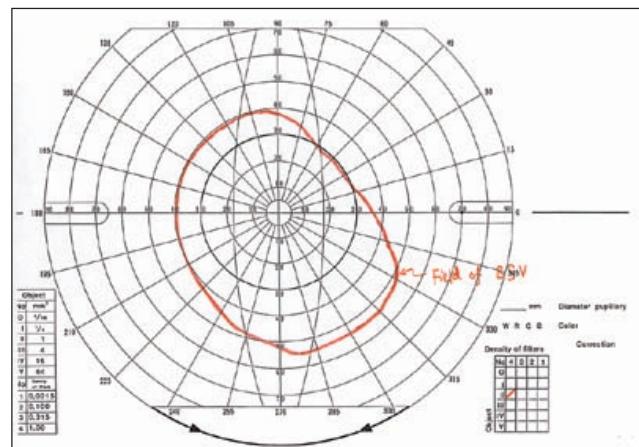
**Figure 2.** Serial visual fields at follow-up visits.

Orthoptic exercises were started in the form of simple convergence exercises with fixation target and base-out prism jump, and increase gradually to  $15^\Delta$  base-out (BO) prism fusional convergence exercises; a  $2^\Delta$  BI Fresnel prism was prescribed to aid fusion.

After a couple of months, the patient noticed an improvement in his reading span and he could be free of diplopia on reading for up to 1 hour. His fusional convergence without prism improved from  $2^\Delta$  to  $12^\Delta$  BO at near fixation and  $2^\Delta$  to  $6^\Delta$  at distance. The fusional convergence with the aid of a  $2^\Delta$  BI prism was  $20^\Delta$  BO at near and  $25^\Delta$  BO at distance. His stereopsis was  $340''$  measured with Frisby and  $400''$  with Titmus. During binocular single visual field testing with red/green goggles, he perceived the target white light as an exact bisect of red and green color; no binocular single visual field was demonstrated. When a white light was used as a target, his binocular field of single vision was much better than expected (**Figure 3**). His diplopia on distance vision was eliminated by a  $3^\Delta$  BI prism incorporated into his spectacles. His near point of convergence improved to 6 cm.

## Discussion

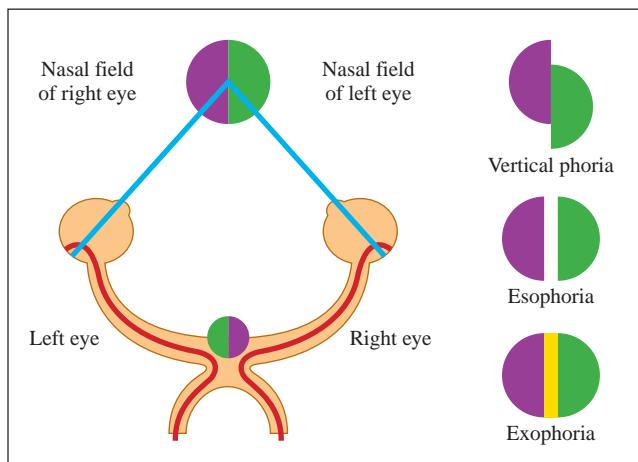
Hemifield slide has been previously reported as an interesting clinical feature of optic chiasmal lesion.<sup>1,2</sup> It is a sensory phenomenon, resulting in diplopia without paresis of the cranial nerves.<sup>3</sup> A complete bitemporal hemianopia or dense bitemporal hemianopic scotoma from damage to the chiasm can cause hemifield slide phenomenon.<sup>4</sup>



**Figure 3.** Binocular field of single vision after orthoptic training.

For such patients, loss of the normal nasotemporal overlap of ganglion cell receptive fields of the two eyes leads to loss of fusion. This results in decompensation of a pre-existing heterophoria to become a heterotropia. The patient's remaining nasal fields therefore either separate or overlap inappropriately, hence the experience of double vision. While reading, patients may notice duplication or disappearance of letters at the vertical meridian during episodes of transient eso- or exo-deviation (**Figure 4**).<sup>4</sup> A similar phenomenon can occur in horizontal altitudinal defects in bilateral optic neuropathy or retinopathy.<sup>5</sup>

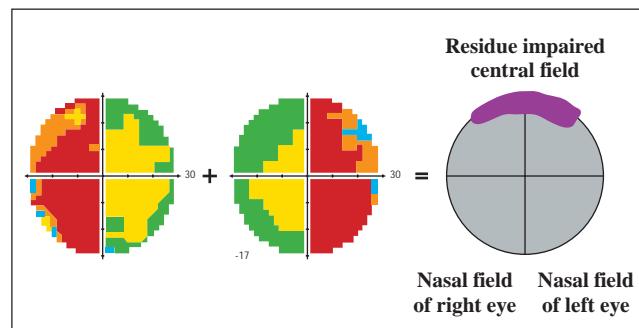
For the patient we have described here, the clinical picture was compatible with hemifield slide. However, the bitemporal



**Figure 4. Visual disturbance secondary to hemifield slide phenomenon.**

hemianopia scotoma was less dense outside the central 15° of field. Diplopia was noted because of an inability to maintain fusion within the relatively small area of correspondence field in each eye. With orthoptic training, mainly in the form of convergence exercise, there was an improvement in the control of diplopia and increase in the time span for reading. The distance diplopia was effectively eliminated with a prism incorporated into his spectacles.

There is little mention about the treatment of this condition in the published literature. In this case report, we have demonstrated that the disturbing double vision secondary to hemifield slide phenomenon can be successfully treated. Single vision may be restored, with an expanded binocular field of single vision. We postulate that the effect of the treatment was mainly due to the improvement in fusional



**Figure 5. Achievement of the binocular field of single vision.**

convergence. This helped the patient to utilize the remaining corresponding visual fields to achieve binocular single vision and keep the hemifields aligned side by side (**Figure 5**). The binocular field of single vision (i.e. total field of vision over which the patient sees singly with both eyes<sup>6</sup>) is the summation of the two nasal hemifields, rather than a representation of the binocular single visual field (the total area in which fusion is present<sup>6</sup>). This is supported by the exact bisection of the white light when red/green goggles were worn on either eye. The measured stereopsis was impaired because only peripheral fusion is possible (340") is too poor for bifoveal fixation).

## Conclusion

It is suggested that every patient with hemifield slide phenomenon should have a detailed visual field testing and orthoptic work up to identify the area of binocular single vision. Training their fusional vergence may help the patient to align the two hemifields and achieve binocular field of single vision.

## References

1. Kirkham TH. The ocular symptomatology of pituitary tumours. *Proc Roy Soc Med* 1972;65:517-518.
2. Wybar K. Chiasmal compression: presenting ocular features. *Proc Roy Soc Med* 1977;70:307.
3. Nachtigaller H, Hoyt WF. Störungen bei bitemporaler Hemianopsie und Verschiebung der Sehachsen. *Klin Monatsbl Augenheilkd* 1970;186:821.
4. Gittinger JW Jr. Chiasmal disorders. In: Albert DM, Jakobiec FA (eds). *Principles and Practice of Ophthalmology*. Volume 4. Philadelphia: WB Saunders Company, 1994: 2619.

5. Borchert MS, Lessell S, Hoyt WF. Hemifield field slide diplopia from altitudinal visual field defects. *J Neuroophthalmol* 1966;16:106-109.
6. Prat-Johnson JA, Tillson G. Motor evaluation of strabismus. In: Prat-Johnson JA, Tillson G (eds). *Management of strabismus and amblyopia*. 3rd ed. New York: Thieme Medical Publishers Inc., 1994:60-61.