

# Homonymous Hemianopia with Macular Sparing: Clinical and Radiological Correlation - case presentation

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## ABSTRACT

A classical case of homonymous hemianopia with macular sparing secondary to stroke involving the occipital cortex is presented. The lesion was localized more anteriorly where anatomically the peripheral vision function in the cerebral cortex is located. Sparing of the occipital pole was responsible for macular sparing in the patient. In this case there was good co-relation between clinical symptoms and radiological findings. This case highlights that well conducted visual field testing and careful evaluation of the visual field defect pattern can localize the lesion site approximately along the optic pathway that can be confirmed by modern imaging modalities.

**Key words:** brain, magnetic resonance imaging, macula, occipital lobe, vision, homonymous hemianopia, stroke

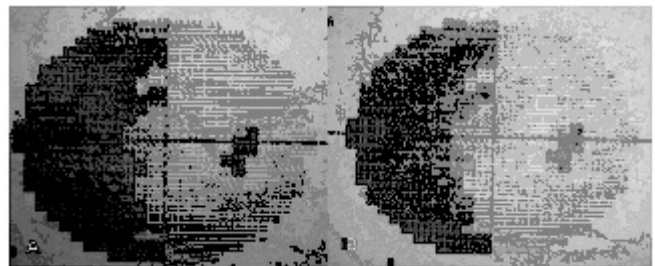
## INTRODUCTION

Representation of the visual field in the occipital striate cortex was first delineated by Inouye<sup>1</sup> and subsequently confirmed by Holmes and Lister.<sup>2</sup> After the introduction of computerized tomography (CT) and magnetic resonance imaging (MRI) of the brain, the accuracy of the Holmes map was confirmed by clinical-radiological correlation.<sup>3, 4, 5</sup>

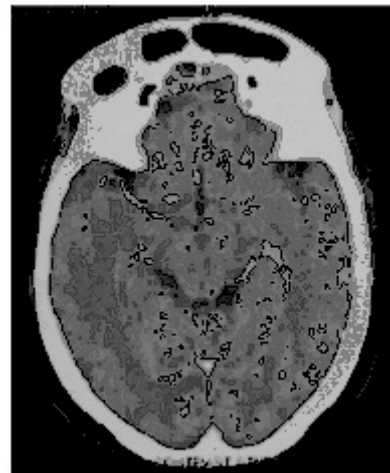
## CASE REPORT

A 55-year-old female presented with progressive decrease in peripheral vision on her right side, over a period of one month. It was associated with mild headache that she described more as a discomfort. At the onset of symptoms she had giddiness for 3-4 days. On general and systemic examination she was found to be normal except for a mild rise in blood pressure (140/70 mmHg). Higher mental functions were normal and there were no motor or sensory deficits. Visual acuities were R 6/18 and L 6/24 which could be corrected with glasses to 6/9 in both eyes. There were no anterior segment abnormalities. Cover test, pupil reactions and extraocular movements were normal. Fundus examination was normal. Venous pulsations were visible on both optic discs. Intraocular pressures were normal. On confrontation, there were dense right homonymous hemianopic defects affecting both inferior as well as superior visual fields. Automated perimetry (Medmont M600 full screening) confirmed a highly congruous maximum

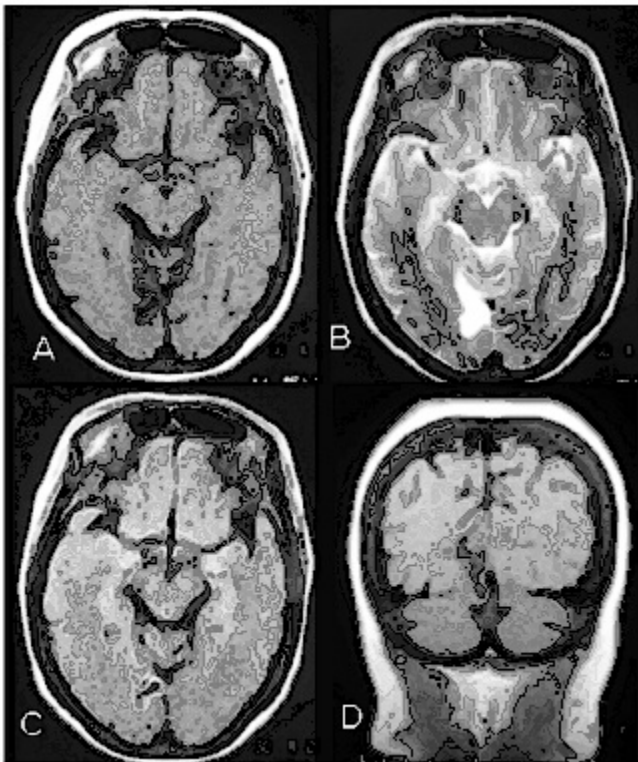
luminance defect in both left hemifields with macular sparing (figure 1). Computerized tomography (CT) showed hypodense non-enhancing lesion in the right occipital cortex (figure 2) that was better seen on MRI (figures 3 and 4). There was also evidence of infarct in left caudate nucleus (figure 5). A diagnosis of occipital lobe infarction was made and she was started on symptomatic treatment.



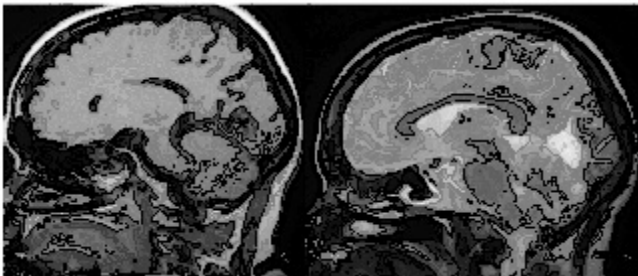
**Figure 1.** Automated perimetry showing a highly congruous maximum luminance right homonymous hemianopia affecting inferior and superior quadrants



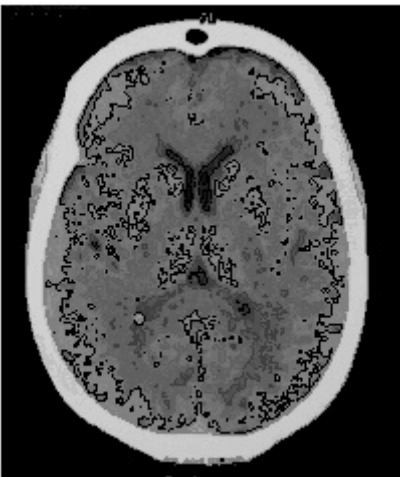
**Figure 2.** CT scan showing ill-defined hypodense non-enhancing lesion in the right occipital cortex



**Figure 3.** MRI showing details of infarction (A) T1 axial, (B) T2 axial, (C) FLAIR and (D) T1 coronal image



**Figure 4.** MRI sagittal sections showing details of infarction (A) T1, (B) T2 images



**Figure 5.** CT scan also showed small infarction in left caudate nucleus

## DISCUSSION

Common causes of homonymous hemianopia include mass lesions, intracranial haemorrhage or infarction in the territory of major cerebral arteries, trauma or rarely complicated migraine.<sup>6</sup> The representation of the field of vision in the human striate cortex is based on the Holmes map in which about 25% of the surface area of the striate cortex is allocated to the central 15 degrees of vision.<sup>5,7</sup> The foveal representation is located at the occipital pole, where the striate cortex usually extends about 1 cm onto the lateral convexity of the occipital lobe. The extreme periphery of the visual field is represented anteriorly, at the junction of the calcarine and parieto-occipital fissures.<sup>7</sup> Macular sparing is associated with survival of the occipital pole in some instances.<sup>3, 5</sup> In this study, the lesion was localized more anteriorly where the cortex is responsible for peripheral vision. Sparing of the occipital pole (by the haemorrhage) was responsible for macular sparing. In this patient, there was good co-relation between clinical symptoms and radiological findings. This case illustrates the clinical value of confrontation and visual field testing. Well-conducted visual field testing and careful evaluation of the visual field defect pattern can localize the lesion site approximately along the optic pathway that can be confirmed by modern imaging modalities.

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