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A cavernous malformation presenting with homonymous superior quadrantanopia

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Abstracts

Cerebral cavernous malformations (CMs) are vascular lesions that may remain asymptomatic but can cause neurological deficits when located in eloquent brain regions. Retrochiasmal visual pathway involvement is rare, and isolated homonymous quadrantanopia is exceptionally uncommon. A 64-year-old woman presented with a one-year history of progressive visual disturbance. Automated perimetry demonstrated bilateral, congruous superior quadrantanopia with well-demarcated defects. Magnetic resonance imaging revealed a well-circumscribed ovoid lesion in the medial right anterior temporal lobe, adjacent to the roof of the temporal horn. The lesion exhibited mixed T2 signal, a hypointense hemosiderin rim, and prominent susceptibility blooming, consistent with a cavernous malformation. Its location corresponded to Meyer's loop, the anterior portion of the optic radiation, explaining the congruous superior quadrantanopia. Reports of CMs resulting in visual field loss are exceedingly rare. This case uniquely demonstrates unequivocal involvement of Meyer's loop, yielding a congruous superior quadrantanopia and expanding the clinical spectrum of CM presentations.

Keywords: Cavernous malformation, homonymous quadrantanopia, Meyer's loop, optic radiation, visual field defect

INTRODUCTION

Cerebral cavernous malformations (CMs) are vascular lesions composed of sinusoidal, thin-walled capillaries lacking intervening neural parenchyma. They typically appear on MRI as ovoid, lobulated structures with mixed signal intensity and a hemosiderin rim.[1] Although many CMs are asymptomatic and incidentally detected, lesions located in eloquent areas may cause seizures, focal neurological deficits, or hemorrhage. Visual pathway involvement in retrochiasmal region is rare, and isolated homonymous horizontal sectoranopia as the sole manifestation has been only exceptionally reported.[2] Hereby we report a case of homonymous superior quadrantanopia caused by a sporadic cerebral CM involving Meyer's loop. To our knowledge, such a presentation has rarely been described in the literature, and this case provides a clear clinico-anatomical correlation.

CASE REPORT

A 64-year-old woman with no previous medical history presented with a one-year history of visual disturbance. The visual field was measured using the Humphrey Visual Field Analyzer 3 (Carl Zeiss Meditec, Dublin, CA, USA) and SITA Faster 24-2, which demonstrated bilateral homonymous superior quadrantanopia (Figure A). The visual field index was 77% in the right eye and 71% in the left eye. Pattern deviation plots confirmed well-defined, symmetric defects that respected the vertical meridian.

Brain magnetic resonance imaging revealed a well-circumscribed ovoid lesion in the medial aspect of the right anterior temporal lobe (Figure B, C, and D). The lesion exhibited mixed signal intensity on T2-weighted imaging with a hypointense hemosiderin rim and a reticulated center. It was located anteromedial to the hippocampus. Coronal T2-weighted images further showed the lesion to be adjacent to the roof of the right temporal horn. On non-contrast

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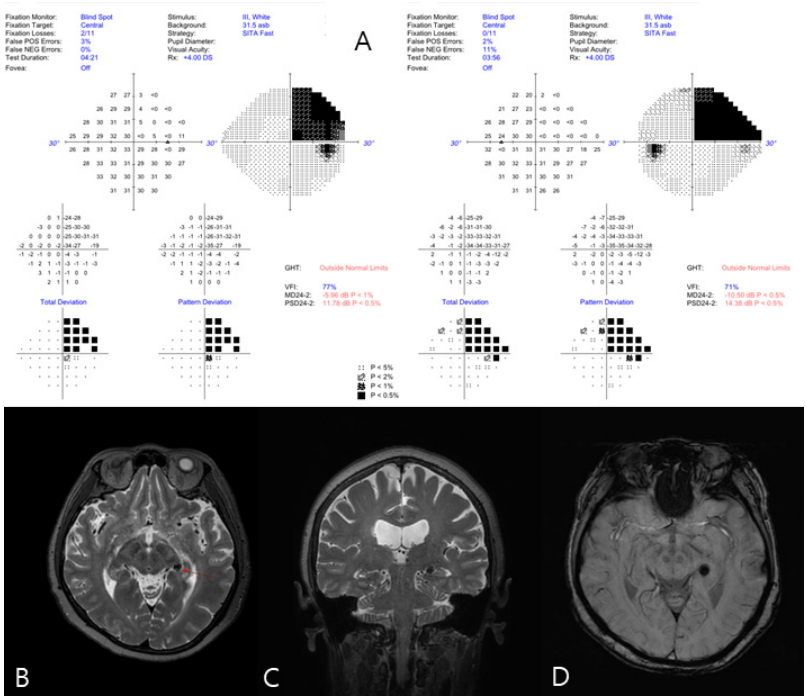

Figure 1. (**A**) Humphrey visual field analysis results (24-2 SITA-Fast) demonstrating a highly congruous right homonymous superior quadrantanopia. Right eye (OD) shows a dense superotemporal defect and left eye (OS) exhibits a corresponding superonasal defect. Both defects respect the vertical meridian and are anatomically consistent with involvement of the contralateral anterior optic radiation, particularly Meyer's loop. Global indices were as follows: OD: Visual Field Index (VFI) 77%, Mean deviation (MD) −5.96 dB, Pattern Standard Deviation (PSD) 11.78 dB; OS: VFI 71%, MD −10.50 dB, PSD 14.38 dB. (**B-D**) Brain magnetic resonance imaging demonstrating a cavernous malformation in the left mesial temporal lobe. (**B**) Axial T2-weighted image shows a cavernous malformation (red arrow), located anteromedial to the hippocampus; (**C**) Coronal T2-weighted image illustrates the vertical extent of the lesion, which is adjacent to the roof of the right temporal horn of the lateral ventricle; (**D**) Susceptibility-weighted imaging reveals blooming artifact surrounding the lesion, compatible with cavernous malformation.

T1-weighted imaging, the lesion appeared hypointense. Susceptibility-weighted imaging demonstrated prominent blooming artifact, consistent with hemosiderin deposition and prior hemorrhage. The lesion's topography corresponded to the known trajectory of Meyer's loop, the anterior portion of the optic radiation that sweeps anteroinferiorly from the lateral geniculate nucleus before arching back toward the occipital cortex. Anatomical studies including formalin-fixed dissection and diffusion tractography have shown that Meyer's loop may extend 25–30 mm from the anterior temporal pole.[3,4] In our case, the lesion's location and the patient's congruous superior quadrantanopia support direct involvement of the anterior optic radiation.

DISCUSSION

While visual field defects due to retrochiasmal lesions are not uncommon, isolated CMs resulting in congruous homonymous quadrantanopia are exceedingly rare. Only one report described a homonymous sectoranopia due to a cavernoma in the lateral geniculate nucleus.[2] In contrast, the current case demonstrates a lesion in Meyer's loop, producing a well-demarcated and anatomically localizing visual field deficit. This highlights the diagnostic value of integrating perimetry and high-resolution MRI to precisely localize retrochiasmal visual pathway lesions. It also expands the spectrum of clinical manifestations associated with cerebral CM.

DISCLOSURE

Ethics: This retrospective study with a waiver of informed consent was approved by the Keimyung University Dongsan Hospital (IRB 2025-08-044).

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Conflicts of interest: None.

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