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# Left-sided hemianopia as an unrecognized symptom of brain tumor and head injury

## *Niedowidzenie połowicze lewostronne jako nieświadomiony objaw guza mózgu i urazu głowy*

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<b>Streszczenie:</b>	Niedowidzenie połowicze jednoimienne to zaburzenie pola widzenia charakteryzujące się obustronnym zajęciem jego prawych lub lewych połówek. Pacjenci z tym defektem skarżą się na trudności z czytaniem i oceną otoczenia w wystarczająco szybki sposób, aby zrozumieć sens oglądanych przedmiotów. Niektórzy spośród nich są nieświadomi posiadania tego defektu pola widzenia. Chcieliśmy przedstawić historię dwojga pacjentów z niedowidzeniem połowicznym lewostronnym, u których rozpoznanie ubytków w polu widzenia było dość „przypadkowe”. U pierwszej pacjentki odkrycie niedowidzenia połowiczego przyspieszyło wykrycie guza mózgu i jego leczenie. W przypadku mężczyzny po urazie głowy wykrycie niedowidzenia połowiczego i uświadomienie pacjentowi, jak poważne są zaburzenia wzrokowe funkcji poznawczych, zapobiegło potencjalnym groźnym następstwom, które mogłyby powstać w wyniku prowadzenia przez niego pojazdu.
<b>Słowa kluczowe:</b>	niedowidzenie połowicze jednoimienne, guz mózgu, uraz głowy.
<b>Summary:</b>	Homonymous hemianopia (HH) is a visual field defect characterized by the involvement of two right or left halves of the visual field in both eyes. Patients with HH complain of difficulties with reading and scanning scenes in sufficiently rapid fashion to make sense of things as a whole. Some of these patients are not aware of their visual field defect. We report two cases of left-sided hemianopia in which visual field defects were detected “quite” accidentally. In the case of the first patient, revealing HH facilitated the detection of brain tumor and its treatment. In the case of the other patient, identifying HH, which was caused by a head injury, and making the patient aware of this fact, prevented potential harmful consequences associated with driving a car by a person with severe deficits in cognitive visual functions.
<b>Key words:</b>	homonymous hemianopia, brain tumor, head trauma.

Homonymous hemianopia (HH) is a visual field defect involving either two right or the two left halves of the visual field of both eyes. It is caused by lesions of the suprachiasmatic part of the visual pathways. The most common cause of HH in adults is stroke (70–89%). The other causes include head injuries (12–15%), brain tumors (12%), neurosurgical procedures (2–3%), multiple sclerosis (0.5–3.5%), and miscellaneous conditions (0.5–1.5%) (1-6).

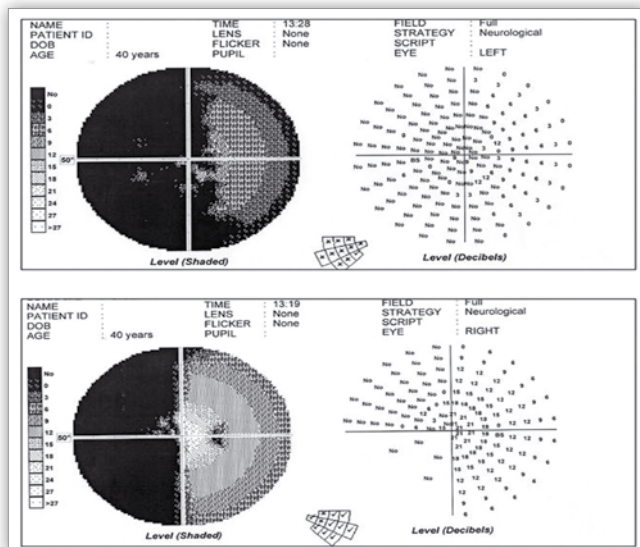
Homonymous visual field defects result in a severe visual impairment and affect a variety of cognitive visual functions. Main complaints of patients with hemianopia include difficulties with reading and scanning scenes in sufficiently rapid fashion to make sense of things as a whole. Consequently, they fail to notice relevant objects or avoid obstacles on their affected side and may collide with approaching people or cars. Interestingly, some of these patients are not aware of their visual field defect and most of them continue driving a car (4).

Unrecognized hemianopia can threaten patient's health and life, especially when performing activities associated with work at height or driving a car. To illustrate this statement, we report two cases of left-sided hemianopia in which visual field defects

were detected “quite” accidentally. In the case of the first presented patient, revealing HH facilitated the detection of brain tumor and its treatment. In the case of the other patient, identifying HH, which was caused by a head injury, and making the patient aware of this fact prevented potential harmful consequences associated with driving a car by a person with severe deficits in cognitive visual functions. This study emphasizes the importance of early ophthalmic examination in all patients with traumatic head injury as well as in those with persistent headache.

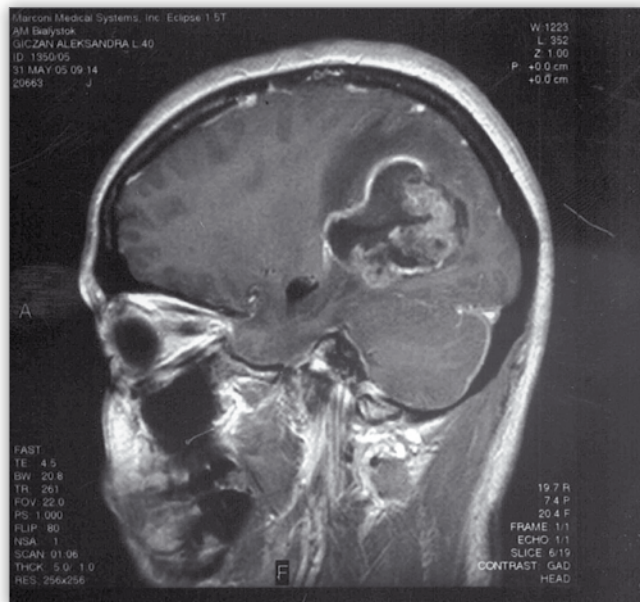
### Case 1

A previously healthy 40 years old woman was referred to the Emergency Ward of our Department by the consulting neurologist who suggested an examination of the eye fundus due to persistent headaches. The patient reported a 6 months history of headache in the frontal and temporal regions, along with vomiting of three days duration. The patient used analgesics occasionally during the headache episodes. She denied any associated features from her eyes, and her family history was unremarkable. The patient worked as a librarian, and was required



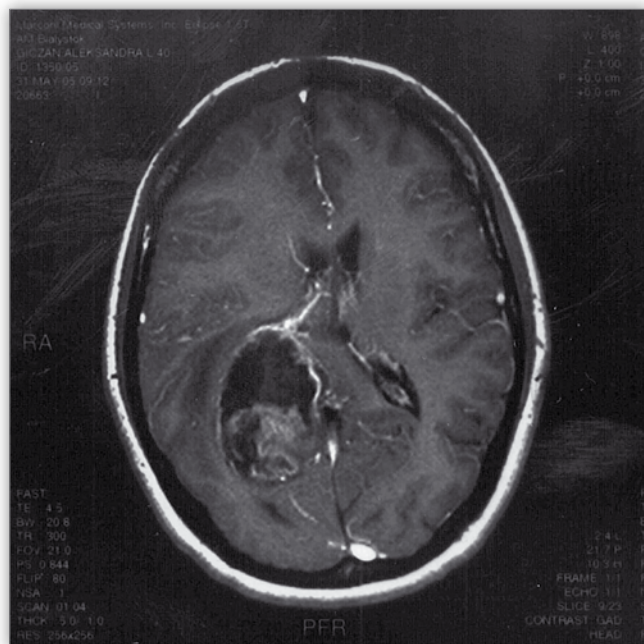
**Fig. 1, 2.** Automated visual field revealing left homonymous hemianopia (Patient 1).

**Ryc. 1, 2.** Niedowidzenie połowiczne lewostronne – obraz badania statycznej perymetrii komputerowej (pacjent 1.).



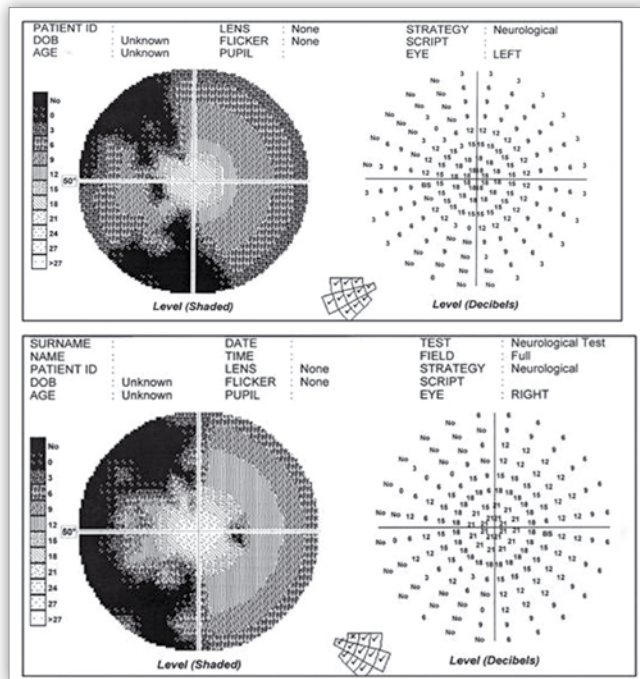
**Fig. 4.** MRI upon admission – the brain tumor extending from the right temporal to the parietal lobe (sagittal view).

**Ryc. 4.** Badanie rezonansu magnetycznego wykonane podczas przyjmowania pacjenta do kliniki – widoczny guz mózgu rozprzestrzeniający się z prawej okolicy skroniowej do płata ciemniowego (płaszczyzna strzałkowa).



**Fig. 3.** MRI upon admission – the brain tumor extending from the right temporal to the parietal lobe (axial view).

**Ryc. 3.** Badanie rezonansu magnetycznego wykonane podczas przyjmowania pacjenta do kliniki – widoczny guz mózgu rozprzestrzeniający się z prawej okolicy skroniowej do płata ciemniowego (płaszczyzna osiowa).



**Fig. 5, 6.** Automated visual field showing partial resolution of the left homonymous hemianopia (Patient 1).

**Ryc. 5, 6.** Obraz badania statycznej perymetrii komputerowej – częściowe zmniejszenie niedowidzenia połowicznego lewostronnego (pacjent 1.).

to climb up 2–3 m high ladder to reach books located on the top shelves.

The initial ophthalmic examination showed the best corrected visual acuity of 5/5 in the both eyes, normal color vision, normal intraocular pressure, normal bilateral pupillary light reflex, and no other abnormalities in anterior and posterior segments of both eyes. No signs of typical optic disk swelling (suspected by referring neurologist), were observed on the eye fundus examination. The borders of both optic disks were slightly indistinct in their nasal parts, but still visible at the en-

tire periphery. Furthermore, no abnormalities were revealed on neurologic examination. Visual field to confrontation suggested a left HH. This was confirmed on automatic perimetry which showed a complete HH (Fig. 1–2).

Computed tomography (CT) of the brain revealed solid-cystic tumor (58 x 36 mm), in the right occipitoparietal region, with peritumoral edema zone and central cerebral structures



displaced to the left side. Brain magnetic resonance imaging (MRI) presented a large tumor in the area of right ventricular trigone (Fig. 3–4).

The patient was admitted to the Neurosurgery Clinic of our Hospital and qualified to surgical removal of the brain tumor. Control ophthalmic examination, including perimetry, was performed three weeks after the surgery. It revealed no abnormalities besides previously noted visual field deficits (Fig. 5–6); however, markedly less pronounced than those recorded on the admission. Currently, the patient is under ophthalmic and neurologic follow-up care.

**Case 2**

52-year-old male referred to our outpatient clinic to change his glasses for near vision due to problems with reading, reported for about two weeks. He had no history of other ophthalmic disorders, but suffered from arterial hypertension. Three weeks prior to the consultation he had experienced a head injury as a result of being hit by a car. Following the accident, the patient was admitted to the Neurosurgery Clinic with the diagnosis of craniocerebral injury and a slight left-sided hemiplegia. CT of the head, performed on the day of injury, revealed a flat paracerebral hematoma in the right temporal lobe, with slight peritumoral edema, but without brain displacement, and retained fluid spaces. After evacuating the hematoma, the patient was hospitalized at the Neurosurgery Department, and subsequently transferred to the Neurology Department, where he remained for about four weeks. He was discharged with good general and neurologic status, with no signs of paresis. Prior to the accident, the patient worked as a sales representative and as such was required to drive a car frequently. Patient’s history

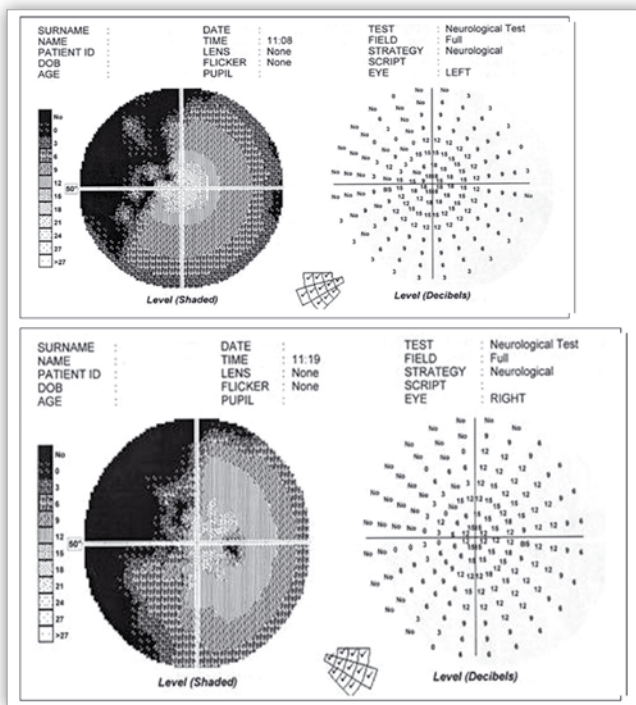


Fig. 9, 10. Automated visual field showing partial resolution of the left homonymous hemianopia (Patient 2).

Ryc. 9, 10. Obraz badania statycznej perymetrii komputerowej – częściowe zmniejszenie niedowidzenia połowicznego lewostronnego (pacjent 2.).

indicated that he continued driving a car frequently after being discharged.

Ophthalmic examination revealed 5/5 visual acuity in both eyes (with no correction), but difficulties with concentration were observed during reading with 0.5 cc +2.50 Dsph recorded in both eyes. Color vision, intraocular pressure and pupillary right reflexes were normal, and no abnormalities were found in anterior and posterior segments of both eyes. Due to the history of injury, the patient was referred to visual field examination, which revealed complete left HH (Fig. 7–8). Control examination was ordered within one month and the patient was suggested to stop driving a car. Another follow-up visit took place after two months. No abnormalities were recorded on ophthalmic examination besides previously observed visual field deficits (Fig. 9–10); however, they were markedly less pronounced compared to initial examination.

**Discussion**

The two cases of HH reported in this paper illustrate that a patient can remain unaware of even severe visual field defects if sufficient visual acuity is retained. Left-sided brain injuries, observed in both of our patients, are usually associated with reading difficulties. Indeed, problems with reading prompted one of these patients to seek ophthalmic consultation. In the case of the other patient, a headache lasting for several months constituted a direct reason for the referral, and it probably was a symptom of the developing brain tumor. A persistent headache, due to its character, can mask the signs of impaired vision. Alarmingly, prior to being diagnosed with HH, both of our patients performed various activities (driving a car, climbing up a ladder), that required normal visual field. One can easily imagine further possible consequences of this situation.

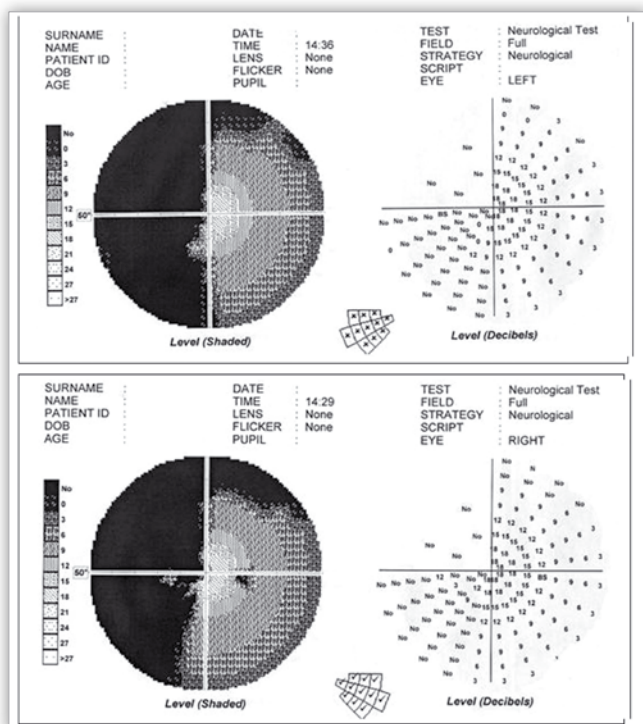


Fig. 7, 8. Automated visual field revealing left homonymous hemianopia (Patient 2).

Ryc. 7, 8. obraz badania statycznej perymetrii komputerowej – niedowidzenie połowiczne lewostronne (pacjent 2.).

Literature evidence of difficulties associated with realizing existing visual field defects is sparse. Trobe et al. (7) presented a small group of "asymptomatic" isolated HHs that were detected during routine ophthalmic examination. Interestingly, a large number of patients with stroke and HH are not aware of their visual field defect (4). Probably, this might occur as a result of older age of such patients and their poorer neurologic status.

Spontaneous recovery of HH depends on the type of underlying pathology. The prognosis is very poor in stroke patients. In contrast, in patients with brain tumor or head injury the recovery is common (~40%) but its chances drops off linearly with time. In most cases, recoveries occur in the first 3 months *post ictus* (3,8,9). Partial improvement of visual field was observed in both of our patients. In the case of the woman with brain tumor, this improvement was probably associated with the removal of the lesion and decreased compression of the proximally located optic tract. Spontaneous improvement in visual field parameters was also recorded in the male with a history of head injury. However, more than three months after the injury he still has more than one inactive quadrant. Bruce et al. (3) observed improvement of visual function in approximately 38% of patients with post-traumatic HH.

The two case reports of HH presented in this paper highlight the following conclusions. Firstly, and the most importantly, routine visual field examination should be performed in all patients with a history of head injuries, brain ischemia and other neurologic disorders, including headaches. Initially, simple examination by the means of confrontation method can be performed, particularly in hospitalized patients. It should be noted; however, that only automatic perimetry is suitable for the detailed examination of the visual field. This should be kept in mind during management of all patients, not only those who report visual defects.

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