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Ophthalmological Findings in Youths With a Newly Diagnosed Brain Tumor

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Abstract

Importance: Visual impairment is an irreversible adverse effect in individuals who experienced a childhood brain tumor. Ophthalmological evaluation at diagnosis enables early detection of vision loss, decision-making about treatment, and when applicable, the timely use of visual interventions. However, awareness of visual impairment in clinical practice is suboptimal, and adherence to ophthalmological evaluation needs to be improved.

Objective: To assess the prevalence and types of abnormal ophthalmological findings in youths with a newly diagnosed brain tumor.

Design, setting, and participants: In this nationwide, prospective cohort study, youths aged 0 to 18 years with a newly diagnosed brain tumor between May 15, 2019, and August 11, 2021, were consecutively enrolled in 4 hospitals in the Netherlands, including the dedicated tertiary referral center for pediatric oncology care.

Exposures: A standardized and comprehensive ophthalmological examination, including orthoptic evaluation, visual acuity testing, visual field examination, and ophthalmoscopy, was performed within 4 weeks from brain tumor diagnosis.

Main outcomes and measures: The main outcomes were prevalence and types of visual symptoms and abnormal ophthalmological findings at brain tumor diagnosis.

Results: Of 170 youths included in the study (96 [56.5%] male; median age, 8.3 years [range, 0.2-17.8 years]), 82 (48.2%) had infratentorial tumors; 53 (31.2%), supratentorial midline tumors; and 35 (20.6%), cerebral hemisphere tumors. A total of 161 patients (94.7%) underwent orthoptic evaluation (67 [41.6%] preoperatively; 94 [58.4%] postoperatively); 152 (89.4%), visual acuity testing (63 [41.4%] preoperatively; 89 [58.6%] postoperatively); 121 (71.2%), visual field examination (49 [40.4%] preoperatively; 72 [59.6%] postoperatively); and 164 (96.5%), ophthalmoscopy (82 [50.0%] preoperatively; 82 [50.0%] postoperatively). Overall, 101 youths (59.4%) presented with visual symptoms at diagnosis. Abnormal findings were found in 134 patients (78.8%) during ophthalmological examination. The most common abnormal findings were papilledema in 86 of 164

patients (52.4%) who underwent ophthalmoscopy, gaze deficits in 54 of 161 (33.5%) who underwent orthoptic evaluation, visual field defects in 32 of 114 (28.1%) with reliable visual field examination, nystagmus in 40 (24.8%) and strabismus in 32 (19.9%) of 161 who underwent orthoptic evaluation, and decreased visual acuity in 13 of 152 (8.6%) with reliable visual acuity testing. Forty-five of 69 youths (65.2%) without visual symptoms at diagnosis had ophthalmological abnormalities on examination.

Conclusions and relevance: The results of this study suggest that there is a high prevalence of abnormal ophthalmological findings in youths at brain tumor diagnosis regardless of the presence of visual symptoms. These findings support the need of standardized ophthalmological examination and the awareness of ophthalmologists and referring oncologists, neurologists, and neurosurgeons for ophthalmological abnormalities in this patient group.