

Teaching Case

Obsessive-compulsive disorder after therapy for an optic pathway glioma

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Introduction

Pediatric brain tumor survivors have an increased risk of psychological distress. They exhibit more symptoms of depression, somatization, fatigue, and daytime sleepiness than their siblings.¹ Severe psychological distress is profoundly disabling, but the prevalence of and risk factors for specific mental disorders after treatment in pediatric patients with brain tumors is unknown. The following case study of sudden-onset obsessive-compulsive disorder (OCD) after treatment for an optic pathway glioma highlights this gap in understanding.

OCD is characterized by obsessions (persistent, intrusive, and disturbing thoughts, images, or urges) and compulsions (repetitive behaviors or rituals performed as an attempt to neutralize obsessions and temporarily relieve the distress).² When the intrusive thoughts recur, the rituals must be performed again.²

Hereditry and environmental factors have been implicated in the onset of OCD, which may be sudden or gradual and occurs at a mean age of 19.5 years.² The rate of OCD among individuals who have a first-degree relative with OCD is 10 times the rate of those who do not have a first-

degree relative with this disorder, which suggests a biological explanation for OCD.³ OCD or obsessive thought patterns have been associated with dysregulation of the orbitofrontal cortex, especially the left orbital gyrus, anterior cingulate cortex, striatum, and components of the basal ganglia-thalamus pathway.⁴ Genetic components may contribute to the development of OCD⁵; persons with OCD have a 3.3-fold increased risk of copy number deletions at 16p13.11.⁶ Environmental factors have also been identified, including behavioral conditioning and distorted cognition.⁷

Case description

Informed consent has been properly documented for this case.

At the age of 14 years, the patient developed headaches and focal visual disturbances, which led to the detection of a glioma involving the optic nerves, chiasm, tracts, and hypothalamus. On ophthalmological examination, she had a right optic neuropathy and a bitemporal visual field defect that was worse inferiorly. Neither the clinical picture nor NF1/SPRED1 genetic testing suggested a diagnosis of neurofibromatosis type 1. The patient was academically and athletically accomplished.

Family mental health history was notable: The patient's mother had a compulsion during childhood to touch objects after passing a person to avoid death. The patient

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had a similar history of heightened awareness of germs during childhood. Both the mother's and patient's fixations were brief, resolved spontaneously, and did not interfere with daily functions.

The decision was made to monitor the patient closely with surveillance magnetic resonance imaging (MRI) scans and ophthalmological examinations. Amitriptyline was used to treat her headaches. During this period of serial imaging and clinical evaluation, her father perceived his daughter to have heightened anxiety, which he attributed to her fear of blindness. Consequently, the patient was referred for psychological evaluation.

The patient disagreed with her father's interpretation of her behavioral changes and denied emotional distress, including health-related anxiety. She attributed the observed changes to a side effect of her increased dosage of amitriptyline. After the amitriptyline dose was decreased, the patient reported being afraid that her visual impairment would likely result in her accidentally harming her beloved competition horses. Her fear seemed proportional to her health loss and related adjustment.

At 16 years of age, the patient's visual status declined, and tumor growth was documented on MRI. After multidisciplinary discussion, the tumor was treated with proton therapy to a dose of 50.4 GyRBE (relative biological effectiveness) in 28 fractions. The left orbital gyrus was adjacent to the tumor and in the radiation field (Fig 1).

Shortly after completing proton therapy, the patient was diagnosed with prostradiation somnolence. Three weeks later, she experienced symptoms of sudden-onset, severe OCD. Obsession with germs and compulsive cleaning was accompanied with hopelessness ("dying inside"), sleep onset insomnia, lethargy, abdominal pain, decreased appetite, and sadness. Panhypopituitarism was ruled out.

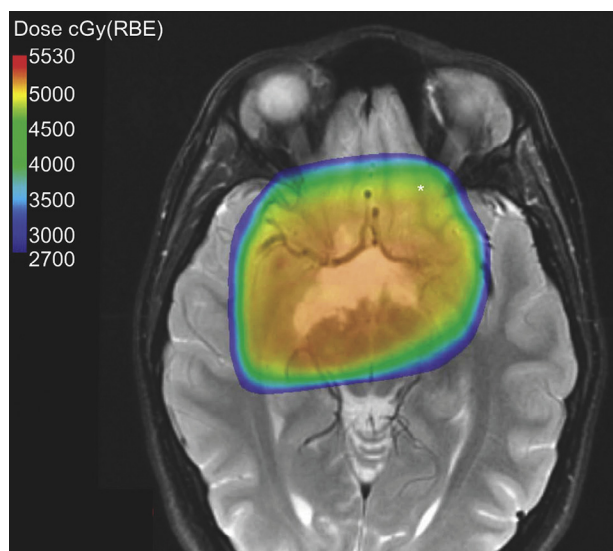


Figure 1 Representative axial image from patient's proton therapy plan, with dose shown in color wash. Asterisk marks location of left orbital gyrus.

Mental health crisis services and safety assessments were provided. Psychotropic medications sertraline and quetiapine fumarate were initiated. Psychotherapy included OCD education, exposure, cognitive-behavioral techniques, relaxation strategies, and stress management. Seven weeks after OCD onset, the patient was encouraged to participate in an intensive OCD treatment program; she attended the program intake but declined participation.

The patient was debilitated by contagion/germ-related obsessions and compulsive hygiene behaviors. She suffered an array of irrational thoughts and behaviors. Her appearance changed dramatically: Her hair and skin integrity were compromised by excessive showering and use of antibacterial wipes; she lost weight and ceased to style her hair, wear makeup, or attend to fashion preferences. She also became housebound. OCD precluded the recommended disease surveillance until 13 months postirradiation.

Three years thereafter, the patient returned for follow-up with MRI and neuro-ophthalmological examinations, which showed that her tumor and vision were stable (Fig 2). Although OCD had disabled the patient in the areas of education, employment, and independent living, her symptoms were much less severe, and she was reentering life through online college classes and horse riding competitions. The patient developed neither neuroendocrine deficiencies nor additional visual deficits. She reported a long-lasting benefit from fluoxetine and intermittent community-based psychotherapy.

Discussion

Several factors increased this patient's risk for psychological dysfunction: premorbid personal and family histories of subclinical compulsive behavior, the presence of a brain tumor, and the traumatic loss of good vision. She also anticipated further loss, including the threat of blindness and death.

Patients with optic gliomas have an increased risk of psychological morbidities. In one sample, 20% of patients presented with irritability, depression, social withdrawal, somnolence, and aggressive behavior at the time of diagnosis.⁸ Intellectual impairment and sleep dysregulation have also been associated with lesions of the optic pathway and hypothalamus.⁹

A review of the literature reveals one report of an 11-year-old boy with a history of OCD whose symptoms acutely worsened due to hydrocephalus resulting from a tectal glioma. His symptoms improved with treatment of the hydrocephalus. OCD has also been associated with central nervous system germinoma in case reports. In a report from Stanford, a 13-year-old boy presented with OCD and was ultimately found to have a suprasellar germinoma.¹⁰ Three cases of OCD developing after treatment of central nervous system germinoma have been reported: a 16-year-old boy with a pineal germinoma treated with radiation and

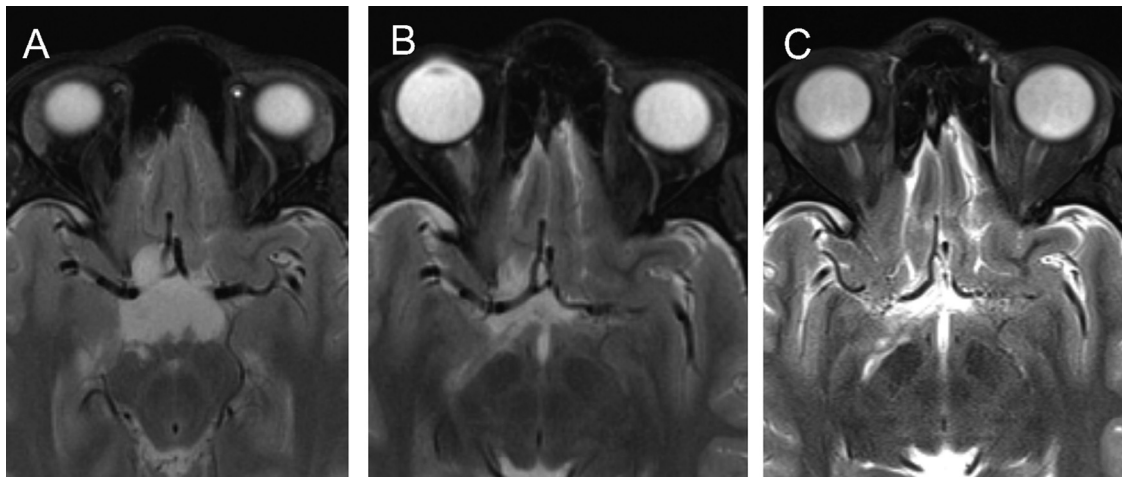


Figure 2 Axial T2-weighted magnetic resonance images of the patient's tumor (A) immediately prior to proton therapy, (B) 13 months after proton therapy, and (C) 33 months after proton therapy. The tumor involved the hypothalamus and extended posteriorly along the optic tracts.

chemotherapy,¹¹ an 18-year-old man with a basal ganglia germinoma treated with chemotherapy,¹² and a 19-year-old man with a pineal germinoma treated with surgery and chemotherapy.¹³

Notably, there is no evidence of a causal relationship between radiation and OCD. Neurological and developmental deficits have been described in literature on optic glioma outcomes, especially when the hypothalamus is involved.¹⁴ Radiation has been associated with neurocognitive dysfunction, academic problems,¹⁵ memory difficulties, poor social functioning, and poor general health.^{16,17} The regions of the brain associated with OCD were within and adjacent to the radiation fields that were treated in this patient (Fig 1). Efforts to correlate physical and psychological morbidities with radiation dose and technique are ongoing.¹⁸

Traumatic events have been associated with the sudden onset of OCD.¹⁹ OCD and posttraumatic stress disorder have a 30% comorbidity rate, compared with OCD and posttraumatic stress disorder prevalence rates of 1% to 2% and 3.5%, respectively, in the general population. This patient experienced several traumatic events, including a life-altering cancer diagnosis and visual impairment that immediately threatened her ability to pursue her passions and be competitive in her sport.

Depression, anxiety, posttraumatic stress, and social withdrawal are specific mental health concerns identified in the Children's Oncology Group Long-Term Follow-Up Guidelines Version 4.0 for patients who receive radiation to the cranium, orbit, eye, infratemporal region, nasopharynx, or Waldeyer's ring.²⁰ Systematic psychological assessments, including early screening and continued monitoring, should be conducted in these patients.²¹

Cognitive behavior therapy and specific serotonin reuptake inhibitors are effective treatments for OCD.²² The remission rate for people who receive treatment for OCD

is approximately 54%, versus 4% without intervention.²³ OCD treatment outcomes are better for those who receive early intervention. Therefore, a specialized intensive treatment program should be considered immediately after the onset of OCD, regardless of ongoing medical and physical health issues. Exposure and response prevention is the primary cognitive behavior therapy intervention for OCD and involves repeatedly exposing the individual to the source of anxiety, such as suspected contaminants or distressing obsessive thoughts. Thereafter, the individual is encouraged to resist anxiety-alleviating ritualistic behaviors.²⁴

Conclusion

How this patient's OCD was related to her glioma or her therapy is unknown. She clinically improved with appropriate interventions, highlighting the importance of psychological evaluation and treatment. Further study of the risk factors for psychological morbidity after glioma diagnosis and treatment is warranted.

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