

Blepharospasm With Photophobia Secondary to Midbrain Tuberculoma and Thalamic Infarct

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Introduction: Blepharospasm is a type of focal dystonia and categorized into primary and secondary forms, based on whether or not a cause can be established. Secondary blepharospasm is uncommon and can be associated with underlying brain lesions. Photophobia is a prominent complaint in blepharospasm patients. We are reporting a case of secondary blepharospasm with photophobia in a patient who had underlying midbrain tuberculoma and thalamic infarcts. This type of presentation has not been reported to the best of our knowledge.

Case Report: A 26-year-old man presented to us with the complaint of increased blinking and involuntary closure of both eyes for 1 year. He had a past history of tubercular meningitis 16 years back when he presented with bilateral ptosis, left up gaze palsy and right hemiparesis suggestive of Weber syndrome. His magnetic resonance images of the brain were suggestive of multiple intracranial tuberculomas, thalamic infarcts, and noncommunicating hydrocephalus. Following treatment he recovered significantly with no residual neurological deficit except mild bilateral ptosis. His recent magnetic resonance images of the brain was suggestive of calcified granuloma in the midbrain and chronic left thalamic lacunar infarcts. He was treated with injection Onabotulinum toxin and his symptoms improved significantly.

Conclusions: Our patient had tuberculoma in the midbrain and chronic infarcts in the thalamus, and both lesions may cause blepharospasm and photophobia independently, so it is difficult to ascertain the causative lesion in our patient. However, it is possible that these heterogeneous lesions are all part of a single functionally connected brain network and further studies are required to confirm this hypothesis.

Key Words: blepharospasm, photophobia, tuberculoma

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Blepharospasm is one of the most common forms of focal dystonia. It is characterized by over-activity of orbicularis oculi muscle manifesting as increased eye blinking and repetitive involuntary eye closure. It can be classified into 2 groups: primary and secondary, depending on whether the underlying cause can be identified or not. The term “benign essential blepharospasm” is often used for primary blepharospasm where the cause is not known. Although the secondary blepharospasm is uncommon, but this can provide important insight into the

pathophysiology and neuroanatomic substrates involved in the blepharospasm. The various conditions that can cause secondary blepharospasm include structural lesions such as stroke, cyst and arterio-venous malformations, drug-induced, neurodegenerative conditions such as Parkinson disease, and rarely infections.^{1,2} We are reporting an interesting case of secondary blepharospasm with photophobia in a patient who had underlying midbrain tuberculoma and thalamic infarcts. This type of presentation has not been reported to the best of our knowledge.

CASE HISTORY

A 26-year-old man presented to us with the complaint of increased blinking and involuntary closure of both eyes for 1 year. His symptoms used to get worsened by exposure to light. He had a background history of tubercular meningitis with multiple intracranial tuberculomas located in the midbrain with left thalamic infarcts with noncommunicating hydrocephalus, diagnosed 16 years back (Figs. 1A, B). At that time, he presented with bilateral ptosis, left up gaze palsy and right hemiparesis suggestive of Weber syndrome. He was given antitubercular treatment along with systemic steroids and ventriculoperitoneal shunt was done. Over a period of 2 years, the patient recovered significantly with no residual neurological deficit except mild bilateral ptosis. Since then he remained asymptomatic for the next 14 years and then developed insidious onset, increased blinking and involuntary closure of both the eyes, but he denied any burning sensation in the eyes. He never used any sensory trick to get relief from his eye symptoms. On examination, he had blepharospasm of severity 9/18 according to blepharospasm severity rating scale (BSRS), and severe photophobia (Video, Supplemental Digital Content 1, <http://links.lww.com/NRL/A53>).³ Repeat magnetic resonance imaging of the brain of the patient revealed calcified granuloma in the midbrain and chronic left thalamic lacunar infarcts (Figs. 1C, D). The patient was given injection Onabotulinum toxin (total: 24 U; 12 U in each eye) which resulted in the significant decrease (BSRS—1/18) in the severity of blepharospasm (Video, Supplemental Digital Content 1, <http://links.lww.com/NRL/A53>) at 1-month follow-up.

DISCUSSION

We report a case of secondary blepharospasm and photophobia in a patient with a history of multiple intracranial tuberculomas and thalamic infarcts. Our patient had 3 important clinical observations.

First, there was a long delay between the primary illness and the onset of blepharospasm and photophobia. However, the magnetic resonance imaging lesions of the brain have not improved significantly over this period of time. It is possible that this delay corresponds to the time taken for the formation of pathologic circuitry due to maladaptive reorganization. Second, our patient had tuberculoma in the midbrain and chronic infarcts in the thalamus, and both lesions may cause blepharospasm and photophobia independently (Fig. 2), so it is difficult to ascertain the causative lesion in our patient. Recent studies suggest that the lesions causing blepharospasm may involve multiple different brain locations.⁴ In a study of 48 cases of secondary blepharospasm, Khooshnoodi et al⁴

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A.C.: contributed in data collection and manuscript preparation. S.P.: contributed in manuscript preparation, review, and critique.

The authors declare no conflict of interest.

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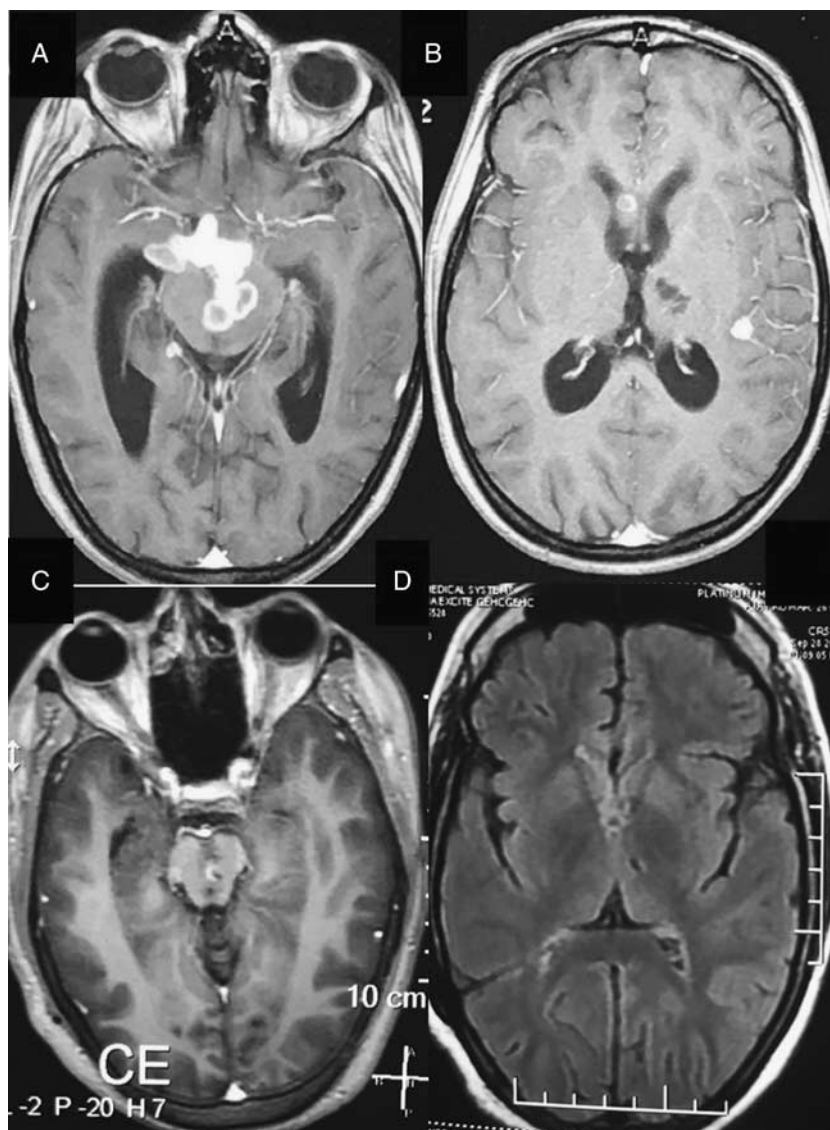


FIGURE 1. Contrast enhanced T1 weighted axial magnetic resonance images (CEMRI) of the brain done at the age of 10 years showed multiple ring enhancing conglomerated lesions in the midbrain with dilated ventricles (A) and infarcts in the left thalamus (B). CEMRI of the same patient done 16 years later at the time of presentation with blepharospasm and photophobia is showing peripherally enhancing calcified nodular lesion in the midbrain (C) and fluid attenuated inversion recovery (FLAIR) image is showing a chronic infarct in the left thalamus (D).

reported lesions in different regions of brain including the thalamus ($n=12$), lower brainstem ($n=11$), basal ganglia ($n=9$), cerebellum ($n=9$), midbrain ($n=7$), and cortex ($n=1$). Imaging studies including functional neuroimaging, and positron emission tomography (PET), and transcranial magnetic stimulation in patients with primary blepharospasm have also suggested the involvement of different regions of the brain, including not only the basal ganglia but also the thalamus, lower brainstem, cerebellum, midbrain, and somatosensory and cingulate cortex.⁵ Significant photophobia in our patient can also be explained by the lesion in the midbrain as well as the thalamus. Previous studies provide evidence for the involvement of both midbrain and thalamus in the pathogenesis of photophobia (Fig. 2). Emoto and colleagues compared controls and blepharospasm patients with and without photophobia using 18-FDG-PET scan. They observed that

blepharospasm patients with photophobia had significantly increased metabolic activity in the thalamus, particularly in the ventral anterior and ventral lateral nuclei and in the superior colliculus of dorsal midbrain.⁶ Recently, melanopsin containing retinal ganglion cells also called as intrinsically photosensitive retinal ganglion cells are identified which act as photosensors (Fig. 2). These cells are directly activated on exposure to light in the absence of inputs from the photoreceptors. Intrinsically photosensitive retinal ganglion cells detect environmental brightness and this light-based response projects either directly to the thalamus or via the optic nerve to the pretectal nucleus of the midbrain. Thus, both midbrain and thalamus are involved in the ocular-related sensorimotor integrations.

Third, our patient showed good response to the botulinum toxin (BoNT) injections. There are few studies

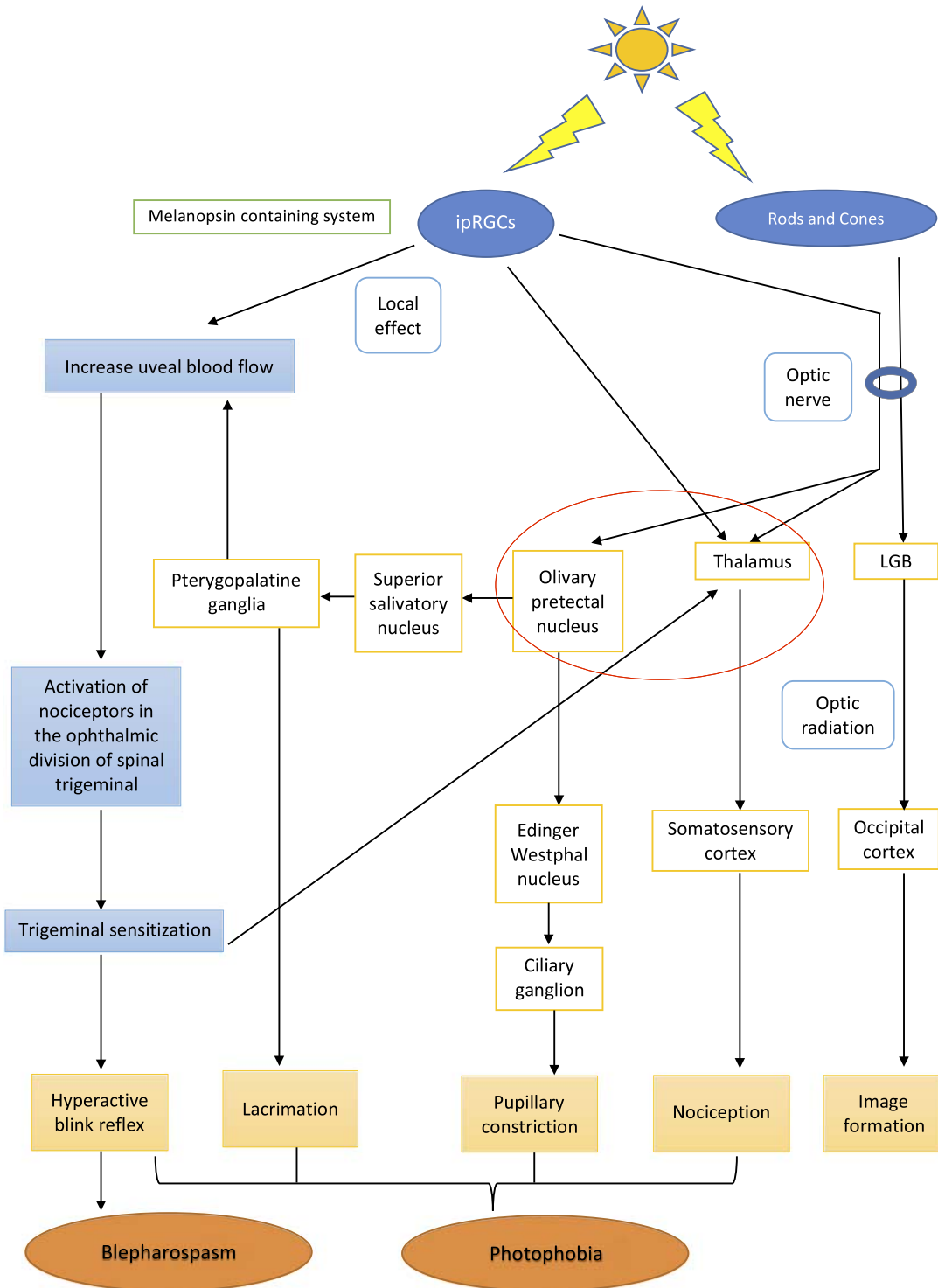


FIGURE 2. The patho-physiological mechanism of blepharospasm and photophobia in our patient secondary to midbrain tuberculoma and thalamic infarcts (encircled in red). ipRGCs indicates intrinsically photosensitive retinal ganglion cells; LGB, lateral geniculate body.

evaluating the outcome of BoNT in secondary blepharospasm. Martinez-Ramirez and colleagues compared the outcome of BoNT between primary and secondary blepharospasm. They reported that the BoNT injections were effective and had similar benefits in both groups of patients,

suggesting that the etiology of blepharospasm has no effect on the outcome.⁷

To conclude, our case supports the fact that the blepharospasm and photophobia both can arise from different regions of the brain and it is possible that these heterogeneous lesions are all part of a

single functionally connected brain network, however a lesion network mapping will be required to confirm this hypothesis.

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