CASE REPORTS

Swallow-Induced Eyelid Myokymia: A Novel Synkinesis Syndrome

Amrita-Amanda D. Vuppala ^a, Gregory J. Griepentrog^b, and Ryan D. Walsh^{b,c}

^aDepartment of Neurology and Ophthalmology, University of Nebraska Medical Center, Omaha, Nebraska, USA; ^bDepartment of Ophthalmology & Visual Sciences, Medical College of Wisconsin, Milwaukee, Wisconsin, USA; ^cDepartment of Neurology, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

ABSTRACT

Herein, we describe a novel manifestation of facial nerve synkinesis, swallow-induced eyelid myokymia, and hypothesise that this phenomenon is due to synkinetic facial nerve innervations of the stylohyoid-posterior digastric complex of suprahyoid muscles and orbicularis oculi muscle. In our patient's case, onabotulinum toxin A treatment provided good therapeutic response. Swallow-induced eyelid myokymia is a unique and previously unreported variety of facial nerve synkinesis.

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Myokymia; benign eyelid myokymia; swallow; aberrant regeneration; synkinesis; facial nerve

Introduction

Myokymia is a disorder of involuntary, fine, undulating, non-synchronous striated muscle fibre contractions resulting in a visible rippling of the overlying skin.¹ Eyelid myokymia is the most common type of focal facial myokymia and involves the orbicularis oculi muscle.² Clinically, eyelid myokymia is typically described by patients as small annoying twitches of the upper or lower eyelids.³ It may be triggered by fatigue, stress, excessive caffeine, or physical exertion and is most often a benign and self-limited condition.² Other reported aetiologies include topiramate,^{4–6} autoimmune diseases,^{7,8} multiple sclerosis,^{1,9–11} brainstem pathology (such as pontine glioma),¹² and repetitive sessions of anodal transcranial direct current stimulation.¹³ In this report, we describe a novel case of eyelid myokymia triggered by swallowing.

Case report

A 46-year-old woman was referred for neuro-ophthalmologic evaluation, reporting 6 months of intermittent twitching of the left lower eyelid triggered by swallowing or lateral tongue movements with her mouth closed. Lip pursing alone did not result in myokymia. She denied any history of facial

muscle weakness/Bell's palsy, head trauma, or medication changes temporally linked with symptom onset. Her past medical history was notable for hypertension managed with lisinopril/hydrochlorothiazide, and hypothyroidism (secondary to Hashimoto's thyroiditis) managed with levothyroxine. In addition, the patient reported that she had undergone laser hair removal treatments to her face (including the left maxillary region) several months prior to symptom onset. The neuro-ophthalmologic exam was notable for intermittent myokymia of the left lower eyelid which could be reliably triggered by swallowing (video). The remainder of her neuro-ophthalmologic examination was unremarkable. Brain magnetic resonance imaging performed with contrast and additional thin cuts through the skull base was unremarkable. Various serum studies including Lyme IgG/IgM, complete blood count, basic metabolic panel, magnesium, RPR, and TSH/free T4 were all negative/normal. The patient has been treated to full relief with 10 units of onabotulinum toxin A injections to the involved orbicularis oculi muscle every 3–4 months.

Discussion

To our knowledge, this case of eyelid myokymia triggered by swallowing and certain tongue movements represents a previously undescribed form of

facial nerve synkinesis. The pathophysiology underlying synkinesis is related to aberrant regeneration of a nerve after injury/damage. As the nerve regenerates, there is excessive collateral branching of axons, which can occur not only at the site of a lesion but along the course of the entire nerve.¹⁴ This ultimately leads to impaired functional recovery of the nerve^{15,16} and misdirection of innervation. Other potential aetiologies for synkinesis are hyperexcitability and ephaptic phenomenon.¹⁷ The most common type of facial nerve synkinesis is orbicularis oculi to orbicularis oris misdirection, resulting in involuntary eye closure with the pursing of one's lips.^{18,19} Other types of facial nerve synkinesis include eyelid to masseteric synkinesis,²⁰ brow to oral synkinesis, gustolacrimal reflex²¹ and oculostapedial synkinesis.²² In rare cases, aberrant reinnervation may involve two adjacent cranial nerves, such as facial-trigeminal and facial-oculomotor synkinesis.¹⁷

We hypothesise that swallow-induced eyelid myokymia, as seen in our patient, is the result of aberrant regeneration involving facial nerve innervations to suprahyoid and orbicularis oculi muscles. The suprahyoid muscles include the stylohyoid, mylohyoid, geniohyoid and digastric muscles, and are involved in tongue/mouth movements and swallowing. In particular, the stylohyoid muscle and posterior belly of the digastric receive innervation from branches of the facial nerve,²³ and function to open the jaw as well as acting as laryngeal elevators, thus assisting in mastication and swallowing. The mylohyoid and anterior belly of the digastric receive innervation from the mandibular branch of the fifth nerve, and the geniohyoid is supplied by the C1 nerve roots which run within the hypoglossal nerve. The orbicularis oculi, the co-innervated muscle in this patient's proposed synkinesis, is a subcutaneous muscle that is innervated by the temporal and zygomatic branches of the facial nerve. It is a muscle of eye closure and also plays a role in tear drainage by helping to ensure proper functioning of the lacrimal pump.

Secondary aberrant regeneration typically occurs in the recovery phase several weeks after an insult to the involved cranial nerve.³ Our patient did not have a known prior history of

facial nerve palsy, but the development of synkinesis involving the seventh nerve innervated musculature, with otherwise negative work-up, is highly suggestive of subclinical neural damage. Since the patient had undergone laser hair removal to the face and neck in recent proximity to the onset of her synkinesis, we considered the possibility of this procedure having caused facial nerve injury. However, based on the mechanism of such light-based therapies, we believe it is unlikely that facial nerve injury would be attributable to this treatment in our patient. Facial laser hair removal employs the use of a laser that targets melanin leading to selective destruction of chromophores.²⁴ Both the wavelength and pulse duration of the laser are well defined such that the chromophores are selectively destroyed, preventing damage to non-targeted surrounding tissue.^{25,26} We are not aware of any published cases of facial nerve palsy caused by laser hair removal treatment, and suspect our patient's recent laser hair removal procedure was coincidental, rather than contributory, to her synkinesis syndrome. Although a definitive cause of facial nerve injury could not be identified in our patient, we postulate a subclinical insult to the facial nerve followed by aberrant regeneration of involved facial nerve fibres innervating the suprahyoid muscles, resulting in synkinesis involving the orbicularis oculi muscle, with clinically significant swallow-induced eyelid myokymia.

Declaration of interest

The authors declare that there are no conflicts of interest. The authors alone are responsible for the writing and content of the article.

ORCID

Amrita-Amanda D. Vuppala <http://orcid.org/0000-0001-5503-8653>

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