EYELID MYOKYMIA – IS IT A WARNING SIGN?

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Abstract

Background: Orbicularis myokymia frequently occurs in young, otherwise healthy individuals. The intermittent muscle fasciculations are transient and generally disappear with time.

Aims and tasks: to synthetise and analyse the causes, significance and treatment of eyelid myokymia

Methods: a literature review; Data was collected from Pubmed, Scopus, Google Scholar, free search.

Results: Eyelid myokymia, unlike myokymia of other facial muscles, is assumed to be a benign, self-limited disorder. It is associated with fatigue, anxiety, stress, exercise, physical exertion, cold weather, excessive use of caffeine, energy drinks, smoking, alcohol, female gender, and reduced sleep. Some authors reported it as a side effect of Topiramate. When it is chronic it might be considered as a separate disease entity of the facial nerve. In rare cases, the eyelid myokymia gradually spreads over several months to affect additional muscles on one or both sides of the face, producing benign essential blepharospasm, Meige syndrome, hemifacial spasm, or, rarely, spastic-paretic facial contracture. Rarely it might be the first sign of brainstem lesions like tumor or multiple sclerosis.

Conclusion: If the myokymia is persistent or progressive, neurologic assessment and investigation may be necessary. Change of lifestyle is advised before invasive treatment. Botulinum toxin is the treatment of choice for chronic eyelid twitching.

Key words: *eyelid twitching, myokymia, benign, brainstem lesion*

Background:

Myokymias are localised involuntary contractions that are wavelike or vermicular and propagate through affected striated muscle **[**29, 30]. They are caused by simultaneous or sequential activations of 1, 2, or more motor units of a muscle. An electromyography reading shows spontaneous muscle activity with different motor units producing brief, repetitive discharges of action potentials in rhythmic or semi-rhythmic bursts at a rate of 3 to 8 Hz **[**13, 14**]**. This is followed by a short (0.5 to 3seconds) and frequently irregular interval of electric silence before the following myokymic discharge occurs **[**24]. The spontaneous discharges are not initiated by voluntary movement, although they may increase with such activity [14].

When myokymia occurs in the face, the most frequently affected muscle is the orbicularis oculi. Myokymia in this muscle results in small, visible contractions of part of the eyelid, typically the lower eyelid. They present in young, healthy subjects with no associated diseases **[**3]. The patients may feel that their eyelid is "jumping wildly," but others do not notice the movement. Contractions tend to be transient and self-limited and episodic, lasting seconds to hours [25**],** although occasionally it persists for several weeks or even a few months before resolving, with the spasms being intermittent throughout the day, lasting up to several hours at a time **[**16]. The involvement of lower and upper eyelids on the same side or the involvement of eyelids on both sides of the face at the same time is rare [28, 3]. Interestingly, eyelid twitching (ET) has been thought as different prospective of fortune in different cultures, such as good luck, bad luck, and happy, angry, sad, and joy things are going to happen for four different eyelids in Chinese and bad luck when appeared in left side in American **[**35**].**

Aims and tasks:

To synthetise and analyse the causes, significance and treatment of eyelid myokymia

Methods:

A literature review; Data was collected from Pubmed, Scopus, Google Scholar, free search.

Results:

Eyelid myokymia (EM), unlike myokymia of other facial muscles, is assumed to be a benign, self-limited disorder. It is associated with fatigue, anxiety, stress, exercise, physical exertion and excessive use of caffeine [28], smoking and alcohol [3, 12]. A cross sectional survey that included 100 medical students of Medical faculty in Tuzla showed a high percentage of signs of eyelid myokymia (44%) of students before exams. Female students were more likely to have EM than male students (OR 2.46:1). Students of fifth study year were at more risk for development of EM than students of fourth and third year respectively (OR 1:1.5:2.67). Energy drinks consuming was a significant predictor for EM occurrence (P=.046). Students who reported to have reduced sleep during exam preparation have significantly more often symptoms of EM (P=.014) as well as individuals who claim to have been exposed to a greater amount of stress (P=.042) [11**].** Another study also showed that women are more vulnerable than men (female to male: 3 to 1) and that chronic eyelid twitching tend to develop more in cold weather (61.27%). According to the authors women usually have more stress than men and this might explain the differences between gender. They analyzed comorbidities with diabetus mellitus, hyperlipidemia, and hypertension and it suggested that its etiology is very unlikely related to metabolic syndrome [20]. Only one case was described in the literature of eyelid myokymia triggered by swallowing and certain tongue movements after laser skin treatment [32].

Medication induced myokymia is rare. Clozapine, gold salts, and flunarizine can induce myokymia [21**]**. Some authors describe eyelid myokymia as a side effect of Topiramate/TPM/ in patients used as a prophylaxis of migraine. There are many ocular side effects of this medication described in the literature like hyperemia, mydriasis, acute angle closure glaucoma, ocular pain, headache, uveitis, visual field defects, acute onset myopia, retinal hemorrhage, suprachoroidal effusions, and scleritis. Neuroophthalmologic manifestations such as blepharospasm, myokymia, and oculogyric crisis are rarely reported [1]. In a study that took place in a headache clinic 140 patients with migraine that were treated with topiramate were included. Eight presented eyelid myokymia after beginning treatment with topiramate (5,7%). Topiramate was stopped and myokymia disappeared in all patients, it was prescribed again and eyelid myokymia reappeared with their previous characteristics in all patients [21**].** Khalkhali et al presented a case of a 47-year-old woman who had begun TPM for binge eating problem. She developed unilateral long standing lower eyelid twitching, which progressed to upper eyelid and eyebrow at the same side. The patient was not a smoker or excessive alcohol or caffeine abuser. Increasing the resting time and changing lifestyle made no significant changes in her eyelid twitching. There was no definite evidence by neuroimaging and clinical or laboratory evaluations causing eyelid myokymia. The symptoms resolved with discontinuation of TPM. Physicians should be aware of the neuroophthalmologic side effects of this drug **[**18**].**

Nearly everyone had experience of eyelid twitching and most neurologists consider it is a symptom rather a disease. However, sometimes ET persists longer and becomes bothersome in some cases, i.e. chronic ET (CET). The purposes of a Chinese study are to delineate its clinical features and electrophysiological characters of CET. They defined it as persisting of ET more than 2 weeks. Half of CET cases demonstrated delayed or absent R2 response in blink reflex. And 45.8% cases had prolonged facial nerve latency (>5% side to side difference). These two findings indicating conduction defect of facial nerve pathway in CET cases which makes the authors consider CET is a disease entity with minor facial nerve neuropathy [20**].**

Banik et al performed systematic follow-up study on patients with chronic, isolated eyelid myokymia to verify its benign nature. It included 15 patients examined between 1983 and 2002 with a diagnosis of isolated eyelid myokymia. In all patients, symptoms began as unilateral, weekly

or biweekly, intermittent eyelid spasms, and progressed to daily spasms over several months. The mean duration of symptoms at first examination was 91 months (range 2.5 months to 20 years). In no patient was the myokymia the first manifestation of a neurologic disease, although one patient progressed to ipsilateral hemifacial spasm. Thirteen patients (86.7%) underwent neuroimaging that gave negative results. The myokymia resolved spontaneously in four patients [3**].**

In rare cases, the eyelid myokymia gradually spreads over several months to affect additional muscles on one or both sides of the face - facial myokymia [4] or producing other neurological desorders of the facial nerve like benign essential blepharospasm, hemifacial spasm, or, rarely, spastic-paretic facial contracture [22]**.**

Eyelid myokymia is mainly of peripheral nerve origin, whereas facial myokymia is often associated with intrinsic or extrinsic lesions or conditions that damage the facial nerve nucleus in the pons **[**3, 22**].** Intrinsic lesions that have often been described in association with facial myokymia that is continuous and affects all the muscles on one side of the face are ipsilateral pontine tegmentum, especially tumours (gliomas or metastasis), cysticercosis, **[**5] and MS. In MS, myokymias may occur either throughout the duration of the disease or appear as its first symptom [7]. Other entities with which it is less frequently associated are multiple system atrophy, and Guillain-Barré syndrome, vascular lesions (cavernous angiomas), tuberculomas, syringobulbia, spinocerebellar ataxia type 3 (Machado-Joseph disease) autosomal-dominant striatonigral degeneration [22**].** In MS, facial myokymias tend to be self-limiting in the course of a few weeks (typically between 2 weeks and 6 months) and they rarely last as long as a year. However, myokymias secondary to malignant tumours typically last several years and resolve with treatment of the neoplasia **[**30**].** Extrinsic processes include subarachnoid haemorrhage **[**6**]**, obstructive hydrocephalus basilar invagination, and extra-axial neoplasms that compress the brainstem [22]**.**

Essential blepharospasm is a bilateral condition consist of episodic contraction of the orbicularis oculi. Initially, the spasms are mild and infrequent, but they may progress to the point that the patient's daily activities are severely disrupted [2**].** In combination with oromandibular dystonia it comprises Meige syndrome **[**18]. Hemifacial spasm (HFS) is a peripherally induced movement disorder characterized by involuntary, unilateral, intermittent, irregular, tonic or clonic contractions of muscles innervated by the ipsilateral facial nerve [32]. The disorder frequently begins as intermittent twitching of the orbicularis oculi muscle but over the course of several years, spreads to involve all the facial muscles on one side [35]. Wang et al said lower ET might frequently show in pre– stage of hemifacial spasm [33]. A neurological study showed abnormal lower eyelid contraction appeared in 46 out of 53 hemifacial spasm **[**9**].** Spastic paretic facial contracture is a rare disorder characterized by unilateral facial contracture with associated facial weakness. Typically, it begins with myokymia of the orbicularis oculi muscle, which gradually spreads to most of the ipsilateral facial muscles. At the same time, tonic contracture of the affected muscles becomes evident [2**].**

Even though it is very rarely described in the literature eyelid myokymia alone can be a warning sign for more serious disease of the brainstem.

A 48 year old woman presented with a 5 year history of intermittent right eyelid twitching. Electromyography of the right lower eyelid revealed myokymic discharges. Blink reflex study revealed a contralateral R1 on stimulating the left, but not the right, supra-orbital nerve. Sensory and auditory evoked potentials were abnormal, pointing to possible brainstem lesions. Oligoclonal bands were present in the cerebrospinal fluid. Magnetic resonance imaging of the brain was normal. This case report demonstrates that benign eyelid twitching can be a localized form of facial myokymia and may be a manifestation of underlying brainstem disease [27**].**

There is only one case reported by a Japanese team of eyelid myokymia with concomitant cerebral tumour. A 52-year-old woman had a 6-month history of left eyelid myokymia accompanied by upper eyelid ptosis and lower eyelid reverse ptosis. Magnetic resonance imaging showed a solid mass measuring 20 × 25 × 20 mm in the temporal lobe of the cerebral cortex, showing isointense on T1-weighted and hyperintense on T2-weighted images. The clinical diagnosis was cerebral astrocytoma. A cerebral tumour generally shows neurological deficits, visual impairment, headache, nausea, and seizures as accompanying symptoms. Left eyelid myokymia was, however, the only symptom of the present case [19].

Clinicians also should know that there are reported cases of eyelid myokymia as the first sign of multiple sclerosis. A 33-year-old otherwise healthy male presented with a week-long history of isolated right lower eyelid myokymia. Two weeks later, the patient's myokymia had progressed to include twitching of the right brow and right upper lip. Imaging revealed multiple demyelinating lesions consistent with multiple sclerosis [4**].** A 34-year-old woman was examined for abnormal movements compatible with myokymias in the right lower eyelid which had been occurring for 2 months. The symptoms initially presented sporadically during the day in episodes lasting from a few minutes to an hour. As the weeks passed, their frequency and intensity had increased and muscle twitches had become continuous. A week after EMs had become continuous, doctors performed a brain MRI which showed multiple lesions in supratentorial white matter in both hemispheres **[**26**].** Hertz et al reported another case of a 33-year-old male with MS that presented with myokymia of left eyelid, which progressed to left hemifacial spasm. An awareness of this presentation not only may lead to an earlier diagnosis in some patients but can be a sign of relapse in patients with established multiple sclerosis [12].

Eyelid myokymia sometimes becomes a source of distress in chronic long standing cases. Banik et al believe that most patients with isolated eyelid myokymia should be managed conservatively, with reassurance, rest, and elimination of or reduction in possible risk factors, such as smoking, alcohol ingestion, and caffeine intake. If the EM continues after elimination of known triggers imaging studies and neurologic assessment should be completed in order to rule out any underlying lesions **[**12**].** If the myokymia persists for more than 3 months and is bothersome to the patient, further intervention may be warranted. Although limited surgical myectomy of the affected pretarsal and preseptal orbicularis oculi has been shown to be of benefit and, in some cases, curative, palliative injections of botulinum toxin are also quite successful and less invasive than surgery [3**].** Muscle relaxants has also been proposed as treatment. In an article from 1989 limited orbicularis myectomy and botulinum-A toxin injections were presented as efficacious treatments in five selected intractable cases of orbicularis myokymia. **[**16**]** Between March 2001 and March 2005 in Korea, botulinum toxin injection therapy was performed in 12 eyelid myokymia patients. Improvement of symptoms was noticed in 10 patients (83.3%). Among the 10 patients, 5 patients were decided as cured patients because they did not require any retreatment. Range and grade of myokymia didn't affect on effect of treatment. Pain, edema, excessive tearing, and unnatural face were noticed as complications of treatment, but all complications disappeared 2 weeks after the treatment **[**36**].** A total of 5 U of botulinum toxin – A injection was given in two locations, intradermally and pretarsally, to the left upper eyelid and to the lower lid, respectively of a patient with eyelid ptosis caused by orbicularis myokymia. The orbicularis activity subsided completely within a week and the ptosis was corrected completely [31**]** Other authors have also suggested the good results of botilinum toxinum in treating eyelid myokymia **[**8, 29**].**

Conclusion:

Eyelid myokymia is generally a benign self-limited condition which if persistent can be considered a separate disease entity. The studies in the literature cosidering its nature and causes are

insufficient. In chronic cases neurologic assessment and investigation may be necessary because it can be either a precursor or a sign for more serious neurological disorder.

Botulinum toxin is the treatment of choice for chronic eyelid twitching but change of lifestyle is advised before that.

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