Botulinum Toxin Injection for Objective Tinnitus from Palatal Myoclonus : A Case Report

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Abstract

Objective tinnitus may be caused by many etiologies-palatal myoclonus being one of them. We report one patient of voluntary palatal myoclonus presenting with objective tinnitus treated with botulinum toxin injection. Five units of botulinum toxin A were injected into each side of the soft palate at the palatal muscles (levator veli palatini and tensor veli palatini muscle). The tinnitus disappeared within two days of injection and no side effect was observed.

Key word : Botulinum Toxin, Palatal Myoclonus, Tinnitus

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Objective tinnitus may be caused by vascular, benign intracranial syndrome, Paget's disease, otosclerosis, patulous eustachian tube, palatal, stapedial, and tensor tympani myoclonus(1). Palatal myoclonus is characterized by involuntary rhythmic contractions of the palatal musculature. In one reported case, a 39-year-old man was able to create palatal myoclonus(2). A pathology of the "triangle of Guillain-Mollaret" or hypertrophic degeneration of the inferior olive are thought to cause the condition(2).

Contraction rates of palatal myoclonus vary between 10 and 240 beats per minute(2). In many cases, palatal myoclonus also causes some degree of objective tinnitus that may be unremitting during sleep or even under general anesthesia. In some patients, phonation and deglutition can cause temporary cessation of palatal myoclonus.

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The mechanisms by which palatal myoclonus cause tinnitus, debated in the literature, include rhythmic contraction of the tensor tympani muscle, the stapedius muscle, or the tensor veli palatini and levator veli palatini muscles[3-6]. Slack et al postulated that it was caused by the snapping closure of the eustachian tube[7].

Traditionally, the tinnitus associated with palatal myoclonus has been managed with drugs such as anxiolytics, anticonvulsants and antidepressants or surgical procedures aimed at modifying palatal and eustachian tube function and adjunctive psychotherapies. Botulinum toxin injection treatment has been reported successfully in five patients with involuntary palatal myoclonus[8-9]. The authors report another patient with voluntary palatal myoclonus presenting with objective tinnitus treated with botulinum toxin injection.

CASE REPORT

A 36-year-old man presented with a 15-year history of left-side objective tinnitus, which he described as 'the click of a clock.' Seven years later he observed a noise in his right ear. The click was also audible to people nearby. The patient could produce palatal myoclonus and associated objective tinnitus by palpation over the left side of the neck or movement of the head. The palatal myoclonus stopped if the stimulation ceased. He could abort the symptom for a short time. Other associated symptoms included dysarticulation and muscle straining of the neck.

During the past 15 years, he had sought treatment from several hospitals including a psychiatrist for somatoform disorder and hypochondriasis. Many antipsychotic drugs including haloperidol, clonazepam, lorazepam, alphazolam, perphenazine, clomipramine and fluxetine were prescribed but all were in vain.

On physical examination, the clicking sound was audible with a regular rhythm of approximately 150 times a minute, which was also visibly synchronized with a rhythmic palatal movement. Neurological examination, otologic examination, audiometry and tympanometry were all normal. Magnetic resonance imaging of the brain was entirely normal.

Five units of botulinum toxin A were injected into each side of the soft palate at the palatal muscles (levator veli palatini and tensor veli palatini muscle). The tinnitus disappeared within two days and no side effect was observed.

One month later he requested another injection as the effect had dissipated.

DISCUSSION

Palatal myoclonus is a movement disorder involving the soft palate, characterized by continuous, involuntary, rhythmic contractions, and is usually bilateral. It is a rare syndrome but it is increasingly being reported. Deuschl et al classified this condition into two groups: 1) symptomatic palatal myoclonus with other brainstem or cerebellar findings, and 2) essential palatal myoclonus[10].

Almost all patients presenting with objective tinnitus have a benign essential disorder and are usually young adults. Neurological findings are normal except for palate tremor. The pathology of the disease is unknown. Although essential palatal myoclonus usually persists, spontaneous remissions have been reported[6].

There has been only one reported case of voluntarily-induced palatal myoclonus in a 39-year-old man who could control the contraction and produce objective tinnitus in either ear or both[2]. While inhaling, he could create objective tinnitus in a single ear but while exhaling he could create the effect in both ears at once.

The authors reported the second case of voluntary-induced palatal myoclonus with associated objective tinnitus. This patient differed from the first patient in that he could induce palatal myoclonus and the associated objective tinnitus by palpation of the left side of the neck or movement of the head. The symptoms stopped if there was no more stimulation, thus he could voluntarily stop the symptoms.

Deuschl et al believe that a spontaneous oscillator, distinct from that causing symptomatic palatal myoclonus, stimulates the trigemminal nucleus causing the rhythmic contraction of the tensor veli palatini, eustachian tube opening, thus producing the audible clicks[10].

Patients with a long duration of the condition probably do not require further investigation once the diagnosis of essential palatal myoclonus has been made[10]. The presented patient had symptoms for 15 years, yet MRI of the brain revealed no significant pathology.

Many treatment modalities have been utilized to control objective tinnitus. Therapeutic regimens, including antidepressants, anticonvulsants and anxiolytic drugs, have yielded varying results

Table 1. Reported cases of palatal myoclonus treated with botulinum toxin injection.

Studies	Patient	Sex, age	Dose	Side effect	Duration of benefit
Saeed et al (1993)	1	M, 25	5 U, bilat	- No	12 weeks
	2	F, 64	5 U, bilat	- Nasal regurgitation, dysphagia	Not recommended
			10 U, bilat		
	3	F, 70	10 U, bilat	- Difficulty with swallowing and speech	1 year
			5 U, bilat		
Bryce et al (1998)	1	F, 32	7.5 U, bilat	- Aural fullness	3-4 months
	2	F, 41	10 U, alternate side	- Aural fullness, hypernasal voice	2 months
			4 U, alternate side	- No	

but there are no clinical studies to prove the effectiveness of these approaches. Other treatments include psychotherapy and the use of tinnitus-masking devices[11].

Surgical procedures such as eustachian tube obliteration and palatal muscle section have been used but this leads to unwanted eustachian tube dysfunction[10].

Over the past 15 years botulinum toxin has been shown to be useful in several conditions, especially strabismus and various movement disorders such as hemifacial spasm, blepharospasm, dystonia, spasticity and myoclonus[12,13]. Botulinum toxin interferes with neural transmission by blocking the release of acetylcholine that makes the muscle clinically weak or paralyzed. This effect lasts about two or three months[12]. Injecting botulinum toxin into the palatal muscle has been reported by two authors (Table 1). Saeed et al reported three patients [8]. The injection site was posteromedial to the maxillary tuberosity so as to paralyze the levator and tensor veli palatini muscles. Side effects to this approach included nasal regurgitation, dysphagia and difficulty with speech. Two patients gained a marked benefit from the treatment, which is the cessation of the myoclonus for several months. Bryce et al reported two patients treated with botulinum toxin injection into the tensor veli palatini at the soft palate just posterior to the edge of the hard palate[9]. The most significant side effects of this treatment were paresis-induced eustachian tube obstruction and velopharyngeal insufficiency.

In the presented patient, 5 units of botulinum toxin A were injected into the tensor veli palatini and levator veli palatini posteromedially to the maxillary tuberosity bilaterally (total dose 10 units). This treatment aborted the symptoms within two days with no side effects. The cessation-effect lasted for four weeks, suggesting the dose may be inadequate. However, our aim was to utilize the smallest dose with the greatest benefits and lowest side effects since larger doses can produce more side effects.

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การรักษาภาวะเสียงเต้นดังเป็นจังหวะในหูจากกล้ามเนื้อเพดานอ่อนกระตุกรัวด้วยการฉีดโบทูลินุม ทอกซิน

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ภาวะเสียงเต้นดังเป็นจังหวะในหูเกิดได้จากหลายสาเหตุ ซึ่งกล้ามเนื้อเพดานอ่อนกระตุกรัวก็เป็นสาเหตุที่สำคัญสาเหตุหนึ่ง จึงได้รายงานผู้ป่วย 1 ราย ที่มีภาวะเสียงเต้นดังเป็นจังหวะในหูจากกล้ามเนื้อเพดานอ่อนกระตุกรัว และสามารถควบคุมให้หยุดได้เอง ซึ่งได้รับการรักษาโดยการฉีด โบทูลินุม ทอกซิน 5 ยูนิต ที่บริเวณเพดานอ่อนทั้งสองข้าง โดยฉีดเข้ากล้ามเนื้อ levator veli palatini และกล้ามเนื้อ tensor veli palatini พบว่าอาการเสียงเต้นดังเป็นจังหวะในหูของผู้ป่วยหายไปภายใน 2 วันหลังจากฉีด และไม่พบผลข้างเคียงจากยา

คำสำคัญ : โบทูลินุม ทอกซิน, เพดานอ่อนกระตุกรัว, เสียงเต้นดังเป็นจังหวะในหู

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