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Case Report

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Treating migraine's with Botox®: a case report

Abstract

Migraine attacks are the most common complaint that leads patients to seek medical care. The treatment of migraine includes various medications depending on acute or preventative therapy. In the past decade the use of using botulinum Toxin Type A (BoNT-A) or Botox® has gained momentum in the treatment of many pain disorders including migraine headaches. The following case study presents a successful case implementing BoNT-A in the treatment plan.

Keywords: Botox, Botulinum toxin type A, Migraine headaches

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Abbreviations: Bont- A, Botox; NSAIDS, Non Steroidal Anti-Inflammatory Drugs; IHS, International Headache Society

Introduction

Headaches are the most common complaint that leads people to seek medical care in the world according to a global Nielson survey in 2007.[1] Migraine, a neurovascular disorder, is recognized as a major cause of disability globally[2] and can be a debilitating disorder.[3] The disorder ranked eighth in years living with the disability, a measure of the burden of disease.[4] The prevalence of the disorder in the United States may be as high as 18%[5] with ~28 million[6] currently affected. Globally, the disorder it is estimated that 14% of the world's population have suffered from migraine at some point.[3] The cost of migraines to employers in the United States is estimated at $13 billion a year as a result of missed workdays and reduced productivity.[7]

Migraine usually presents as severe, unilateral, throbbing headache, lasting between 4 and 72 hours.[8] Associated symptoms include nausea and emesis accompanied with photo- and phonophobia.[9] Treatment for the disorder can include acute therapy. The acute therapy for migraines may include medications such as non steroidal anti-inflammatory drugs (NSAIDS) and migraine-specific agents such as triptans.[10] The success of acute therapies is guarded as acute medication overuse can itself cause more frequent headaches called rebound or medical overuse headache.[11,12] Another treatment modality for the disorder is preventative therapy. Preventative therapy can include adrenergic receptor antagonists, such as propranolol and timolol; calcium-channel antagonists such as verapamil; tricyclic antidepressants such as amitriptyline; and anticonvulsants such as divalproex sodium, gabapentin, and topiramate.[5,10,13,14]

A preventative therapy that has gained momentum in treating migraines is botulinum toxin type A (BoNT-A).[15] The mechanism by which botulinum Toxin Type A (Allergan, Irvine, CA) prevents migraine discomfort is not fully understood. For migraines, there is no muscle component involved[15] but *in vitro* evidence suggests BoNT-A may prevent the release of neuropeptides involved in pain perception and inflammation.[13] BoNT-A, a neurotoxin also known as Botox®, has become a viable and effective therapy for headaches. Safety and tolerability are significant advantages of BoNT-A over other preventative therapies. BoNT-A is a natural protein produced by the anaerobic bacterium, *Clostridium botulinum*.[15] BoNT-A exerts its effects through uptake by cholinergic neurons resulting in temporary chemodenervation and a decrease in neuromuscular transmission.[13] This treatment option also relieves the pain when there is excessive muscle contraction.[16]

This case report is a patient with a history of migraines headaches for over ten years and treated by numerous doctors in a myriad of specialties.

Case presentation

A 49-year-old female who had been suffering from migraine headaches was referred to our private practice office. The patient reported she had been to a myriad of doctors from neurologist to pain management specialists to chiropractors to acupuncturists to other dentists. The patient stated she had limited or no success with the other treatments received over 10 years and was becoming depressed and felt like there was no hope of improvement.

She presented with a history of chronic migraine headaches for over 10 years. The patient was diagnosed with migraine headaches from a neurologist using the International Headache Society (HIS) diagnostic criteria seen in (Table 1). The patient reported 6 attacks per month averaging at least 1-2 per week. The migraines typically lasted around 7-10 hours. She reported of severe pain and could have symptoms of nausea or photophobia with her attacks.

The patient reported of trauma to the head/neck and jaw region as a child in a car wreck. The patient stated no surgery was needed but felt her jaw was never right afterwards and start of sporadic headaches. She stated headaches got worse when around 35-years of age and progressively worsened. The patient reported the area with the highest concentration of pain was in the forehead area.

On physical exam the patient's oral health was unremarkable with restorations in posterior teeth. The patient was asked to report on an analog pain scale of 1 to 10 (1 being no pain and 10 being highest pain) when palpating the muscles. Muscles of mastication and muscles of the neck and back were unremarkable when palpated with patient reporting 1 on the scale (Figure 1). Patient reported 5 in the procerus and corrugator muscles and 3 on the frontalis muscle on palpation.

When taking her medical history, the patient was asked to report on the pain scale, the level of pain when she was having a migraine attack. She reported the areas by pointing to the affected muscles on her face. The most painful areas were where she indicated in the lower medial forehead or glabella area. The patient stated on an analog pain scale of 1 to 10 her pain was "1,000" in the glabellular region when she had migraine attacks. She also reported of less significant pain in the frontalis muscles including area over the anterior temporal region and reported a score of 5 when migraines occur on the pain scale.

The patient was given the informed consent. The informed consent was reviewed with the patient and the patient signed the informed consent. From the information gathered a treatment plan was made. The treatment plan was presented and reviewed with the patient and

the patient approved the treatment plan using BoNT-A to treat her migraine headaches. The patient was told of the injection sites for treatment and we would use the "follow-the-pain" approach from Blumenfeld's protocol (Table 2).

The patient reported most severe pain in with her migraines in the procerus and frontalis muscles. The dosage protocol was used that had been determined to be safe (Table 3).

Table 1 Migraine, International Headache Society (HIS) diagnostic criteria[17]

Diagnostic criteria	
1. At least 5 attacks fulfilling criteria B-D	
1. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)	
1. Headache has at least two of the following characteristics:	1. Unilateral location 2. Pulsating quality 3. Moderate or severe pain intensity 4. Aggravation by or causing avoidance of routinephysical activity (eg, walking or climbing stairs
1. During headache at least one of the following:	1. Nausea and/or vomiting 2. Photophobia and phonophobia
Not attributed to another disorder	

Table 2 Summary of injection protocols and clinical indications: Adapted[18]

Injection sites	**Clinical features on history or exam**
Follow-the-trigeminal-nerve (fixed sites)	Migraine or migrainous headache
Follow-the-pain	Tension-type headache
Follow-the-muscles-of mastication	Temporomandibular disease (TMD)
Follow-the-dystonia	Cervical dystonia (CD)

Table 3 Suggested injection protocol by anatomical site (Abbreviated): Adapted[18]

Muscle	**Botox ® Unit/Site**	**Number of injection sites**
Procerus	2.5-5.0 U	1
Medial Corrugator Lateral	2.5 U	2 (1 per side)
Frontalis	2.5 U	8-12 (4-6 per side)
Temporalis	2.5-5.0 U	8 (4 per side)

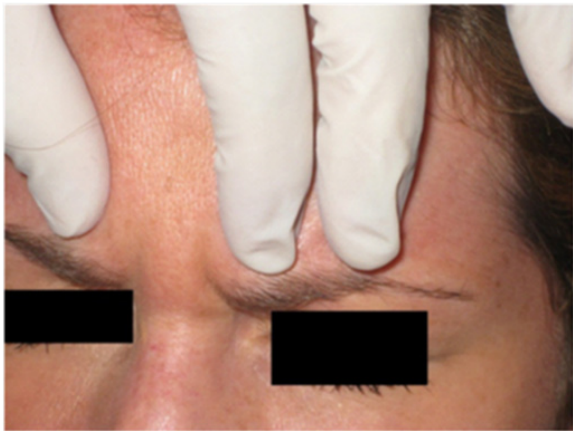

Figure 1 Palpating lower medial forehead region.

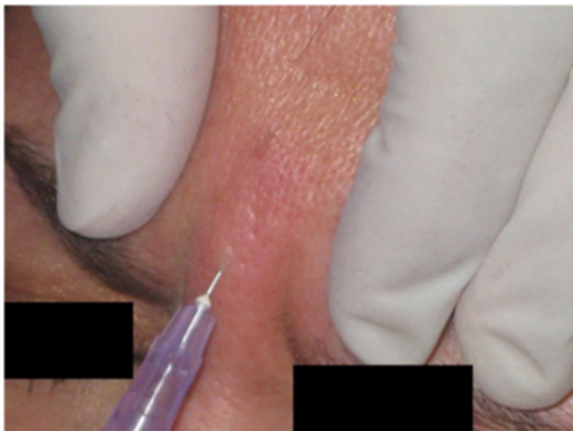

Figure 2 5.0 U of BoNT-A injected into procerus muscle.

The first injection site of BoNT-A was the procerus muscle at 5.0 U (Figure 2). The next injection site was the corrugator muscles and 2.5 U injected for each muscle with 2 injection sites (1 per side). The final injection site was the frontalis muscle and 2.5 U was injected on 12 sites (6 per side).

The patient was given post-operative instructions and told to return in 1 week for follow up. The patient was also told to keep a record any side effects and incidences of migraine attacks. The patient was called that night and the patient reported of no side effects and doing well at this time. At the 1 week follow up appointment the patient did not note any side effects from the BoNT-A. At the 1 week follow up the patient reported she had not had a migraine headache in a week.

The patient was asked to come in weekly to record any changes and the patient reported of no side effects and no migraines until week 11 when she had her first migraine attach since receiving BoNT-A. The patient was asked on the pain scale how painful it was and she reported a 6. The patient understood that in approximately 3-4 months she would have to have more BoNT-A.

In summary, the patient expressed great satisfaction and stated: "I can't believe I can live my life now and not be a prisoner of migraines."

Discussion

Botulinum toxin has been used for over 25 years to treat various neurological disorders.[19] The patient had been treated by several doctors for over a decade and the patient had little or no improvement in their migraines so BoNT-A was a potential treatment option. Even though the exact mechanism is not understood the reduction in muscle innervation can reduce pain in patients with migraine headaches.[20] The excellent tolerability of BoNT-A makes it an effective treatment alternative for patients who fail to tolerate, and therefore discontinue traditional oral prophylactics.[21] Because the case study described shows a correlation between BoNT-A and migraine episodes the author concludes that the injection of botulinum type A is a safe and effective treatment option for selected cases for patients with migraine headaches. The treatment for migraines with BoNT-A should be reserved for selected cases where conventional therapy is ineffective and symptoms are severe.

Acknowledgements

I'd like to acknowledge my patient for allowing us to use her life experience with migraine to help us learn and possibly provide more treatment options for migraine headache patients.

Conflicts of interest

None.

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