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Case Report

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ZAPTed (Zygomatic Arch and Point Triggers) Protocol for Botulinum Toxin Injections in the Management of Refractory Trigeminal Neuralgia

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Abstract

Trigeminal Neuralgia is s disabling chronic pain condition that is characterised by recurrent episodes of severe, lancinating pain to the face. The condition generally responds well to pharmacotherapy and / or surgery. In a minority of case these treatment modalities are ineffective or unsuitable and other treatment modalities need to be considered.

Botulinum toxin type A has been used effectively in the treatment of a several pain syndromes such as chronic migraine. There are also a number of reports of its use in trigeminal neuralgia, with doses ranging from 50 to 170 units. In addition, a number of different injection techniques have been described.

We assessed the clinical effects of botulinum toxin type-A injections in 5 patients with refractory idiopathic trigeminal neuralgia. All patients exhibited increased sensitivity to touch (allodynia) over the appropriate facial region.

Patients were infiltrated with up to 35 units of botulinum toxin with 10 units into the region below the zygomatic arch and the additional 25 units into facial triggers zones in a grid like fashion. We propose that this standardised injection protocol be termed the "ZAPTed" protocol.

The Numerical Rating Scale was used to establish the efficacy of the injections. All 5 patients reported significant benefit from the botulinum toxin injections, with a reduction in pain by greater than 75%, even though they had previously been unresponsive to medical and in some cases, invasive treatments. This confirms previous reports that botulinum toxin injections are a useful therapeutic tool in the management of refractory trigeminal neuralgia. The doses required are much smaller than previous reports using this therapeutic option. The treatment effect using a standardise injection protocol was also more effective and longer lasting.

Introduction

Trigeminal neuralgia (TN) (tic douloureux) is a disorder of the trigeminal nerve that causes intense episodes of sharp, stabbing, electric shock-like pain in the distribution of one or more of the 3 branches of the trigeminal nerve [1]. Each attack of pain can be triggered by talking, chewing, brushing teeth and touching the face (trigger zones). Trigeminal neuralgia is a clinical diagnosis, with imaging used to exclude pathology causing secondary trigeminal neuralgia, such as Multiple Sclerosis or structural abnormalities compressing the trigeminal ganglion such as meningiomas or epidermoid cysts.1

A majority of cases ae due to focal compression of the trigeminal nerve at the root entry zone at the level of the pons, by an aberrant arterial or venous loop, which leads to demyelination of the trigeminal sensory fibres [2].

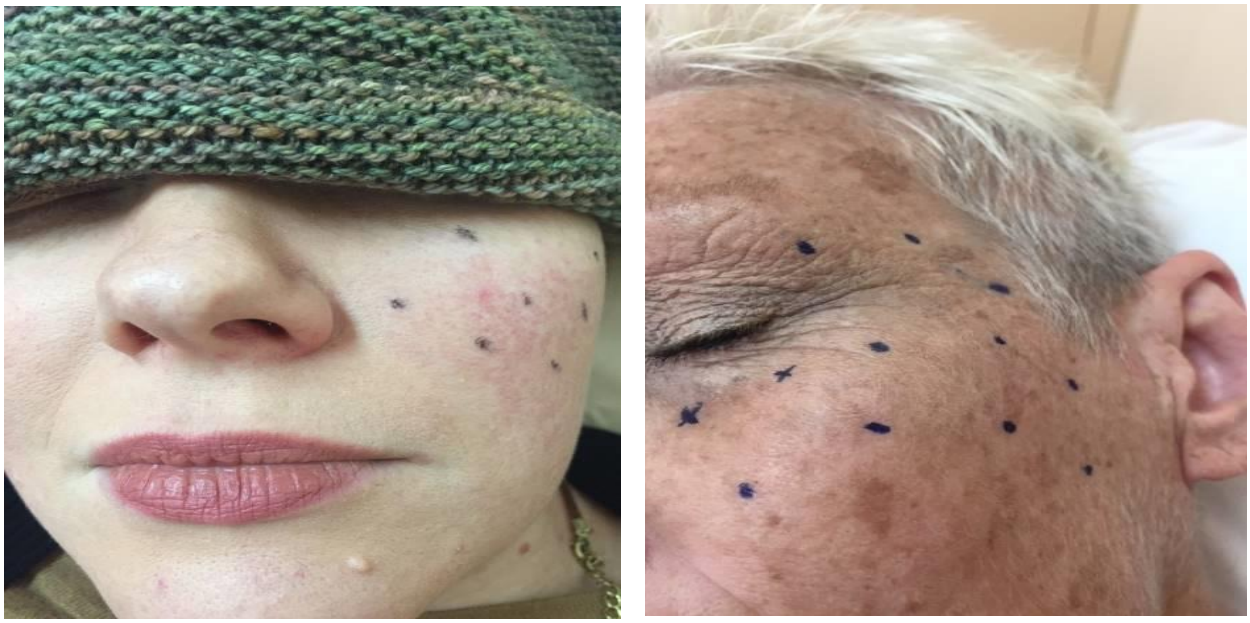
First line of treatment of trigeminal neuralgia is usually in the form of anticonvulsant drug, especially carbamazepine [1]. In a minority of cases, pharmacological treatment modalities are ineffective and other treatment modalities need to be considered. Botulinum toxin type A (BTX-A) has been used effectively in the treatment of a several pain syndromes such as chronic migraine and has been reported as being effective in the management of TN [3-6].We assessed the analgesic effects of BTX-A in patients with refractory TN.

Method

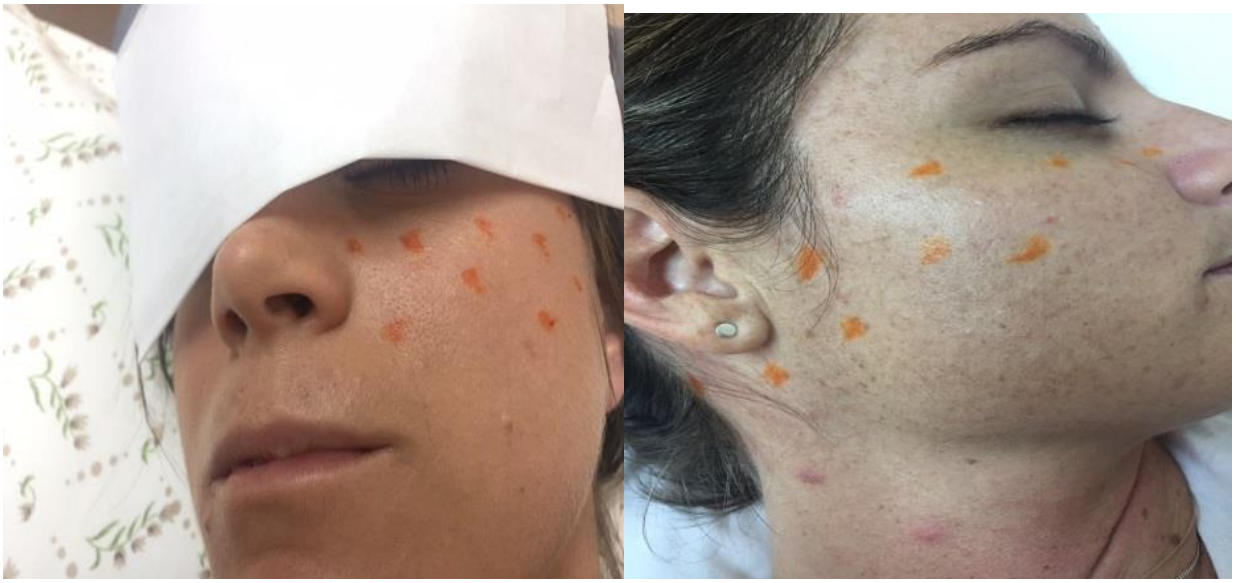
We had five (5) patients with refractory idiopathic TN, all female, with ages ranging from 27-61 years of age. The mean duration of pain was 98 months (8.1 years) with a range 14-205 months. Pain affected the maxillary division in all 5 patients. All patients had localised areas of increased sensitivity to touch in this region of the face. All patients had ongoing disabling pain, despite receiving a

number of appropriate treatments for TN for years. 2 patients were considered candidates for decompression surgery, but preferred not to proceed.

A maximum of 35 units of BTX-A was injected intra-dermally with 10 units being injected just below the zygomatic arch and the other 25 units into painful facial triggers points in a grid-like fashion, approximately 2 centrimetres apart. - "ZAPTed injection protocol. (Picture1).



Picture 1: "ZAPTed (Zygomatic Arch and Point Triggers) Injection Protocol.



The patients' response to BTX-A was evaluated using the Numerical Rating Scale (NRS) and also the number of attacks per day, before and after BTX-A.

Informed and written consent was obtained from all patients indicating that BTX-A in the treatment of TN was not an approved treatment modality. Informed consent was also obtained from all patients to publish photographs demonstrating the injection sites. As TN is not an approved indication for BTX-A in Australia, the Trigeminal Neuralgia Association (TNA) Australia secured funding from the Cromwell Foundation to support this project and supply of BTX-A.

Results

All 5 patients obtained relief of pain after BTX-A injections and indicated they noticed an improvement in pain with reduced sensitivity to touch in the trigger points. The mean NRS was 8.6 at baseline and 1 at week 8 and back to 6.2 at week 12. The mean number of paroxysms of pain was 40 per day at baseline and 0.12 per day at week 8. The mean duration of effect was 16.8 weeks, ranging from 8 weeks to 26 weeks (Table 1).

Transient facial asymmetry was seen only in 1 patient after the first injection, which did not recur on subsequent injections after dose reduction.

Case	Sex	Duration of Pain (months)	Episodes per day Baseline	Episode at 8 weeks	NRS Baseline	NRS at 8 weeks	Duration (weeks)	BTX-A units
1	F	14	30	1	8	1	10	22.5
2	F	204	50	0	9	2	26	35
3	F	32	45	0	9	0	8	30
4	F	84	40	0	9	2	20	27.5
5	F	156	30	0	8	0	20	22.5
AV.		**98**	**40**		**8.6**		**16.8**	**27.5**

Table 1: Comparison of Treatment Effects.

Discussion

BTX-A has been used in a number of neuropathic pain conditions. The direct analgesic effect of BTX-A is thought to be due to its effect on blocking the release of the neurotransmitters from the post-ganglionic sympathetic nerve endings such as nor-adrenaline, which is known to increase in chronic, and ATP, which is a stimulant of muscle nociceptors, rather than purely relating to its effect on muscle contraction by inhibiting the release of acetylcholine from the pre-synaptic nerve terminal [6].

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Our findings clearly demonstrate that there is role for BTX-A in the treatment of refractory TN in those who have increased sensitivity to touch over the appropriate facial region. All patients benefited from the treatment, even though they did not respond to conventional medical and in some cases, interventional treatment. Pain recurred once the effect of the BTX-A wore off, as expected, but we found that on average the duration of effect was longer, 16.8 weeks, than has been reported in previous studies. In addition, the treatment effect on pain and number of episodes of pain patients experienced seemed to be greater.

In previous studies, BTX-A is injected either sub-cutaneously along the trigeminal branches [5] or into trigger points [4] or below the zygomatic arch, in variable doses ranging from 25 units to 170 units.

We injected 10 units just below the zygomatic arch and 2.5 units of BTX-A intra-dermally into painful triggers points in a grid-like fashion, terming this the "ZAPTed" injection protocol (Picture 1). With this standardised injection protocol, lower doses of BTX-A seem to be required, with an average of 27.5 units, compared to previous studies which averaged 75 units [7]. This effect may relate to the injection technique as not only were the trigger points injected, but an additional injection was given just below the zygomatic arch region.

This study provides further support for the use of BTX-A in the treatment of TN. The effect can be long lasting and can be repeated, when required. The injections are well tolerated as the lower doses used, only resulted in transient facial weakness on one occasion. Further studies are required to validate the standardised ZAPTed injection protocol.

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