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Interventional Management of Facial Pain: A Retrospective Case Series

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Background: Chronic facial pain is initially managed with conservative measures and medications but can also be treated with interventional procedures in refractory cases.

Case Report: We report a case series of 20 patients with atypical trigeminal neuralgia who had inadequate pain relief with medical management. Patients presented with pain in various distributions of the trigeminal nerve, with 75% having unilateral pain and 25% having bilateral pain. Approximately half (n = 9) of patients reported inciting events, including postsurgical, traumatic, or postinfectious etiologies; whereas, the remaining (n = 11) had no identifiable inciting etiology. Patients underwent infraorbital, supraorbital, supratrochlear, zygomaticotemporal, or trigeminal nerve blocks (NBs), based on pain distribution.

Conclusions: Although patients varied on the amount of efficacy and length of response, on average, patients experienced an 80% improvement of their pain over a 3-month period. The findings suggest that interventional techniques, such as ultrasound-guided NBs, are an option for providing significant pain relief for patients with facial pain who are not adequately managed with medication or amenable to surgery, but they may require relatively frequent repeating of these procedures.

Key words: Atypical trigeminal neuralgia, facial pain, ultrasound

BACKGROUND

Chronic facial pain is a presenting symptom for a wide range of different diagnoses. By far, the most common cause of facial pain is due to various forms of headaches, including more common migraine and tension headaches, as well as less common cluster headaches and hemicrania continua, among others (1). Pain limited to the distribution of the trigeminal nerve can be classified as trigeminal neuralgia. Classical trigeminal neuralgia, or tic douloureux, involves all 3 divisions of the trigeminal nerve and is due to vascular compression, which is potentially amenable to surgical intervention if patients have an insufficient response to conservative or medical management. Atypical trigeminal neuralgia, on the other hand, may involve any of the divisions of the trigeminal nerve or more distal branches, and rarely involves all 3 major divisions. Although causes, such as trauma, surgery, or infection, may be identifiable as instigating the pain, many times there are also no identifiable causes in cases of atypical trigeminal neuralgia.

Management of atypical trigeminal neuralgia often begins similarly to classical trigeminal neuralgia, with anti-inflammatory medications (acetaminophen, nonsteroidal anti-inflammatory drugs) and certain sodium-channel inhibiting anticonvulsants (carbamazepine, oxcarbazepine). If these medications do not provide sufficient relief, or the patient is not able to tolerate them, other options, but with less evidence for efficacy, include lamotrigine, topiramate, gabapentin, pregabalin, baclofen, and duloxetine (2-4). Topical medications,

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such as lidocaine or capsaicin, have also been found to be beneficial for some patients (5,6). Management of atypical trigeminal neuralgia can also involve more conservative measures, such as desensitization therapy, and psychological interventions, such as cognitive behavioral therapy or acupuncture (7,8).

Interventional pain procedures are an option if patients do not have sufficient response to either conservative or medical management. Examples of such procedures include trigeminal nerve blocks (NBs), botulinum toxin injections, radiofrequency ablation (RFA) to disrupt pain signal transmission, and peripheral nerve stimulation (9,10).

Finally, surgical treatment of chronic facial pain is an option that, if successful, may provide a more permanent solution but may not necessarily be appropriate for all patients due to medical contraindications, differing goals of treatment, and refractory/atypical facial pain cases that are generally not responsive to surgical intervention (9).

Ultimately, the choice of treatment depends on multiple factors, including the specific pathologic process, the distribution and characteristics of the pain, and characteristics specific to the patient, such as age, past medical history, and prior surgical interventions (9). Patient preference is, of course, a highly important factor, and especially patients with a postsurgical etiology for their pain may be reluctant to pursue further surgical intervention. For patients with atypical facial pain who fail medical management and are not candidates for surgical intervention for the reasons discussed above, ultrasound-guided NBs are a minimally invasive and widely available option for adequate and lasting pain relief.

Prior research looking at response to NBs in patients with other pain disorders, such as intractable headache or occipital neuralgia, demonstrates that peripheral NBs could potentially be a nonsurgical option for the management of refractory facial pain (15). Additional studies (11-14) on NB response in patients with typical trigeminal neuralgia also demonstrated pain relief, reduced dependence on pain medication, and increased quality-of-life postinjection.

The current study is a case series of 20 patients who had inadequate pain control with medical management alone. The patients all underwent serial NBs of the trigeminal nerve, its divisions, or branches, depending on the exact distribution of the pain. Measures of efficacy of intervention and duration of effect were collected for all patients. As far as we are aware, the current case series is the largest one of patients specifically with atypical trigeminal neuralgia in the literature.

CASES

The case series includes 20 patients (14 women, 6 men; ages range 24-85 years old, Table 1). Sixteen patients described unilateral facial pain and 4 described bilateral facial pain. Two of the twenty patients had associated symptoms of trouble chewing and paresthesias in the distribution of the trigeminal nerve. Of the 20 patients, 11 described no identifiable inciting event, 6 described the onset of pain following head and neck surgery, one described postinfectious pain, and 2 described a fall. All patients were initially managed on different combinations of anti-inflammatory, anticonvulsant, antidepressant, muscle relaxant, and opioid medications. They were identified as having failed medical management after an adequate trial period of medications and persistent significant functional impairment. On physical exam, most patients had tenderness to palpation along the distribution of the trigeminal nerve and some had mild allodynia to light touch.

Patients underwent infraorbital, supraorbital, supratrochlear, zygomaticotemporal, or trigeminal NBs depending on the laterality and distribution of reported pain. A more detailed description of the procedure for ultrasound-guided trigeminal NBs is provided in the supplementary material (also see Fig. 1). Injections were composed of 2% lidocaine or 0.25% bupivacaine combined with methylprednisolone acetate (Depo-Medrol, Pharmacia & Upjohn Company, New York, NY). Low concentrations of these local anesthetics were used to selectively inhibit only sensory fibers in mixed nerves (15).

Many patients required ongoing serial NBs, with some patients requiring up to 12 blocks by the time of retrospective chart review. Following injections, 4 patients reported complete relief, 3 patients reported little to no relief, and the remaining reported intermediate relief with a median of 80% improvement in pain. This benefit lasted from one to 5 months, with a median length of benefit of 3 months. One patient with < 4 weeks of relief additionally underwent RFA procedures, but without substantial improvement in length of benefit beyond that provided by the NBs. Case outcomes did not appear to correlate with any other patient-specific factors, including age, gender, body mass index, or comorbid conditions.

DISCUSSION

The current case series describes 20 patients presenting with atypical trigeminal neuralgia after having an inadequate response to medical management alone. From this case series, we have found that interventional pain management techniques, such as ultrasound-guided NBs, are an option that may provide significant and, in some cases, durable pain relief to patients with atypical trigeminal neuralgia or chronic facial pain that is not adequately managed with medication or amenable to surgery. Although some patients reported relatively short-term relief, in our case series, half of the patients reported relief of ≥ 3 months , and such patients could be reasonably managed with repeat injections in the long term.

Table 1. Patient symptom location, procedure, and outcomes.

Patient ID	Complaint	Procedure(s)	Outcomes
CD	Right facial pain	Infraorbital NB, infraorbital RFA, trigeminal RFA, maxillary nerve RFA	Pain relief for 1 mo
CS	Left head pain due to herpes ophthalmicus	Supraorbital, left trigeminal NBs	Pain relief for 6 wk
KC	Left frontal head pain	Supraorbital, supratrochlear, occipital NBs	Pain relief for 6 wk
JK	Left facial pain	Zygomaticotemporal, supraorbital, and infraorbital, trigeminal NBs	Pain relief for 3-4 d
AO	Head and neck pain	Occipital NBs	No pain relief
PC	Right facial pain	Trigeminal NB	Pain relief for 3 mo
AC	Nose pain due to reconstructive surgery	Infraorbital NBs	Pain relief for 2 wk
CS	Right facial pain	Trigeminal NBs	Pain relief for 5 mo
LK	Right facial pain	Trigeminal NBs	Pain relief for 2 mo
CG	Left facial pain	Trigeminal NBs	Pain relief for 2 mo
RR	Bilateral facial pain	Trigeminal NB	Unknown outcome
ML	Right facial pain	Trigeminal NB	Unknown outcome
EH	Left facial pain	Trigeminal NBs	Pain relief for 2 mo
TH	Left facial pain	Trigeminal NBs	Pain relief for 1 mo
TC	Left facial pain	Trigeminal NBs	Pain relief for 1 mo
MY	Bilateral facial pain	Trigeminal NB	No pain relief
AD	Right facial pain	Trigeminal NB	Unknown outcome
VT	Left facial pain	Trigeminal NBs	Pain relief for 1 mo
RF	Right mouth pain	Trigeminal NB	Pain relief for 1 wk
SD	Right facial pain	Trigeminal NB	Pain relief for 1 mo

Abbreviations: NB, nerve block; RFA, radiofrequency ablation; mo, month; wk, week; d, day.

CONCLUSIONS

Patients with atypical facial pain can be managed with medication, NBs, ablation procedures, neuromodulation, and surgery, in increasing order of invasiveness. For those who fail medical management and are not candidates for invasive procedures/surgical intervention due to medical contraindications, patient preference, and refractory/atypical facial pain cases that are nonresponsive to surgical intervention, NBs are a minimally invasive and widely available option that may provide adequate and durable relief from pain in select patients. Ideally, these would be incorporated into a standardized protocol for the management of chronic facial pain that includes these various options.

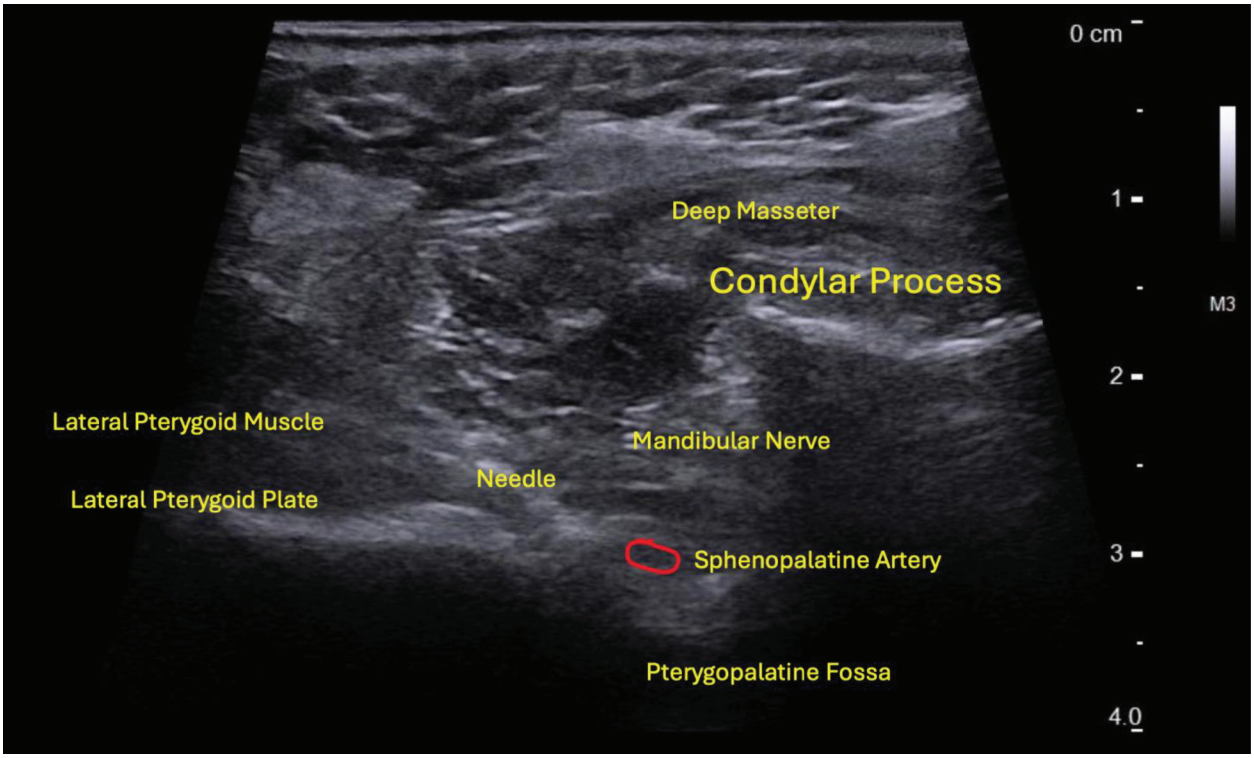

Fig. 1. Ultrasound view of trigeminal ganglion branches emerging from pterygopalatine fossa.

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SUPPLEMENTAL MATERIAL

Description of Ultrasound-Guided Trigeminal Nerve Block Technique

This supplemental material describes the technique developed for ultrasound-guided trigeminal nerve blocks at our clinic. The procedure involves injection into the pterygopalatine fossa with ultrasound guidance. The fossa is visualized bound posteriorly by the palatine plates, medially and anteromedially by the palatine bone, and anteriorly by the maxillary bone. By injecting into this fossa, the injectate can reach all the branches of the trigeminal nerve as it is a relatively compact space, which is in communication with the foramen rotundum. Before becoming an established technique in our clinic, it was validated on a single patient through a combination of fluoroscopy and ultrasound guidance by injecting contrast under live fluoroscopy and observing spread of the contrast into the foramen rotundum.

The procedure begins with the patient positioned supine with the head turned approximately 30° contralateral to the side of the intended block. The proceduralist is positioned on the side of the patient contralateral to the targeted side. The block is performed by injecting a combination of local anesthetic (2-3 mL of 2% lidocaine) and 40-80 mg of methylprednisolone acetate deep into the pterygopalatine fossa using ultrasound guidance. The fossa is visualized using an axial view with a linear probe positioned immediately inferior to the zygomatic bone. Imaging may be improved by having the patient slightly open their mouth to move the coronoid process of the mandible out of the view of the fossa and intended needle path. After injection of a small amount of local anesthetic superficially, an echogenic ultrasound needle is introduced into the skin and advanced with in-plane visualization directing the needle tip deep into the pterygopalatine fossa. After negative aspiration, injection of 1 mL of normal saline is used first to confirm position of the needle. The pterygopalatine fossa does contain blood vessels. To ensure injections were not intravascular, we therefore used an ultrasound needle with a blunt tip and intermittent negative aspiration when proceeding with the delivery of the injectate. Injections are performed at the superior portion of the fossa by having the probe as close to the zygomatic bone as possible while ensuring a view of the fossa. In the inferior part of the fossa lies the greater palatine canal that communicates with the oral cavity. Injection of normal saline can be used to verify with the patient that the injectate does not enter the patient's oral cavity or throat.

This procedure provides several advantages compared to fluoroscopic approaches. It allows direct visualization of the target site as well as visualization of the maxillary nerve and artery, thus decreasing the risk of intraneural or intravascular injections, respectively. The procedure does not require fluoroscopic equipment, exposure of the patient or proceduralist to ionizing radiation, or injection of contrast. Additionally, with an experienced proceduralist, the procedure can be completed in under 5 minutes.