

Brief Commentary

Management of Refractory Trigeminal Neuralgia Using Extended Duration Pulsed Radiofrequency Application

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Trigeminal neuralgia (TN) produces incapacitating facial pain that reduces quality of life in patients. Thermal radiofrequency (RF) ablation of gasserian ganglion (GG) is associated with masseter weakness and unpleasant sensations along the distribution of the ablated nerve. Pulsed radiofrequency (PRF) of GG has minimal side effects but literature is inconclusive regarding its benefit in refractory TN. Increasing the duration of PRF application to 6 minutes in TN produced encouraging results. PRF application to the saphenous nerve for 8 minutes reported improved pain relief and patient satisfaction. We report successful management of two patients of classic TN, which were refractory to medical management and interventional nerve blocks. The lesion site were confirmed with motor and sensory stimulation through a 22 G, 10 cm RF needle with 5 mm active tip. Both the patients received four cycles of PRF at 42 °C with each cycle of 120 seconds (8 minutes). The visual analogue scale (VAS) in case 1 reduced from pre block score of 80 to score 10 postblock, while in case 2 the VAS reduced from pre-block score of 85 to score 15 postblock. During follow up both the patients are now pain free with minimal dose of carbamazepine at 12 and 6 months respectively. We used PRF for longer duration (8 minutes) in these patients, which resulted in improved VAS and WHOQOL-BREF score in these patients. PRF of mandibular division of GG for extended duration provided long-term effective pain relief and quality of life in patients of refractory classic TN.

Key words: Trigeminal neuralgia pain, pulsed radiofrequency ablation, interventional approach

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Trigeminal neuralgia (TN) produces incapacitating facial pain that reduces quality of life in patients. Thermal radiofrequency (TRF) ablation of the gasserian ganglion (GG) is associated with the highest rates of complete pain relief but the beneficial effects are also attended by diminished corneal reflex, masseter weakness or paralysis, dysesthesia, anesthesia dolorosa, keratitis, transient paralysis of cranial nerves III and VI and, in a few patients, permanent cranial nerve VI palsy, carotid-cavernous fistula, and aseptic meningitis may occur (1-3). The advantages of pulsed radiofrequency (PRF) over TRF are its safety, minimal invasiveness, and ability to be used in critically ill patients or in patients that are not willing to have surgery (4). PRF of the GG has minimal side effects but the literature is inconclusive regarding its benefit in refractory TN. Increasing

the duration of PRF application to 6 minutes in TN produced encouraging results (5). Improved pain relief and patient satisfaction was reported with PRF application to the saphenous nerve for 8 minutes (6). We report the successful management of 2 patients with classic TN with an extended duration (8 minutes) of PRF, which were refractory to medical management and interventional nerve blocks.

Case 1

A 70-year-old man presented with a 4 – 5 year history of severe intermittent lancinating pain on the right side of the face in the distribution of the mandibular nerve. The patient was on oral carbamazepine 400 mg thrice daily and gabapentin 300 mg thrice daily but continued to experience pain with a visual analogue scale (VAS) score of 80. Four months

prior the patient had received a mandibular nerve block (local anaesthetic and steroid) but had a relapse of pain after 2 months. On examination the patient had no sensory or motor deficit in the trigeminal nerve region. Blood and other investigations including magnetic resonance imaging (MRI) were normal. The procedure was explained to the patient and a written informed consent was obtained. Under fluoroscopic guidance the foramen ovale was visualized with a submental view and with strict asepsis, a 22 G, 10 cm RF needle with 5 mm active tip was directed towards foramen ovale using a "tunnel view." After eliciting motor stimulation (Cosman Medical Inc., Burlington, MA, USA) in the mandibular nerve territory at (0.8 V, 2 Hz), the RF needle was advanced further until only sensory stimulation was perceived (0.4 V, 50 Hz) and 4 cycles of PRF (42°C, each lasting 120 seconds) of the mandibular root of the trigeminal nerve were applied (Fig. 1). At the end of the procedure dexamethasone, 4 mg, was administered through the RF needle. VAS reduced from a pre-block score of 80 to 10. Post-procedure, the patient received antibiotics, paracetamol, and antacids for 5 days. During follow-up of one year, the patient's general well-being and nourishment improved and became more alert and socially interactive. The patient reported one episode of mild pain on the same site at 8 months but is now pain free with occasional use of carbamazepine. The WHOQOL-BREF (7) score

improved from 76 prior to block to 104 at one year of follow-up with improved quality of life.

Case 2

A 50-year-old man presented with a refractory case of TN on the left side of his face that had lasted 3 – 4 years. He had previously received multiple drugs, several hospital referrals, and interventions for TN twice without relief in symptoms. There was no sensory or motor loss in the trigeminal nerve territory. Medical management included carbamazepine 400 mg thrice daily and gabapentin 300 mg thrice daily, with no relief in symptoms. He appeared mentally depressed, sedated, and unable to concentrate due to side effects. Past history revealed hypertension for 5 years that was controlled on regular treatment. MRI excluded the presence of any tumor or vascular cause of the TN and other investigations were within normal values. The same interventional procedure was followed as described case 1. VAS decreased from pre-block of 85 to 15 after block. During a follow-up of 6 months, the patient remained pain free with carbamazepine 100 mg twice daily. There is a marked decrease in dose of carbamazepine from 1200 mg/day to 200 mg/day with no requirement of gabapentin, which led to improvement in the patient's alertness and quality of life. The WHOQOL-BREF (7) score improved from 80 prior to block to 109 at 6 months with improved quality of life.

The literature describes application of PRF for a lesser duration of (2 minutes) that did not provide long-term benefits (8). In an animal study, PRF treatment was more effective when applied in the early stages of mechanical allodynia (one week). Increasing the exposure time of PRF current from 2 to 6 minutes has shown a significant anti-allodynic effect without motor impairment (9). Earlier attempts at PRF treatment with an increased duration of 4 minutes also provided encouraging results (10). Use of PRF for a longer duration (6 minutes) in 36 patients provided excellent pain relief of $\geq 80\%$ in 55.9% during follow-up of patients at 12 months but with continued medications (5). Van Zundert and coworkers (10) studied 5 patients with TN who received 2 cycles of PRF at 120 seconds each (4 minutes) with an output at 45 V. The pain relief varied from months to years with need of a second PRF of the GG in 2 patients (10). In a retrospective analysis (11) the reasons for ineffective pain relief in patients with idiopathic TN were studied. The authors found that in the "effective pain relief TN group" the patients had received optimized PRF parameters with increased intra-

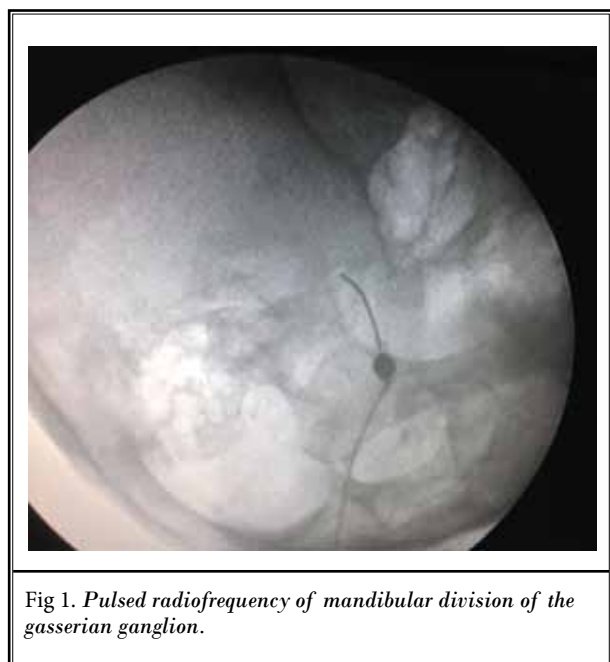


Fig 1. Pulsed radiofrequency of mandibular division of the gasserian ganglion.

operative output voltage (electric field intensity) (11).

Extending the duration of PRF to the GG up to 8 minutes in 2 individual cases of refractory classic TN resulted in long-term pain relief and improved quality of life. The extended benefits of the neuromodulatory

may also have resulted in decreased requirement of carbamazepine. However this requires further evaluation and multi-centric randomized controlled trials to confirm the benefit of extended duration PRF as observed in our patients.

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