CASE REPORT

Management of refractory secondary glossopharyngeal neuralgia with percutaneous radiofrequency thermocoagulation

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ABSTRACT

Glossopharyngeal neuralgia (GN) can present as an orofacial pain syndrome in which there are repeated episodes of intractable pain in the tongue, throat, tonsils and ears. Primary GN is idiopathic, whereas secondary GN has some identifiable cause like tumor invasion that leads to constant irritation of the nerve. Current therapies include pharmacological management, nerve blocks, decompression surgery, and neuromodulation by either medications or pulsed mode radiofrequency. Radiofrequency lesioning of the glossopharyngeal nerve is a minimally invasive technique, which can effectively manage the pain in such patients. Here, we report a case in which secondary GN due to invasive tongue tumor, unresponsive to pulsed mode radiofrequency treatment, was treated with radiofrequency thermocoagulation (RFT).

Key words: Glossopharyngeal neuralgia; Cancer pain; Pain management; Pulsed radiofrequency; Radiofrequency thermocoagulation.

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INTRODUCTION

GN is a rare clinical entity, with a reported incidence of approximately 0.8 per 100,000 people in the general population[1], though incidence is high in patients suffering from oropharyngeal malignancies[2]. The disease is characterized by severe paroxysmal attacks of sharp, intractable pain effecting the sensory distribution of the glossopharyngeal nerve, including the base of the tongue, soft palate, tonsils, pharyngeal pillars, posterior pharyngeal wall, and the inner ear[3-5]. It can be classified by etiology. Primary GN is idiopathic, whereas secondary GN has some identifiable cause like trauma, tonsillectomy, peritonsillar abscess and invasive carcinoma[6]. Treatment varies according to etiology of disease. One of the minimally invasive techniques is radiofrequency lesioning. Pulsed mode radiofrequency lesioning seems to be safe and effective method in treating GN[7]. Another mode of radiofrequency which can be used for the treatment of intractable GN is radiofrequency thermocoagulation (RFT). To our knowledge only two reports in literature describe low temperature RFT of glossopharyngeal nerve[8,9]. We present a case of secondary GN due to invasive tongue carcinoma successfully treated with high temperature percutaneous RFT at 80°C.

CASE REPORT

A 72 year old man developed a growth with ulcers on left border of his tongue six months earlier. Biopsy was done

which confirmed the lesion to be squamous cell carcinoma. MRI showed a large growth involving left posterior part of the tongue and extending into surrounding structures. There was no lymph node involvement and distant metastasis was not appreciated. He received 20 courses of radiotherapy, each with a dose of 55Gy for the tumor. Surgical resection could not be performed due to massive local invasion of tumor into surrounding structures.

The patient was referred to Pain Clinic, Shaukat Khanum Memorial Cancer Hospital & Research Centre to relieve his sharp intractable pain on the left side of his tongue and throat radiating towards left ear. The pain was episodic in nature and severe in intensity with VAS of 9-10. The clinical distribution of pain showed involvement of glossopharyngeal nerve by the invading tumor. Oral medications like morphine, celecoxib, gabapentine and carbamazipine were prescribed which initially provided some pain relief. With the passage of time, the pain became refractory even with total daily dose of 90mg oral morphine.

Pulsed radiofrequency lesioning of glossopharyngeal nerve was planned on day-case basis. Informed consent and intravascular access was taken. Patient was placed supine on operating table and baseline monitors were applied to monitor vital signs non-invasively. Oxygen was administered by nasal cannula. The angle of mandible and mastoid process were marked on left side. Under complete aseptic conditions a skin weal was raised with local anaesthetic midway between the angle of mandible and mastoid process, using a 27 G needle. A blunt 22 G radiofrequency needle with 4mm active tip was introduced until the styloid process was hit. The needle was then walked off posteriorly and advanced another cm. Aspiration was done with a 3ml syringe which was negative for blood and CSF. Sensory stimulation was performed with 0.3mV at 50 Hz which produced paresthesias in the distribution of the glossopharyngeal nerve. Motor stimulation by up to 1mV at 2 Hz produced local muscle contractions. Contractions of muscles innervated by phrenic and spinal accessory nerve were absent. Patient remained hemodynamically stable without any bradycardia and hypotensive episodes during these confirmatory stimulations. Four cycles of pulsed radiofrequency lesioning of 2 Hz with 20 millisecond pulses was performed at 42° C for 2 min. At the end of procedure 20mg triamcinolone and 10mg bupivacaine were injected in a volume of 2.5ml. The patient tolerated the procedure well without any complications. The relief was very good with VAS of 0/10 immediately after the procedure. However, the pain recurred just after 6hrs, gradually increasing in intensity and reaching a VAS of 9-10 after 24 hours.

Keeping in mind the massive local invasion of tissues by tumor and the recurrence of the pain, now RFT of glossopharyngeal nerve was planned. Under aseptic conditions, glossopharyngeal nerve was located with sensory stimulation up to 0.3mV at 50Hz. Motor stimulation of 1mV at 2Hz produced no activity of muscles innervated by phrenic and spinal accessory nerve. The patient remained hemodynamically stable during these confirmatory stimulations. Two cycles of RFT at 80° C for 2 min were performed. After the procedure, he experienced significant pain relief. He was followed up for pain in the next few weeks and showed consistent pain relief with VAS of 0-2.

DISCUSSION

Glossopharyngeal nerve is the 9th cranial nerve which anatomically can be divided into a peripheral segment, root entry zone and a central segment[10]. Chronic neuropathic pain can originate by irritation or damage to any segment of the nerve. Primary GN is most commonly due to microvascular compression of the central segment of glossopharyngeal nerve[10,11]. Malignancy, trauma, tonsillectomy, peritonsillar abscess and an elongated styloid process are the common causes that can lead to irritation and damage to peripheral segment of glossopharyngeal nerve causing neuropathic pain in the peripheral distribution of nerve termed as secondary GN [6,12]. Tongue carcinoma has been mentioned as an etiology of secondary GN[12].

Both primary and secondary GN present in the same way[6]. There are sharp, stabbing pulses of pain in the back of the throat, tongue, the tonsils, and the middle ear. The excruciating pain of GN can last for a few seconds to a few minutes, and may return multiple times in a day or once every few weeks[13]. Many individuals with GN relate the attacks of pain to specific trigger factors such as swallowing, drinking cold and hot liquids, sneezing, coughing, talking, clearing the throat, and touching the gums or inside the mouth[14]. Some cases of GN are also associated with cardiovascular compromise. Bradycardia, arrhythmia, hypotension, cardiac syncope, and asystole have all been related to attacks of neuralgia[15].

Treatment for GN can be divided into pharmacological and interventional management. Several classes of drugs have been used like carbamazepine, gabapentine, diazepam, phenytoin, amitriptyline, phenobarbital and baclofen[16,17]. Carbamazepine and gabapentine are anticonvulsant drugs that can be effective in suppressing painful paroxysms, although spontaneous remissions are common, the relapses may become refractory to drug therapy[18]. Intolerable side effects and difficulty with oral intake also lead to poor patient compliance.

Interventional options, including peripheral nerve resection, rhizotomy, styloidectomy, microvascular decompression or percutaneous radiofrequency techniques, are considered when individuals either do not respond to, or stop responding to drug therapy[18]. Peripheral nerve resection and surgical rhizotomy are not very effective methods and are related with high incidence of recurrent pain and morbidity[19]. Microvascular decompression is successful method for treatment of primary type of GN and produce long term outcomes[20]. But microvascular decompression is a surgical procedure requiring craniotomy that is itself associated with 5% mortality[21].

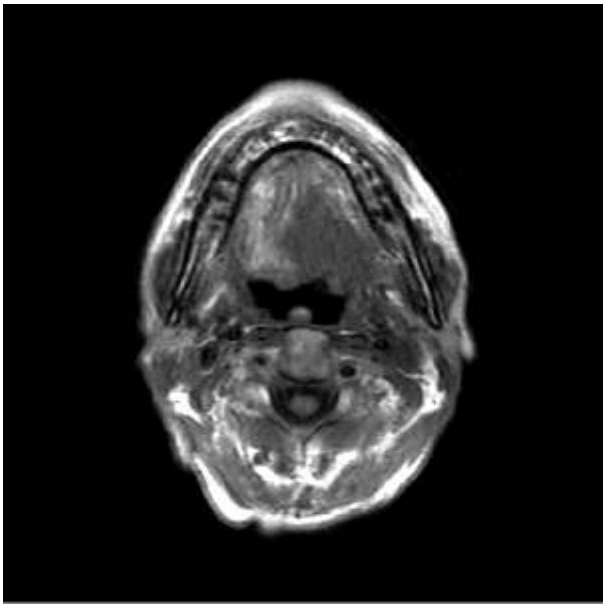
Percutaneous radiofrequency techniques seem to be a safe, effective approach for treating both primary and secondary types of GN. It is possible that if the condition is secondary, the clinical response may be greater in intensity and lasts longer[7]. Radiofrequency technique involves placement of an insulated needle with an active tip in the vicinity of a nerve or ganglion. A grounded electrode is passed through the cannula and radiofrequency current is emitted at the tip of the needle. There are two types of radiofrequency lesioning that are used clinically: RFT and pulsed radiofrequency lesioning. In the conventional RFT method a constant output of high frequency current produces temperatures > 45° C. The heat production associated with this technique is neuroablative. Alternatively, in pulsed radiofrequency method brief pulses of high voltage electric current are used. Pauses between the pulses allow heat to dissipate and thus less nerve destruction occurs. The temperature with pulsed radiofrequency generally does not exceed 42° C [22]. The exact mechanism of action of pulsed radiofrequency is unknown, as temperature below 45° C do not cause irreversible damage to neural tissue[23]. It has been proposed that pulsed radiofrequency may act by modulating pain perception rather than directly destroying neural tissue[24].

In our patient with refractory GN due to invasion of peripheral segment of the nerve, pulsed radiofrequency lesioning failed to produce significant pain relief by modulating the nerve. Therefore, in the next step RFT was tried. Percutaneous raRFT of glossopharyngeal nerve may be useful for the treatment of intractable GN and not associated with significant neurological and cardiovascular complications in debilitated cancer patients[9]. In our review of literature we found that previously low temperature had been used for RFT of glossopharyngeal neuralgia to avoid injury to the vagus nerve[8,9]. Due to short life expectancy and massive local invasion of surrounding structures by the carcinoma, we used high temperature i.e. 80° C, which produced good pain relief without any significant hemodynamic complications. However, larger studies are needed to prove the safety and efficacy of high temperature percutaneous rRFT in refractory secondary GN due to oropharyngeal carcinomas.

CONCLUSION

Percutaneous RFT with high temperature may be beneficial for providing significant pain relief in selected group of patients with refractory GN due to invasive oropharyngeal malignancies.

Figure 1: MRI showing growth in left posterior part of tongue extending into surrounding structures.



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