

CASE REPORT

Case of Difficult Identification of Foramen Ovale: Radiofrequency Ablation of Gasserian Ganglion for Trigeminal Neuralgia Secondary to Squamous Cell Carcinoma in a Posthemimandibulectomy, Hemimaxillectomy Patient

¹Ravi S Sharma, ²Gautam Das, ³Tasrif Hamdi

ABSTRACT

Oral squamous cell carcinoma (SCC) represents 90 to 95% of all malignant neoplasms of the oral cavity. Squamous cell carcinoma occurs in several well-established intraoral sites, including the floor of mouth, tongue, gingiva, lips, and buccal mucosa. It might also present in the tooth-bearing segment of either the maxilla or mandible. We report a case of a 56-year-old female posthemimandibulectomy, hemimaxillectomy patient secondary to SCC involving the maxilla, mandible, and buccal mucosa. Patient presented with chief complaints of electric shock-like sensation along the distribution of trigeminal nerve. These symptoms were aggravated during exposure with cold winds and during conversation. This facial pain was resistant to medications like carbamazepine. So radiofrequency ablation of Gasserian ganglion via foramen ovale was planned. Patient had near-complete relief of symptoms after culmination of the procedure.

Keywords: Gasserian ganglion, Squamous cell carcinoma, Trigeminal neuralgia.

How to cite this article: Sharma RS, Das G, Hamdi T. Case of Difficult Identification of Foramen Ovale: Radiofrequency Ablation of Gasserian Ganglion for Trigeminal Neuralgia Secondary to Squamous Cell Carcinoma in a Posthemimandibulectomy, Hemimaxillectomy Patient. *J Recent Adv Pain* 2017;3(2):105-107.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Trigeminal neuralgia is a severe, almost exclusively unilateral neuropathic pain located within distribution of the trigeminal nerve manifesting as paroxysmal high-intensity jabs or stabs lasting seconds. The pain is often characterized as an “electric shock” and is typically

accompanied by a unilateral grimace, hence, the designation “tic douloureux.” The neurologic examination is almost always normal. Etiology can be compression by vascular loop (classically) or by major neurological condition (secondary), such as tumor or multiple sclerosis. We report an unusual case of trigeminal neuralgia where patient presented with squamous cell carcinoma (SCC) in whom hemimandibulectomy and hemimaxillectomy were performed and identification of foramen ovale was difficult to accomplish. The patient was treated successfully with radiofrequency (RF) ablation of Gasserian ganglion with near-complete relief of pain.

CASE REPORT

A 56-year-old female with SCC in whom hemimandibulectomy and hemimaxillectomy were performed presented with severe electric shock-like pain (numeric rating scale 8) on the right side of face/cheek for last 2 weeks (Fig. 1). Pain was present in the right mandibular and maxillary region including right ear and tongue. This patient had also underwent chemotherapy and radiotherapy for alveolar cancer. This pain was aggravated by cold winds and on conversations. Neurological examination was unremarkable. Magnetic resonance



Fig. 1: Right side of patient's face posthemimandibulectomy and hemimaxillectomy

¹Fellow, ²Director, ³Lecturer

^{1,2}Daradia: The Pain Clinic Kolkata, West Bengal, India

³Department of Anesthesia and Intensive Therapy, Medical School University of North Sumatera, Indonesia

Corresponding Author: Ravi S Sharma, Fellow, Daradia: The Pain Clinic Kolkata, West Bengal, India, e-mail: drravishankarsharma4u@gmail.com,

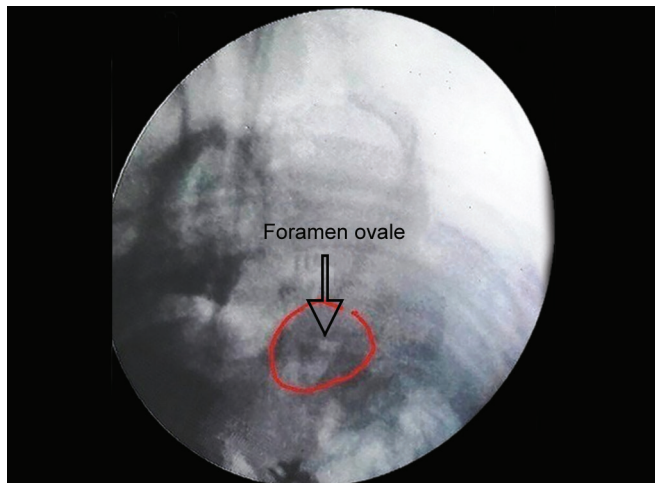


Fig. 2: Submental view of right foramen ovale

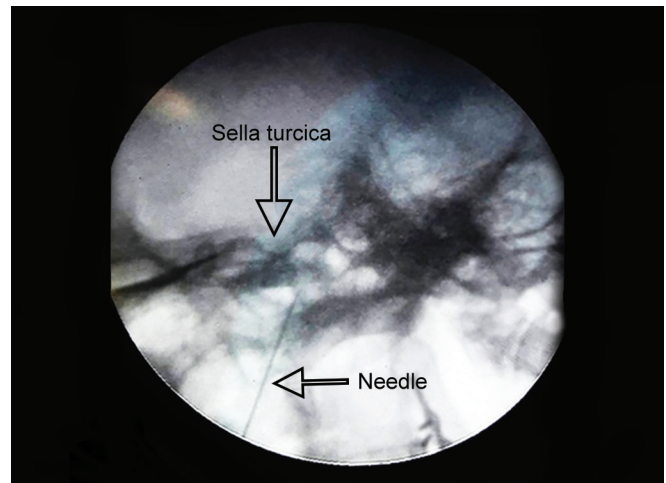


Fig. 3: Needle position in lateral view targeting toward the junction of clivus and petrous part of temporal bone

imaging revealed absence of vascular loop. For this complaint, initially patient was prescribed with carbamazepine tablet along with fentanyl patch 25 µg but the pain relief was inadequate. Later, oral morphine was also prescribed, but the pain relief was not satisfactory. Radiofrequency ablation of Gasserian ganglion was planned. Under all aseptic precautions, identification of foramen ovale was done using standard procedure and standard equipment. Patient was placed in supine position with neck extended with the help of a folded towel underneath the shoulder, and submental view of right foramen ovale was identified under fluoroscopic guidance (Fig. 2). Local anesthetic was injected to raise a skin wheal to provide pain relief during needle introduction. Thereafter, 25 G spinal needle was introduced toward foramen ovale and tract was infiltrated with 1% lidocaine. After anteroposterior (AP) view, we confirmed the needle position with lateral view to make sure that our needle was targeting toward the junction of clivus and petrous part of temporal bone (Fig. 3).

After AP view, we confirmed the needle position with lateral view to make sure that our needle was targeting toward the junction of clivus and petrous part of temporal bone.

Before RF lesioning, sensory and motor stimulation was done. Sensory stimulation was 0.6 V and 50 Hz. Motor stimulation was performed at 1 V and 2 Hz. Test stimulation proved to be a tough task as there was absence of mandible and maxilla. After test stimulation, 0.5 mL of 1% lignocaine was given followed by six cycles of RF ablation of Gasserian ganglion.

We did six cycles of lesioning with every cycle lasting for 90 seconds. First and second cycle: 90 seconds at 70°C, third and fourth cycle: 90 seconds at 75°C, fifth and sixth cycle: 90 seconds at 80°C. At the end of procedure, dexamethasone 2 mg was injected locally.

DISCUSSION

Trigeminal neuralgia is a sudden, usually unilateral, severe stabbing recurrent pain in the distribution of one or more branches of the fifth cranial nerve.¹ Trigeminal nerve supplies sensation to most of the scalp, face, teeth, oral cavity, anterior and middle cranial fossa, tooth pulp, gingival, periodontal membrane, and nasal cavity.² Symptoms of trigeminal neuralgia are caused by demyelination of the nerve leading to ephaptic transmission of impulses. Demyelinated axons are prone to ectopic impulses, which may transfer from light touch to pain in the fibers present in close proximity (ephaptic conduction).³ Pain arising from this nerve is very intense, and can be affecting more than one area because of multiple innervations in the face, and it represents irritation of the nerve along the course. Etiology of the pain may be due to contact between a healthy artery or vein and the trigeminal nerve at the base of the brain (classical trigeminal neuralgia). This places pressure on the nerve as it enters the brain and causes the nerve to misfire. Other causes of trigeminal neuralgia include tumor-suppressing nerve or multiple sclerosis, which damage the myelin sheath (symptomatic trigeminal neuralgia).^{4,5} Trigeminal neuralgia can involve any segment of the nerve, from its central origins to its peripheral branches. Also, trigeminal neuralgia can mimic dentoalveolar disease, as it did in this patient's case. Most of the tumors that may lead to the origin of trigeminal neuralgia (acoustic and trigeminal schwannomas, meningiomas, epidermoid cysts, lipomas, and metastases) are generally located in the posterior cranial fossa.⁵ This patient had SCC involving buccal cavity along with the bones. Oral SCC represents 90 to 95% of all malignant neoplasms of the oral cavity. Oral SCC occurs in several well-established intraoral sites, including the floor of mouth, tongue (most common), gingiva, lips, and buccal mucosa. It might also

present in the tooth-bearing segment of either the maxilla or the mandible, with bony involvement. It is typically associated with the mandible or the maxilla but will slowly invade the underlying tissues after its onset.⁶ Our hypothesis was that the trigeminal neuralgia symptoms are secondary because of tumor spreading to adjacent area along the course of nerve. So, for this patient, pain management was a form of palliative care.

This patient had multiple pain generators, ranging from irritation of trigeminal nerve itself to cancer, RF, chemotherapy procedure, and chronic pain because of postoperative procedure. Because of presence of more than one pain generator and absence of mandible and maxilla postoperatively, pain management for this patient was very difficult. Surgery, chemotherapy, and radiotherapy are forms of therapy in cancer patients that can cause persistent pain in survivors and up to 50% of whom may experience persistent pain that adversely affects their quality of life. Chronic pain following cancer surgeries may occur in up to 50% of patients.⁷ But, the presenting complaint with this patient was pain along distribution of trigeminal nerve (on the right side of remaining face/cheek) areas for 2 weeks. Pain was also there in right mandibular and maxillary region including right ear and tongue.

The pharmacological therapy was done but there was no significant pain relief so we decided to perform RF ablation of Gasserian ganglion.

But the problem with this patient was difficulties in identification of foramen ovale because the structure surrounding foramen has been removed, i.e., she was a postright hemimandibulectomy hemimaxillectomy patient. Normally, the foramen ovale is located in the greater wing of the sphenoid bone, posterior and lateral to the foramen rotundum.⁸ Mean length of foramen ovale is 6.5 mm. Maximum and minimum length observed is 10 and 3 mm respectively. Mean width on right side is 3.55 mm. Maximum width of foramen ovale is 7.0 mm. Minimum width is 2.0 mm.⁹ But in real situation, using C-arm guidance, finding foramen ovale and its dimensions with sphenoid bone and foramen rotundum as a marker is a very strenuous task⁸ using fluoroscopic guidance because the C-arm picture only represents two dimensions and also pictures were overlapping.

For this patient, first we placed the patient in supine position with mouth open and neck extended using folded towels underneath her shoulder. Using C-arm caudal tilt and oblique rotation, submental view was obtained. Finally, foramen ovale was identified after multiple rotation and exposures and RF ablation of Gasserian ganglion was done. Normally, foramen ovale is situated at the posterior border of greater wing of sphenoid.⁹ In normal patients having maxilla and mandible, it is easy to locate foramen ovale. Using fluoroscopic guidance, foramen ovale will appear like "rising sun" in the space between mandible and maxilla.

CONCLUSION

In cancer patients, identification of foramen ovale for RF ablation of Gasserian ganglion is difficult because of distortion of normal anatomy. Adequate anatomical and equipment knowledge along with great deal of experience is utmost requirement for identification of foramen ovale in such patients.

REFERENCES

1. Nurmikko TJ, Eldrige PR. Trigeminal neuralgia pathophysiology, diagnosis, current treatment. *Br J Anesth* 2001 Jul;87(1):117-132.
2. Joshi M. Text book of pain management. 3rd ed. New Delhi: Paras Medical Publisher; 2014.
3. Krafft RM. Trigeminal neuralgia. *Am Fam Physician* 2008 May;77(9):1291-1296.
4. The Facial Pain Association. Trigeminal neuralgia. American Association of Neurological Association. Gainesville (FL): The Facial Pain Association; 2012. Available from: <http://www.facingfacialpain.org/>.
5. Klieb HB, Freeman BV. Trigeminal neuralgia caused by intracranial epidermoid tumour: report of case. *J Can Dent Assoc* 2008 Feb;74(1):1001-1003.
6. Mehanna P, Smith G. Maxillary carcinoma: a wolf in sheep's clothing. *Can Fam Physician* 2009 Mar;55(3):262-264.
7. The British Pain Society's. Cancer pain management. *Br Pain Soc* 2010 Jan;7:1-115.
8. Skrzat, J, Walocha J, rodek W, Ni ankowska A. An atypical position of the foramen ovale. *Folia Morphol* 2006 Sep;65(4):396-399.
9. Roma P, Mehta CD. Morphometry of foramen ovale at base of skull in Gujarat. *IOSR J Dent Med Sci (IOSR-JDMS)* 2014 Jun;13(6):26-30.