ejpmr, 2022, 9(9), 401-403

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Case Study

ISSN 2394-3211

EJPMR

PULSED RADIOFREQUENCY ABLATION OF SPHENOPALATINE GANGLION FOR MOLAR TOOTH PAIN

Dr. Garima Dabas*[1] and Dr. Sahil Gupta[2]

[1]Junior Resident, Department of Anaesthesia and Critical Care, IGMC Shimla.
[2]Junior Resident, Department of General Medicine, IGMC Shimla.

***Corresponding Author: Dr. Garima Dabas**

Junior Resident, Department of Anaesthesia and Critical Care, IGMC Shimla.

Article Received on 21/07/2022 **Article Revised on 11/08/2022** **Article Accepted on 01/09/2022**

ABSTRACT

Sphenopalatine ganglion is the largest collection of neurons in the calvarium outside of the brain. Over the past century, it has been a target for interventional treatment of head, tooth and facial pain due to its ease of access. Block, radiofrequency ablation, and neurostimulation have all been applied to treat a myriad of painful syndromes. RFA of SPG has widely been used for treatment of cluster headaches but very less literature is available that describes its usefulness in molar toothaches. This article describes the role of pulsed RFA of SPG in upper molar tooth pain.

KEYWORDS: Sphenopalatine, radiofrequency, pulse, molar tooth.

INTRODUCTION

The SPG is an autonomic ganglion, communicating with the first and second division of the trigeminal nerve, the facial nerve, and the carotid plexus. It is also known as Meckel's ganglion, the pterygopalatine ganglion (PPG), and the nasal ganglion. It is situated in the pterygopalatine fossa; this is a small pyramidal space, upside down, 2 cm high and 1cm wide, situated behind the posterior wall of the maxillary sinus, anterior to the medial plate of the pterygoid process, and lateral to the perpendicular plate of the palatine bone; superiorly, the pterygopalatine fossa is limited by the sphenoid and laterally it communicates with the infratemporal fossa. Superiorly, the fossa communicates with the orbital apex through which some nerve branches reach the lacrimal gland. The posterior wall of the fossa has three important openings: superolaterally the foramen rotundum, which transmits the second branch of the trigeminal nerve; infero-medially the Vidian (pterygoid) canal, related to the anonimus nerve (Deep and Greater petrosal nerves) and the pterigovaginal canal [pharyngeal canal].

The SPG is located posterior to the middle turbinate and is few millimeters deep to the lateral nasal mucosa.

The ganglion has sensory, motor and autonomic components, but the most representative fibers are parasympathetic, which inputs derive from the superior salivatory nucleus (SSN) in the brainstem. The preganglionic parasympathetic fibers pass through the intermediate nerve and reach the PPF by the greater superficial petrosal nerve (GSPN) across the Vidian channel. The GSPN also carries the gustatory sensitivity that reaches the palate through the palatine major in inferior channels. The parasympathetic secretomotor fibres synapse in the SPG and the postsynaptic fibres distribute to the mucous membrane of the nose, soft palate, tonsils, uvula, roof of the mouth, upper lip and gums, upper part of the pharynx, lacrimal gland, and meningeal vessels.

For its innervation, both sympathetic and parasympathetic, the SPG is believed to play a part in the headache pain and cranial autonomic symptoms associated with cluster headache, which is a result of activation of the trigeminal-autonomic reflex. In 1908 Sluder was the first to highlight the role of the SPG in neuralgic syndromes of the face. Sluder reported that patients who had refused surgery for an active ethmoido-sphenoidal inflammation, developed sphenopalatine ganglion neuralgia (SPGN) later. Thus, Sphenopalatine ganglion neuralgia or Sluder's neuralgia (SPGN) is a type of facial neuralgia, defined as a complex symptom consisting of neuralgic, motor, sensory, and gustatory manifestations. SPGN refers to intermittent episodes of vasomotor hyperactivity causing conjunctival injection, lacrimation, serous nasal discharge sensory disturbances of the palate and oropharynx with distorted gustatory sensations.

Therapies that target the SPG have been used with increasing frequency since the beginning of the 20th century.[8] Modern therapies primarily include SPG block and radiofrequency ablation (RFA) of the SPG. These treatment modalities have been studied with promising evidence of effectiveness in the treatment of

Cluster Headache (CH), migraines, and trigeminal neuralgia. Blockade and ablation of the SPG have also been studied to a lesser degree in cases of upper tooth ache, postherpetic neuralgia, head and neck cancer pain, postoperative analgesia after endoscopic sinus surgery, and atypical facial pain syndromes.[2,9,10] Hence, with our case of 30 year old patient, we illustrate the usefulness of SPG ablation using pulsed radiofrequency in case of resistant upper molar tooth pain despite tooth extraction.

CASE REPORT

A 30 year old female presented in the pain clinic with pain in the right upper 1st molar tooth. After getting her tooth extracted, the pain aggravated. Pre procedure VAS was noted as 8-9/10. Hence, she was posted for pulsed radiofrequency ablation (PRFA) of sphenopalatine ganglion. In the OT, she was placed in the supine position. Intravenous line attached with 18 Gauge cannula and spO2 probe and NIBP were attached. Then, sterile prepping and drapes were applied to the right side of the face. A lateral fluoroscopic view of the face was obtained using a C-arm by superimposing the mandibular rami on top of one another. The skin above the mandibular notch was anaesthetized using 2 ml of 2% inj. lignocaine. A 10 cm curved blunt 22 gauge spinal needle was advanced in a superior and medial direction toward the pterygopalatine fossa under fluoroscopy. An intermittent anteroposterior (AP) view was obtained to assess needle depth that was adjacent to the ipsilateral nasal wall. 0.5-1 mL of non ionic, water-soluble contrast was injected under continuous fluoroscopy to rule out intravascular uptake and intranasal spread. Once proper needle placement is confirmed, The sensory stimulation was checked by keeping the voltage at 0.2 V and frequency at 50 Hz and width at 1 ms and keeping the needle at the same point, the motor stimulation was checked by keeping the frequency at 2 Hz and width at 1 ms and increasing the voltage to up to 2 V. After that, the LA with inj. 2% lignocaine was given through the same needle and RF ablation electrode was attached to complete the electrical loop and Pulse RFA process was started. In this, the radiofrequency currents were cycled for 20 milliseconds, at 2 Hz, for 120 seconds. The voltage was controlled so that the highest temperature remained below 42 degrees Celsius. This was done to avoid any damage to the spinal motor nerves. After completion of the procedure, 0.5 ml of 2% lignocaine was again injected to reduce the chances of neuritis. The post procedure VAS score was again noted which came out to be 1-2/10. Patient was then shifted to the post anaesthesia recovery room. The recovery was smooth and uneventful.

DISCUSSION

RFA of the SPG seeks to extend the pain relief achieved by SPG blockade. RFA is a valuable and potentially longer lasting option for patients who respond favourably to SPG blocks.[12]

RFA of the SPG can result in temporary or, in rare cases, permanent hypoesthesia or dysesthesia of the palate, maxilla, or posterior pharynx. Interestingly, reflex bradycardia has been reported during radiofrequency lesioning that could be explained by the rich parasympathetic connections in the SPG.[26] Choosing pulsed radiofrequency vs conventional thermal ablation may help to reduce these effects; however, limited evidence is available.[27-29] Narouze et al conducted a prospective cohort study in which 15 patients suffering from chronic CHs underwent SPG RFA.[9] Using a fluoroscopically guided infrazygomatic approach, 0.5 mL of lidocaine was injected, and 2 RF lesions were performed at 80°C for 60 seconds each, followed by the injection of 0.5 mL of 0.5% bupivacaine and 5 mg of triamcinolone post ablation. The study reported statistically significant improvement in attack intensity, frequency, and pain disability index at interval follow-ups through 18 months.

RFA of the SPG has also been used in myriad other head and facial pain disorders, including Sluder neuralgia, posttraumatic headache, atypical trigeminal neuralgia, atypical facial pain, chronic facial pain secondary to cavernous sinus meningioma, trigeminal neuralgia, and SPG neuralgia attributable to herpes zoster. Akbas et al published a case series of 27 subjects with various types of head and facial pain.[29] Pain was completely relieved in 35% of cases, moderately relieved in 42%, and ineffective in the remaining 23% undergoing RFA.

CONCLUSION

The SPG has been a therapeutic target for headache and facial pain disorders for more than a century. While these methods also have promising evidence for use in upper tooth pains resistant to other treatment, migraines, trigeminal neuralgias, and postoperative pain associated with sinus surgeries, more large-scale, randomized controlled trials are warranted if these techniques are to become standards of care. Emerging techniques, such as neuromodulation of the SPG, are available and may provide a cost-effective reliable option for treatment of a variety of tooth and facial pain conditions.

ABBREVIATIONS

AP-anteroposterior
CH-Cluster Headache
GSPN-greater superficial petrosal nerve
NIBP- Non Invasive Blood Pressure
OT- Operation theatre
PPG-pterygopalatine ganglion
PRFA-pulsed radiofrequency ablation
RFA-radiofrequency ablation
SSN- superior salivatory nucleus
SPG- Sphenopalatine ganglion
SPGN-sphenopalatine ganglion neuralgia
sPO2- saturation of peripheral oxygen

REFERENCES

1. Ho KWD, Przkora R, Kumar S. Sphenopalatine ganglion: block, radiofrequency ablation and neurostimulation - a systematic review. *J Headache Pain*, 2017. December 28; 18(1): 118.
2. Sluder G. The anatomical and clinical relations of the sphenopalatine (Meckel's) ganglion to the nose and its accessory sinuses.
3. Narouze S, Kapural L, Casanova J et al. Sphenopalatine ganglion radiofrequency ablation for the management of chronic cluster headache. *Headache*, 2009. April; 49(4): 571-7.
4. Zanella S, Buccelletti F, Franceschi F, et al. Transnasal sphenopalatine ganglion blockade for acute facial pain: a prospective randomized case-control study. *Eur Rev Med Pharmacol Sci*., 2018. January; 22(1): 210-6.
5. Narouze S, Kapural L, Casanova J et al. Sphenopalatine ganglion radiofrequency ablation for the management of chronic cluster headache. *Headache*, 2009. April; 49(4): 571-7.
6. Naouze SN. Sphenopalatine ganglion block and radiofrequency ablation. In: Narouze SN, ed. *Interventional Management of Head and Face Pain: Nerve Blocks and Beyond*. New York, NY: Springer Science, 2014: 47-52.
7. Konen A. Unexpected effects due to radiofrequency thermocoagulation of the sphenopalatine ganglion: two case reports. *Pain Digest*, 2000; 10: 30-3.
8. Bayer E, Racz GB, Miles D et al. Sphenopalatine ganglion pulsed radiofrequency treatment in 30 patients suffering from chronic face and head pain. *Pain Pract*, 2005. September; 5(3): 223-7.
9. Narouze S. Complications of head and neck procedures. *Tech Reg Anesth Pain Manag*, 2007. July; 11(3): 171-7.
10. Akbas M, Gunduz E, Sanli S et al. Sphenopalatine ganglion pulsed radiofrequency treatment in patients suffering from chronic face and head pain. *Braz J Anesthesiol*, 2016. Jan-Feb; 66(1): 50-4.