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Case Report

Case Report: Radiofrequency Pulsed Therapy for Glossopharyngeal Neuralgia with Associated Syncope

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Abstract

Glossopharyngeal neuralgia (GPN) is characterized by paroxysmal, severe, and lancinating pain at the base of the tongue and throat on one side, often radiating to the oropharynx or ear. The intensity of the pain can be debilitating and, in severe cases, may be accompanied by potentially life-threatening conditions such as cardiac arrhythmias and syncope, significantly impacting the patient's quality of life. The incidence of GPN is low, and there is limited clinical awareness and understanding of the condition, leading to a high rate of misdiagnosis. In recent years, pulsed radiofrequency has emerged as an effective and minimally invasive treatment modality for the management of GPN. We report a case of a 56-year-old male patient with recurrent glossopharyngeal neuralgia accompanied by syncope. The patient tested positive for the topical application of local anesthetics, and cranial nerve magnetic resonance imaging (MRI) revealed compression of the right glossopharyngeal nerve by a small blood vessel. Both 24-hour Holter monitoring and video electroencephalography (EEG) showed no abnormalities. In addition to treatment with carbamazepine and pregabalin, the patient's pain as well as syncope resolved after two sessions of CT (ComputedTomography)-guided pulsed radiofrequency (PRF) therapy of the glossopharyngeal nerve. Clinicians should be aware of the rare clinical occurrence of glossopharyngeal neuralgia with syncope. PRF is a measure of safe and effective which could be considered the first choice for minimally invasive therapy.

Keywords

Glossopharyngeal Neuralgia, Syncope, Pulsed Radiofrequency

1. Introduction

Glossopharyngeal neuralgia (GPN) is a rare cranial nerve disorder characterized by deep, stabbing pain lasting several seconds in the distribution area of the glossopharyngeal nerve, occasionally radiating to the ear. Some patients may experience bradycardia, cardiac arrest, convulsions, or even life-threatening syncopal episodes. A 52-year-old male patient presented with recurrent episodes of brief yet severe pain in the right base of the tongue, pharynx, and ear, accompanied by recurrent syncope. He was diagnosed with glossopharyngeal neuralgia. Despite thorough investigation, the etiology of the patient's recurrent syncope remained elusive. To elucidate the cause, we conducted 24-hour Holter monitoring and video electroencephalography (EEG), both of which yielded no abnormal findings. Based on the absence of cardiac or neurological anomalies, we attributed the episodes to vasovagal syncope. Following two sessions of pulsed radiofrequency modulation of the glossopharyngeal nerve, the patient experienced significant pain relief and no

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further syncopal episodes. Glossopharyngeal neuralgia accompanied by syncope is clinically rare and prone to misdiagnosis and mistreatment. In addition to conventional pharmacological treatments and microvascular decompression, minimally invasive pulsed radiofrequency therapy offers significant benefits, including high efficacy, simplicity of the procedure, low cost, and minimal damage. It can be considered one of the preferred options for invasive treatment.

2. Case Description

A 52-year-old male presented with severe pain in the right base of the tongue and pharynx, accompanied by intermittent loss of consciousness for six months. The pain was paroxysmal and stabbing, occurring 3-4 times daily, each episode lasting about two hours. It was triggered by chewing, swallowing, sneezing, or wide mouth opening. During pain episodes, the patient occasionally experienced profuse sweating, neck muscle stiffness, right-sided hearing loss, followed by loss of consciousness. There were no symptoms of dyspnea, generalized convulsions, nausea, vomiting, or incontinence. Syncope lasted from a few seconds to several minutes and resolved spontaneously. No neurological sequelae were observed after pain relief. Long-term oral treatment with carbamazepine, sustained-release lofepramine, and mecobalamin was ineffective. The patient had a history of type 2 diabetes for over four years and hypertension.

His physical examination revealed that touching the right base of the tongue and posterior pharyngeal wall induced pain and general weakness. The right pharyngeal reflex was diminished. Other examinations as well as routine laboratory testing was unremarkable. The The 24-hour Holter monitoring and continuous video EEG was normal, without arrhythmias and epileptiform changes and no change in EEG pattern even during the syncopal events. Cranial nerve hydrographic MRI indicated the anterior inferior cerebellar artery (AICA) closely adhering to and compressing the right glossopharyngeal nerve root (Figure 1). The diagnoses were made as follows: 1. Glossopharyngeal neuralgia; 2. Type 2 diabetes mellitus; 3. Grade 2 hypertension: very high risk.

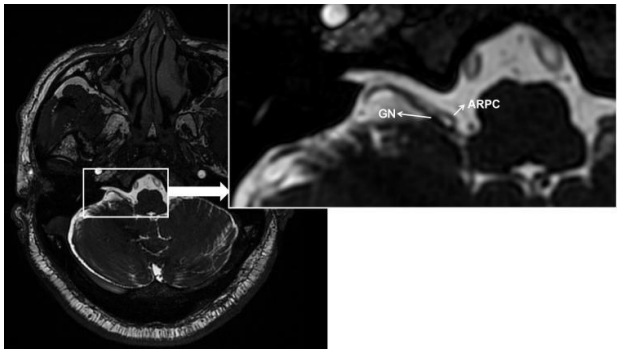

Figure 1. *Magnetic resonance cranial nerve hydrography revealed that the right glossopharyngeal nerve was closely adhered to and compressed by the anterior inferior cerebellar artery (AICA).*

While continuing treatment with carbamazepine, pregabalin, and mecobalamin, the patient underwent two sessions of right-sided glossopharyngeal nerve radiofrequency modulation (42 ℃, 85V), each lasting 15 minutes (Figure 2). Additionally, 10 ml of a mixture of lidocaine, mecobalamin, and methylprednisolone was injected into the middle segment of the styloid process. Three days after the first procedure, the patient reported a globus sensation in the right posterior pharyngeal wall, which did not affect swallowing. There was no pain induced by eating, chewing, or opening the mouth widely. On the fourth day postoperative, the patient experienced mild pain when swallowing, but no syncope occurred. After the second procedure, the patient reported complete pain relief, with a dull sensation in the posterior pharyngeal wall. Physical examination showed that the pain trigger points at the right base of the tongue and posterior pharyngeal wall had disappeared. Sensation in the right posterior pharyngeal wall was reduced compared to the left side, and the right pharyngeal reflex was absent. No other abnormalities were observed. Six months after discharge, the patient reported a persistent abnormal sensation in the right posterior pharyngeal wall but had no recurrent paroxysmal pain or syncope.

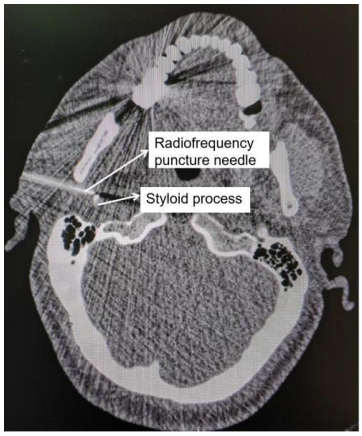

Figure 2. *Under CT guidance, the radiofrequency needle was advanced near the middle segment of the styloid process. Pulsed radiofrequency treatment was initiated after inducing abnormal sensations in the area supplied by the glossopharyngeal nerve.*

3. Discussion

Glossopharyngeal neuralgia (GPN) is a type of paroxysmal neuralgic pain occurring in the distribution area of the glossopharyngeal nerve. It was first described by Harris in 1921 [1]. GPN is rare, accounting for only 0.2% to 1.3% of craniofacial pain syndromes, with an annual incidence of 0.2 to 0.8 per 100,000 people [2]. In severe cases, it may be accompanied by tinnitus, hearing loss, bradycardia, or even syncope [3, 4]. The glossopharyngeal nerve originates from the medulla and travels alongside the vagus and accessory nerves. The carotid sinus branch of the glossopharyngeal nerve (Hering's nerve) is connected to the vagus nerve, with

small communicating nerve fibers that may cause cross-interaction. It is currently believed that the syncopal symptoms of GPN may be related to vagal stimulation caused by excessive impulses from the carotid sinus branch, achieved through direct branch connections or reflex pathways between the medullary vagal nuclei [5]. There have been reports of GPN attacks causing frequent sinus arrest and syncope, requiring treatment with a cardiac pacemaker [6]. In this case, the patient experienced transient loss of consciousness several times following severe pain in the glossopharyngeal area. Given the patient's history of hypertension and diabetes, it was necessary to exclude cardiogenic and neurogenic syncope. However, 24-hour Holter monitoring, cardiac ultrasound, and video EEG showed no positive findings, leading to the consideration of syncope purely due to glossopharyngeal-vagal nerve stimulation.

GPN can be classified as primary or secondary based on etiology. The former has an unknown cause; Amthor and Reddy suggest it may be due to microvascular compression, leading to demyelination of the glossopharyngeal and vagus nerves, causing short-circuiting between their fibers and resulting in pain [7, 8]. The latter is often triggered by irritants to the glossopharyngeal nerve, such as cerebellopontine angle tumors, arachnoiditis, vascular diseases, nasopharyngeal tumors, or Eagle's syndrome, leading to pain in its distribution area. Wang Xiaoqiang et al. [9] reported that in 20 cases of primary glossopharyngeal neuralgia, the responsible vessels were found under the microscope. In this case, cranial nerve hydrographic MRI revealed a small blood vessel closely adhering to and compressing the right glossopharyngeal nerve root, leading to the diagnosis of primary glossopharyngeal neuralgia.

The treatment of glossopharyngeal neuralgia (GPN) can be divided into conservative and surgical approaches. Commonly used medications for conservative treatment include carbamazepine, pregabalin, phenytoin, and mecobalamin, which aim to reduce neural excitability and nourish the nerves. Medication therapy often requires a prolonged course and gradual tapering [10]. If conservative treatment is ineffective, surgical intervention is indicated. Major surgical options include microvascular decompression and selective glossopharyngeal-vagal nerve root section, both of which have definitive outcomes and low recurrence rates. However, it is crucial to consider the potential complications associated with open surgical procedures, such as intracranial infection, hemorrhage, vocal cord paralysis leading to hoarseness, and aspiration during swallowing. Therefore, a careful risk-benefit analysis is warranted when selecting open surgery as a treatment option [11].

In recent years, with the advancement of neuromodulation techniques, percutaneous thermocoagulation of the petrous ganglion, thermocoagulation of the glossopharyngeal nerve, and pulsed radiofrequency (PRF) of the glossopharyngeal nerve have been gradually applied to patients with inadequate response to medications, intolerance, or unwillingness to undergo open surgery. Radiofrequency thermocoagulation, guided by imaging, induces nerve degeneration through thermal effects or enhanced field effects [12]. However, this technique is technically challenging and can result in unavoidable damage to adjacent tissues, leading to complications such as hoarseness, dysphagia, glossopharyngeal numbness, and taste disturbances [13]. Pulsed radiofrequency (PRF) is a modified radiofrequency thermocoagulation technique that operates at lower temperatures, minimizing significant tissue damage while effectively treating neuropathic pain [14]. Pulsed radiofrequency (PRF) therapy exerts its effects by directly targeting peripheral nerves or the dorsal root ganglia (DRG), modulating the ectopic discharge of neuronal cells and altering ion conduction across the nerve sheath membrane. This results in prolonged suppression of neuronal excitability, thereby achieving sustained pain relief. Compared to other interventions, PRF treatment is less invasive, offers greater procedural stability, and has a superior safety profile [15]. In this case, the patient experienced significant pain relief and control of syncopal symptoms after two sessions of PRF treatment. This suggests that PRF may effectively inhibit vagal nerve excitation caused by hyperactivity of the glossopharyngeal nerve. Six months post-treatment, the patient remained symptom-free, indicating that a relatively simple treatment achieved a definitive outcome, which is encouraging.

4. Conclusion

In patients with glossopharyngeal neuralgia accompanied by syncope, after excluding cardiac and central nervous system diseases, pulsed radiofrequency (PRF) therapy can be considered one of the preferred invasive treatment options.

Abbreviations

GPN	Glossopharyngeal Neuralgia
PRF	Pulsed Radiofrequency
MRI	Magnetic Resonance Imaging
EEG	Electroencephalography
AICA	Anterior Inferior Cerebellar Artery
CT	Computed Tomography

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Conflicts of Interest

The authors declare no conflicts of interest.

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