

Glossopharyngeal neuralgia: Neurovascular compression as a source of symptoms

Paritosh Dahiya¹, Mohammad Hassan^{2*}, K.M. Sivasubramaniyan³

¹Post Graduate Resident, ^{2,3}Assistant Professor

Department of Radiodiagnosis, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, India

***Corresponding Author:**

Mohammad Hassan

Assistant Professor, Department of Radiodiagnosis, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, India

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ABSTRACT

INTRODUCTION:

One of the rare conditions described in medical literature is Glossopharyngeal neuralgia, and is characterized by severe pain in tonsils, throat, ear, or tongue. Irritation of the 9th nerve has been attributed as the causative factor of the neuralgia and several conditions has been found to attribute the symptoms. The purpose of this study is to identify structural causes of Glossopharyngeal neuralgia by MR Imaging.

METHODS:

This is a retrospective study done on 5 patients who were referred to the department of Radiodiagnosis of Sri Lakshmi Narayana Institute of Medical Sciences Medical College and Hospital, during the period of March 2020 to September 2020, with symptoms of glossopharyngeal neuralgia.

RESULTS:

2 of the patients in the study were noted to have neurovascular conflict of the glossopharyngeal nerve with the vertebral artery and PICA on the affected site close to the supra olivary fossa which is an abnormal location. In rest of the patients no cause could be ascertained for the head and neck pain.

CONCLUSION:

The diagnosis of Glossopharyngeal neuralgia remains difficult as patients usually have non-specific symptoms and subtle imaging findings. MR Imaging can identify the presence of vessel loops near the medial portion of cerebello-ponto-medullary angle and should raise suspicion of abnormal course of vessels which may be a factor contributing to the symptoms. Careful correlation of the nerve roots in SPACE or CISS sequences for neurovascular conflict can help make the diagnosis in indeterminate cases.

Keywords: Glossopharyngeal neuralgia, neurovascular conflict, SPACE, CISS

INTRODUCTION

Glossopharyngeal neuralgia is a rare condition and is characterized by severe pain in tonsils, throat, ear, or tongue. These episodes are recurrent and are often of short duration and may be associated with activities such as chewing, coughing, swallowing or even laughing ^[1]. Irritation of the 9th nerve has been attributed as the causative factor of the neuralgia. The irritation may occur due to several causes which include infections, infarctions, tumors, vertebral

artery dissections ^[2], Chiari malformations ^[3] and neurovascular compression.

In certain individuals, cardiac clinical features such as asystole, arrhythmias and syncope have also been reported. A complex network between vagus nerve, nervus intermedius and glossopharyngeal nerve has been attributed as a possible cause and this condition is referred as vagoglossopharyngeal neuralgia ^[4].

The glossopharyngeal nerve is a mixed nerve containing both sensory and motor fibers and originates from the anterior aspect of medulla and continues laterally in the posterior cranial fossa into the jugular foramen from where it exits the cranium^[5]. It is located just anterior to the Vagus nerve hence may be involved in neuralgia with it. The most medial part of the CP (cerebellopontine) angle is the supra olivary fozette and it is in close relation to the root entry of the 9th nerve. This is an important landmark for decompression surgeries^[6]. The most common vessel reported to cause compression of 9th nerve is the PICA (posterior inferior cerebellar artery). Vertebral artery and Anterior inferior cerebellar artery (AICA) have also been noted to cause compression^[7].

Materials and Methods:

This is a retrospective study of patients who presented with symptoms of nonspecific throat pain which was sudden, severe and episodic, often accompanied with eating and swallowing, and were referred to the department of Radiodiagnosis of Sri

Lakshmi Narayana Institute of Medical Sciences Medical College and Hospital, during the period of March 2020 to September 2020.

The study included 5 patients. The age groups included in this study ranged from 20-75 years with a mean age of 52. Patients were evaluated using Siemens 1.5 T MAGNETOM ESSENZA MRI scanner. Various sequences used include T1W, T2W, FLAIR Axial, Coronal, Sagittal; DWI/ADC; T2 SPACE; GRE; TOF-MRA, MRV. No contrast was used for this study.

RESULTS:

Using thin sections of highly T2W SPACE sequences, 2 of the 5 patients were noted to have neurovascular conflict of the glossopharyngeal nerve with the vertebral artery and PICA on the affected site close to the supraolivary fozette which is an abnormal location. Corresponding TOF-MRA images confirmed location of the offending artery. No contact was noted on the contralateral site. In rest of the patients no cause could be ascertained for the head and neck pain.

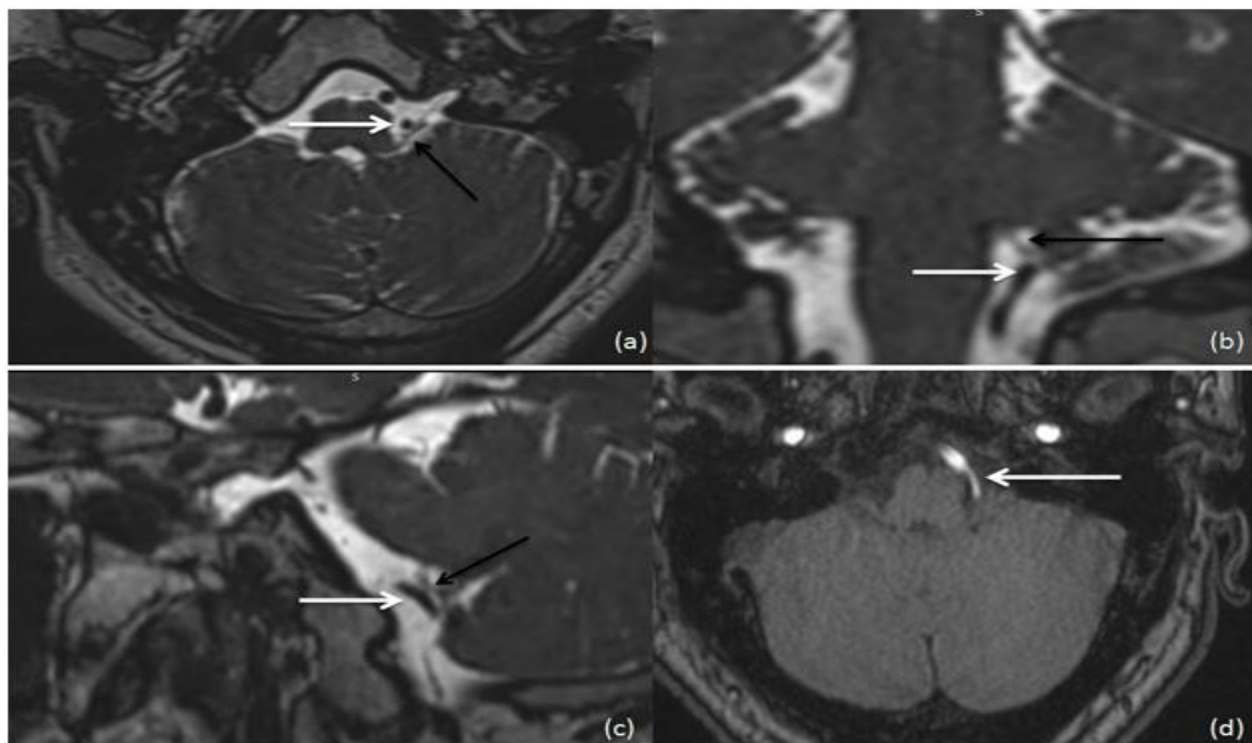


Figure 1 (a) – (d). 25 year old patient with complains of left sided neck pain - T2W SPACE Axial (a) Coronal (b) and Sagittal (c) sequences show close abutment of the cisternal portion of the left glossopharyngeal nerve (**black arrow**) at the root entry point by the left vertebral artery (**white arrow**). TOF-MRA at the same level (d) shows tortuous left vertebral artery.

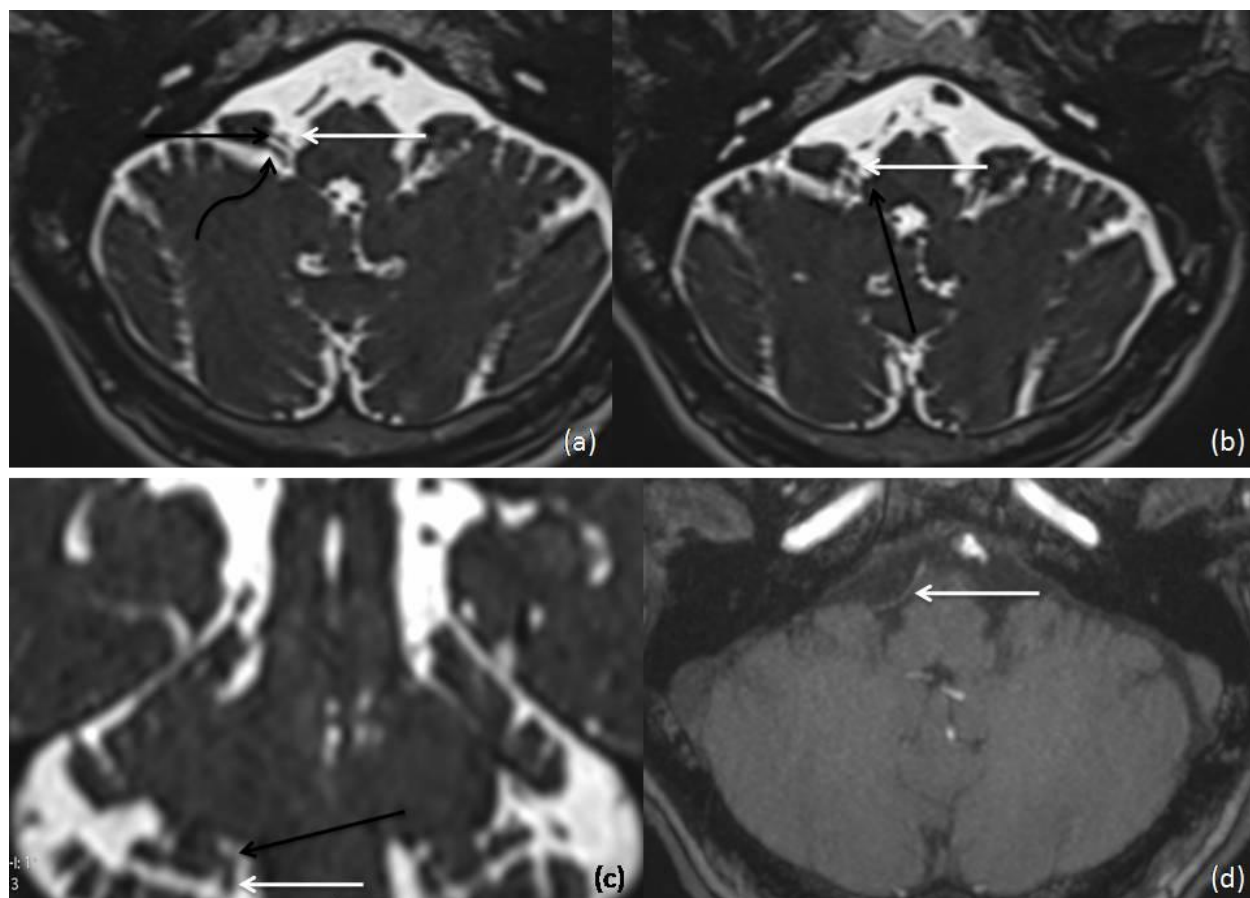


Figure 2 (a) – (d). 70-year-old male with complaints of right sided neck pain and mild hoarseness of voice. T2W SPACE Axial (a), (b) and Coronal (c) sequences show prominent right posterior inferior cerebellar artery (white arrow) closely abutting the right glossopharyngeal nerve (black arrow) at the root entry zone. The vagus nerve is also visualized exiting from the medulla (curved black arrow). TOF-MRA (d) shows looping of right PICA (white arrow) which is in close proximity to the right supraolivary fovea.

DISCUSSION:

Glossopharyngeal neuralgia is a rare entity with nonspecific symptoms and subtle imaging findings with often no clear causative factors. After ruling out tumors and infections of base of skull as possible causes, careful evaluation of the nerve should be done from its source of origin at medulla using thin heavily weighted T2 sequences.

The root of glossopharyngeal nerve is located at the supra olivary fovea which is the medial most portion of the cerebello-ponto-medullary angle^[8]. In a study done by Lister et al(1982) it was reported that normally there is no contact of the glossopharyngeal nerve with the vessels in this region, out of the 42 cases they observed there was no vascular structure near the glossopharyngeal nerve in 39 of these cases^[9]. In our cases however vascular loops were

observed in TOF-MRA sequences indicating a possibility that looping or tortuosity of the vessels may play a significant role in glossopharyngeal nerve contact especially if it is in the region of supra olivary fovea.

IN our study both patients were given pharmacological therapy of gabapentin and reported relief in the symptoms.

A limitation of our study is the inability to evaluate the size of the offending vessels and comparing them to normal due to the low field strength MRI scanner. A 3T or higher MRI can probably be used to rectify this.

Various treatment modalities exist to deal with symptomatic relief of the patients as goal is to relieve the symptoms. Anti seizure drugs such as carbamazepine, pregabalin and gabapentin have been

used^[10]. Glossopharyngeal nerve blocks may be used to alleviate the pain however this could lead to swallowing difficulty and even vocal cord paralysis (if block is bilateral)^[11]. Surgical therapies such as extracranial neurotomies^[12] and direct intracranial section of the glossopharyngeal nerve^[13] have also been used.

In conclusion, with the advent of higher field strength MRI scanners, the incidence of detection of this entity has increased, however, due to nonspecific symptoms and low clinical index of suspicion, the diagnosis of glossopharyngeal neuralgia remains elusive. Presence of vessel loops near the medial portion of cerebello-ponto-medullary angle should raise suspicion of abnormal course of vessels and should lead to careful evaluation of the nerve roots in SPACE or CISS sequences which are crucial imaging sequences to support the clinical suspicion of a neuro-vascular compression syndrome.

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