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Glassopharyngeal Neuralgia and Depression: Cause or Co-Morbidity

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Abstract:

Glassopharyngeal neuralgia is a painful disease which affects the ninth cranial nerve. Depression is a serious medical condition which affects the way a person thinks and acts in a negative way. In this prospective study, we evaluated 30 patients with glossopharyngeal neuralgia clinically who came to department of ENT in Datta Meghe medical college, Nagpur.

. The mean age of participants was 47.5 years and of patients was female. Using, DSM -5 diagnostic criteria , depression was present in 63.33% (19/30)(p value <0.0005) of patients with glossopharyngeal neuralgia. Among these 30 cases 56.6% (17/30) had essential hypertension, 30% (8/30) had diabetes malleitus and 23.3%(7/30) were hypothyroid.

Thus concluding that glossopharyngeal neuralgia and depression are closely related to each other anatomically and physiologically. Therefore, all clinician treating patients with glossopharyngeal neuralgia should consider a possibility of them developing depression and treat them accordingly.

Key words : Neuralgia, Depression

Introduction:

Glassopharyngeal neuralgia (GN) is a less common painful pathology that affects the 9th nerve, the glassopharyngeal nerve in which patient suffers from very severe,sharp, stabbing episodes of pain in the in the posterior pharynx, base of tongue,tonsillar region and ear[1]. It can last for few

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seconds to a few minutes, and there are many episodes in a day or once every few weeks. Number of patients has related this with triggering factors such as drinking cold water, swallowing spicy food, coughing, clearing throat, sneezing, touching back of throat or tongue. [1] It is commonly seen around 40-50 years of age. [2,3]

Typical glossopharyngeal neuralgias can be diagnosed based on presenting complains. For confirmation, the back of the throat is touched with cotton swab which elicits pain, which can be relieved by applying local anesthetic solution there. [2] Once diagnosed, the underlying cause for neuralgia can be diagnosed using blood tests, radiological investigations like x-rays, CT scan or MRI [2, 3]

Treatment includes pharmacotherapy, which includes medications like membrane stabilizers (carbamazepine, gabapentin, pregabalin)[4] with , low doses of selective serotonin reuptake inhibitors (SSRI) and vitamin B12. Glassopharyngeal nerve blocks are used as an adjuvant therapy for very severe pain or for rapid pain relief. [4] They can be performed by intra-oral approach or extraoral approach using a non-neurolytic agents (local anesthetic agents) with or without additives (steroid, ketamine, etc.) or with neurolytic agents (phenol, alcohol, glycerol, etc. It is definitely a safer alternative to more invasive procedures.[5]

When a patient is unable to tolerate drug medications or has resistance, they may be offered surgical treatment.The offered procedures include: Extracranial procedures like, direct surgical neurotomies or radiofrequency thermal rhizotomy [6,7,8] & Intracranial, like direct excision of glossopharyngeal and vagal nerves at the cerebello-pontine angle {8,9] and then Central procedures, such as the operation of the trigeminal tractotomy-nucleotomy or nucleus caudalis DREZ. Extracranial neurotomy and percutaneous radiofrequency rhizotomy are limited to those patients who have failed medical treatment and are unable to tolerate the open cranial procedure. Stylectomy was also promising, if the other central causes of GPN were excluded [10,11] and related styloid enhancements were found. Recently, reports from various cases have been published, showing the positive results of radiofrequency neurolysis (PRN) surgery and gamma-ray surgery (GKS) surgery. The latest advancement being Cyber-knife which is very precise,non invasive, painless and does not need anesthesia.PRN is a non-invasive neuromodulatory therapy for both, idiopathic and secondary GPN. [12,13]

Depression is a major depressive disorder that can be defined as a serious medical illness affects the way you feel, think and act in a negative way. It is a treatable illness in which one feels sad or looses interest in activities which he once enjoyed, ultimately affecting emotional and physical health and productivity. [14]

Depression ranges from mild to severe and can have symptoms like feeling sad, uninterested, loss of weight or appetite, excessive sleep or insomnia, slowed down speech and physical activities, guilt feeling, unable to concentrate, difficulty in making decisions and suicidal ideas. The Global Burden of Disease report shows that a significant increase in unipolar depression

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episodes is 1.9 percent in men and 3.2 percent in women, and a one-year increase is estimated at 5.8 percent in men and 9.5 percent in women. [15]

Patient should have all these symptoms for at least two weeks to be called in depression. [14]

To treat depression,it depends on patients medical condition and their personal preferences. It has been shown that the severely depressed patients need only anti-depressant medications such as SRI, a serotonin reuptake inhibitor; NRI, Noradrenaline reuptake inhibitor; DRI, Dopamine reuptake inhibitor; MAOI, a monoamine oxidase inhibitor and electroconvulsive therapy, magnetic stimulation,psychodynamic- interpersonal psychotherapy, psychoanalytic oriented psychotherapy. [16]

Material and Methods:

This study was carried out in Department of ENT in Shalinitai Meghe hospital, Wanadongri, Nagpur and research centre in collaboration with Jawaharlal Nehru medical college and hospital, Sawangi, Wardha from January 2018 to March 2020. We performed a observational prospective study in 30 cases diagnosed to have glassopharyngeal neuralgia.

Ethics statement: Informed written consent was taken from all the patients in there vernacular language. Patients who were illiterate, thumb impressions were taken in presence of relative/witness after reading out the consent form to them.

Study population: 30 patients diagnosed as glassopharyngeal neuralgia in the department of ENT from January 2018 to March 2020 were included in the study. All the enrolled patients were above the age of 18 years. The patients who were already diagnosed to have a psychiatric illness, or on substance abuse or any co-morbidities which can cause a psychiatric illness were excluded from the study. Diagnosis of glossopharyngeal neuralgia was made clinically and the underlying causes for the condition were evaluated. The patients who were enrolled in the study had a follow up period of minimum one year, in which the patient followed up every month.

Clinical analysis of the patient contains a discussion of demographic information (age, gender, body weight, educational attainment, marital status, etc.) and systematic assessment of pain, based on the following criteria: pain perception (location, size, length, etc.), personal - Reported symptoms (orofacial pain), daily activity estimates, medical history, and your general pain self-assessment on visual analogue scale (VAS) [17] to measure pain intensity.

Depression DSM-5 Diagnostic Criteria

According to DSM -5, a person should experience five or more of the following symptoms within the same 2 weeks and at least one of these symptoms should be (1) feelings of depression or (2) loss of interest or happiness.

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1. Significant decrease in interest or happiness in all, or almost all, activities for most of the day, almost every day.

2. Significant weight loss when not reducing diet or gaining weight, or decreasing or increasing appetite almost daily.

3. Decreased thinking and decreased body movement (seen by others, not only slowing down feeling).

4. Fatigue or exhaustion almost daily.

5. Feelings of worthlessness or guilt over almost every day.

6. Decreased ability to think or concentrate, or hesitate or not able to make decisions, almost daily.

7. Repeated thoughts of death, a continuing idea of suicide without a specific plan, or a suicide attempt or a specific suicide plan.

To get a diagnosis of depression, these symptoms should cause significant stress or disability in performing at social front, at work, or in other important areas of work. The risk of the patient abusing drugs or other co-morbidities that can cause these symptoms should be looked into. [18,19]

Results:

The study included 30 patients with glossopharyngeal neuralgia. The mean age of participants was 47.5 years and 60% (18/30) of the patients were female. Using, DSM -5 diagnostic criteria, depression was present in 63.33% (19/30) (p value <0.005) of patients with glossopharyngeal neuralgia. Among these 30 cases, 56.6% (17/30) had essential hypertension, 30% (8/30) had diabetes mellitus and 23.3 %(7/30) were hypothyroid.

Discussion:

Recently, there has been a significant amount of data showing the over-riding between pain- and depression induced by neuroplasticity changes and changes in neurobiological mechanisms. It has been suggested that this fact plays an important role in the development of neuralgia induced depression. In particular, the mechanisms of pain sensation have been shown to share the same brain regions involved in the management of emotions, including the insular cortex, prefrontal cortex, anterior cingate, thalamus, hippocampus, and amygdala, which form the basis of histological structural for the coexistence of pain and depression [20]

In addition, these abnormal plastic changes may also occur on the nerve pathways from the peripheral to the central nervous system and contribute to the occurrence, development and

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maintenance of chronic pain. [21] In short, chronic pain and depression can be based on normal neuroplasticity in central nervous system.

Serotonin (5-HT), dopamine (DA), and nor epinephrine (NE), are important monoamine neurotransmitters studied at the cellular level through mechanisms involved in chronic pain such as neuralgias and depression. The classical monoamine hypothesis suggests that depression may be due to a decrease in the availability of monoamine neurotransmitters such as 5-HT and NE in the central nervous system (CNS) [22], [23 - 24]. In the same way proving to have an important role in neuralgias.

It has been reported that in patients with depression, blood levels of BDNF decrease. [25,26]. On the other hand, the BNDF's important role in pain has also been confirmed by extensive studies. Yajima et al found that BDNF released from the spinal cord can create signaling pathways binding to TrkB, thereby activating spinal protein kinase C expression in spinal neurons, which can regulate pain sensitivity and further contribute to the progression of neuropathic pain [27,28].

In recent years, the relationship between inflammatory factors and the CNS has become increasingly clear. Pain and depression have been caused by the surrounding inflammatory response. [29-41]

Glutamate activity, one of the neurotransmitters in the CNS, has been found to be present at synapses throughout the brain [32]] In addition, glutamate and its receptor subtypes, N-methyl-D-aspartic acid (NMDA) receptor and I -receptor of α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA), has been found to be associated with the occurrence and development of chronic pain such as neuralgias and depression [33 - 35]

The mechanism of action of tricyclic antidepressant drugs may be to prevent the repeat uptake of 5-HT and NE at the synapse site and improve the prevention of CNS pain. They are helpful in reducing the number of glossopharyngeal neuralgias [36]

Conclusion : Considering the discussion above and our results, we are able to comment that glossopharyngeal neuralgia and depression are closely related in view of both anatomical areas of brain and the neurological functions, whereby chronic glossopharyngeal neuralgia may lead to depression. It has been seen that both glossopharyngeal neuralgias and depression have a significant impact on quality of life and therefore we should be aware of possibilities of patients with glossopharyngeal neuralgias developing depression and treat them accordingly. However the sample size is small to strongly conclude and needs further research.

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