



Neurovascular Compression Syndromes: An Innovative Cure for Pain-Free Future

Mayukh Pandit*

Department of Anatomy, Triveni Institute of Dental Sciences Hospital & Research Centre, Bilaspur, Chhattisgarh 495001, India

*Corresponding author: Pandit M, Department of Anatomy, Triveni Institute of Dental Sciences Hospital & Research Centre, Bilaspur, Chhattisgarh 495001, India; E-mail: [mayukhpandit17\[at\]gmail\[dot\]com](mailto:mayukhpandit17[at]gmail[dot]com)

Editorial Article

The word neuro comes from ancient greek, a combining form meaning nerves and nervous system which builds the compound word: neurology [1]. Nerve could be defined in simple terms as whitish fibers or bundle of fibers that forms a part of the system which transmit impulses of sensation, motion and other stimuli to brain and spinal cord and impulses from these to muscles and organs. Our brain is the most complex organ of our body and this complexity of relying information between brain and different parts of body primarily to and from regions of head and neck including sense of vision, taste, smell and hearing which is directed from brain by *Cranial nerves*. Sometimes compression in these cranial nerves could lead to develop serious chronic vascular compression disorder due to vascular structure. Compression in nerves could lead to demyelination which leads to further damage of axons. So, neurovascular compression syndromes are vascular compression disorder where cranial nerves are compressed due to aberrant vascular structures which directly contact the cisternal portion of nucleus. Neurovascular compression syndromes most commonly affects the transition zone between the central and peripheral myelin [2].

There are several forms of neurovascular compression syndromes known out of which the most common ones are Trigeminal neuralgia and Hemifacial spasm whereas Genuiculate neuralgia, Nervous intermedius neuralgia and Vestibular Paroxysmia are the less common ones. All this forms of Neurovascular compression syndromes are characterised by functional disturbances of cranial nerves.

Trigeminal Neuralgia

Trigeminal neuralgia is among the most common Neurovascular compression syndromes known characterized by sudden paroxysmal attack of pain lasting from few hours to several days and confined to distribution of one or more divisions of trigeminal nerve. International Headache Society defines Trigeminal neuralgia as painful unilateral affliction of face characterized by brief electric shock limited to divisions of trigeminal nerve [3].

This chronic disorder affects more in women than in men. Trigeminal neuralgia usually arises from blood vessels typically Superior Cerebellar artery which compress the 5th cranial nerve when it exits the brain stem. This compression causes damage to protective covering present around the myelin sheath. This injury to myelin sheath are known to cause suffering of pain which becomes unbearable and patients develops psychiatric disorders which is followed by development of suicide ideation in patients. Hence it is also called *Suicide disease* because it is believed more than 50% of people commits suicide who are suffering from this disorder.

Hemifacial Spasm

Hemifacial Spasm also known by the name as *Tic Convulsif* which are characterized by irregular and involuntary contraction of facial muscle [4].

Hemifacial spasm usually arises due to offentionation of facial nerve by Anterior Inferior cerebellar artery, due to tumor or injury. It was first demonstrated and described by Grovers in 1899. This begins with clonic movement of orbiculus oculi and spreads to corrugators, frontalis, orbiculi oris, platysma and zygomaticus

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progressively with years [5]. This disorder affects more in elderly women whereas frequency is less in men. The incidence of Hemifacial spasm is approx 0.8 per 100,000 persons [6]. This form of neurovascular compression syndromes are usually observed more in the subcontinent of Asian countries.

Glossopharyngeal Neuralgia

Glossopharyngeal neuralgia also known by the name as *Eagle's syndromes* characterized by brief stabbing electric shock like pain felt in throat area, back of tongue, or middle ear and as well as in tonsils. This neuralgia is among the most rare and less common ones. Glossopharyngeal neuralgia arises due to compression of glossopharyngeal nerve offended by blood vessels when they exit the brain stem. This occurs due to trauma, surgical procedure, tumors, and vascular abnormalities or sometimes due to infections as well. This disorder also affects more in women than men, usually middle aged and older. The pain due to this syndrome would be triggered while performing activities like swallowing, speaking, laughing, chewing or coughing [7]. The duration of this pain would last from few seconds to minutes and will usually affect on one side of face.

Nervous Intermedius Neuralgia

Nervous Intermedius neuralgia also known by the name as *Genuiculate neuralgia*. This usually arises from vascular compression which mainly occurs in nervous intermedius by anterior inferior cerebellar artery. Nervous Intermedius neuralgia was first discovered and demonstrated by John Nottingham. This is one of the most less common syndromes which occurs with severe and sharp unilateral peri-auricular pain and is most often described as 'ice-prick in the ear' [8]. The International Headache Society defines this neuralgia as episodes of pain usually located deep in the ear which might last for seconds or minutes and are often triggered by sensory or mechanical stimuli at posterior wall of auditory canal without any pathology.

Vestibular Paroxysmia

Vestibular Paroxysmia is among the rarest of neurovascular compression syndromes which occurs due to vascular compression of vestibular nerve by blood vessels mainly a loop of Anterior Inferior cerebellar artery. This disorder was first described by Janetta in 1975 as 'disabling positional vertigo'. The symptoms of vestibular paroxysmia includes short attack of spinning or non-spinning vertigo, which would usually last few seconds to minutes and occur in a series of upto 30 or more everyday [9]. Vestibular Paroxysmia is one the most controversial syndromes known.

Treatments

The treatment of neurovascular compression syndromes starts with therapeutic medications at initial stage of this disorder and once it advances requires surgical procedures for permanent cure. Medications which are used to treat almost all forms of neurovascular compression syndromes and are found to be very effective in controlling the pain and providing relief initially includes [10]:

- Carbamazepine
- Baclofen
- Phenytoin
- Gabapentin
- Clonazepam

Carbamazepine is considered as the drug of choice because it provides very good relief of symptoms initially. But adverse effects such as hyponatremia are usually observed which may necessitate the discontinuation of medication. Also this medication provides relief of symptoms for very short period of time. So, the affected patient would require operative procedures for long term pain relief.

There are various major and minor surgical procedure known which are employed to cure Neurovascular compression syndromes for long term basis of pain relief. Among all the surgical procedure known, Microvascular decompression surgery [MVD] have shown the highest pain relief period of 12-15 years or more. In 1967, Dr Peter Janetta have introduced this surgical procedure and reported his study in '*The New England Journal of Medicine*'. It showed that initial success rate was 82% for complete pain relief [11]. The main objective of MVD was to separate the offending nerve from vascular structure by placement of Teflon sponge. Teflon sponge isolates the nerve from pulsating effect and pressure of blood vessels. There are very serious complications of MVD widely reported for Trigeminal neuralgia and Hemifacial spasm such as intracerebellar hematoma with acute hydrocephalus, status epilepticus, subarachnoid hemorrhage and also possible infections of brain stem [12]. Also Teflon could be one of the major causes of recurrence which have been reported to cause a condition known as *Teflon Granuloma* after 5-10 years of operation. Teflon Granuloma both clinically and pathologically could emulate malignancy. There are also some adverse reactions observed from Teflon such as frontalis muscle suspension in TMJ surgery as well as pericardial closure in rheumatic heart surgery [13].

So for proper cure of Neurovascular compression syndromes one must aim at repositioning of affected cranial nerve with better alternative which will not produce any adverse effects and would cure permanently. Working hard on this specific disorder for years observing and specifically working in innovation of better alternative which would cure all forms of neurovascular compression syndromes without any adverse outcomes and with



null complications. I designed and invented a surgical implant named as 'MOLUMA'S' Surgical Implant which would be able to cure this disorder on permanent basis with very minimal complications. This invention is named after my beloved parents Moly and Uma whom I want to express my heartiest gratitude by curing and saving lives of sufferings. MOLUMA'S Surgical Implant would be ensuring proper separation of offending structures and will resist all forms of displacement along with protecting the surrounding anatomical structures. MOLUMA'S surgical procedure is designed on the bias of robotics which would be able to resolve all complications and would produce the best result in terms of permanent pain relief. I believe healthcare facilities should be made accessible and affordable to every life residing in perspective of cost. I am working; innovating, improving and improvising more so that MOLUMA'S Surgical Procedure would be cost-effective approach so that everyone would be get treated from these severe painful disorders efficiently and on permanent basis without any form of major complications and recurrence.

Apart from cure of Neurovascular compression syndromes, I am working in other fields of incurable disease and innovating their cure on permanent basis with minimal complications and more importantly making it very low cost effective ones, so that we could proceed to an era of 'disease-free' world with no sufferings from pain and where each and every one of us can get cured permanently and lead rest our lives prosperously.

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