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Development of Trigeminal Neuralgia after Pregnancy

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Abstract:- Pregnancy can cause severe painful complications. Trigeminal neuralgia is one of the complications that can cause by pregnancy. TN complications cause sudden facial pain like electric shocks. There can be various other causes of trigeminal neuralgia but an increase in estrogen level aggravates activation of extracellular signal-regulated kinase (ERK) in trigeminal ganglions and anticipation is increased. TN afflicts females during pregnancy and causes further complications in its management. Trigeminal nerve decompression increase morbidity. It can cause possible damage to the decompression area of the brain. Studies reported TN can be cured by using conventional radiofrequency ablation of Gasserian ganglion or gamma knife radiosurgery.

Keywords:- *Trigeminal Neuralgia, Pregnancy, Epidemiology, Pathophysiology, Trigeminal Nerve Compression,*

I. INTRODUCTION

Trigeminal neuralgia so-called tic douloureux is a sudden facial complication that causes severe pain. TN is a chronic complication that affects the 5th cranial nerve or trigeminal nerve which is widely distributed in the head. During a trigeminal neuralgia attack, the patient feels a sudden electric shock in their gums, teeth, and jaws. [1]

Usually, it attacks one facial side of the patient, especially on the lower facial side but it can also attack both sides of the face at different times. Patients with trigeminal neuralgia may experience these attacks regularly, for weeks or they may last for months.

Patients who experience severe TN may experience these attacks a hundred times in a day. This complication is very difficult and it may influence the overall quality of patient life. It may lead to other complications such as depression, isolation, and weightlessness.

II. EPIDEMIOLOGY

TN is a rarely occurring disease and there are about 10000 to 15000 cases of this disease every year in the US. TN was first reported by Penman and there were 107 males and 200 females per one million US population.[2]

Another study reported there this condition is twice in females as compared to males. Pregnant women are more susceptible to experiencing TN.[3][4]

Another research suggested its prevalence is a 3:1 ratio between women and men. Studies suggested older adults more than 50 years old experience this disease more frequently compared to younger population. [5]**Error! Reference source not found.**

III. TRIGEMINAL NERVE COMPRESSION DURING PREGNANCY

Evidence suggested in the peripheral mechanism of allodynia, pregnancy increases the level of estrogen which also increases nociception as a result of activation of extracellular signal-regulated kinase (ERK) in trigeminal ganglions. Investigational models of chronic pain show ERK and Mitogen-activated protein kinases (MAPK) are both activated by estrogen.

In a research trial, to determine the role of hormone and ERK activation in trigeminal pain disease; the complete freunds adjuvant injections CFA were injected in masseter muscles. With the use of graded monofilament, the withdrawal changes to whisker pads (secondary allodynia and V3) and masseter (primary allodynia and v3) were recorded. \

This simulation toward withdrawal response was increased by the presence of inflammation and estrogen treatment. It indicates its effect on primary and secondary allodynia is higher with the presence of estrogen as compared to inflammation alone.

The activation of ERK was examined in trigeminal nerves with the help of immunohistochemistry and western blotting. The results show that treatment with estrogen and masseter inflammation stimulates the activation of ERK having additive effects when both are used. They confirmed this combined treatment of estrogen and masseter inflammation also boost immunoreactive response pERK (V1/2) in neuron division 1 and 2. [7]

IV. PATHOPHYSIOLOGY

Most patients with trigeminal neurologic, suffer pain as a result of trigeminal nerve compression. TN leads to nerve demyelination at the compression site in brain. Researchers have not yet discovered the exact mechanism of demyelination leading to TN symptoms. However, it is believed that demyelinated lesions generate ectopic impulses which may lead to ephaptic transmission. The facial pain is generated by ephaptic fibres connections. The fibres arbitrate the light touch which gives electric shock-like facial pain in the triggered zone where light tactile is simulated.

Even a single stimulus can provide a painful sensation showing possibilities of the central mechanism of TN generating pain. Studies also reported alternation in the hippocampus (sensory& motor cortex) influences TN.[8]

Some studies reported torus vessels lead to vascular compression resulting in demyelination. Radiological and pathological examinations show these vessels are rooted in trigeminal nerves and the main cerebral artery is the implicated vessel. This research later confirmed when doctors separated nerves and vessels, the symptoms were reduced. **Error! Reference source not found.**

Another bio resonance hypothesis suggested the frequency of vibrations leads to closure between the trigeminal nerve and its nearby structures; resulting in trigeminal nerve fibres damage which fluctuates proper nerve impulses transmission finally leading to pain. [10] There can be other causes that may lead to TN such as atriovenous malformation, bony compression, medulla mall infarcts, pons, and bony compressions etc.[10]

V. CASE REPORT

In a research study, a 28-year-old (30 weeks) pregnant woman was diagnosed and studied with TN on the left facial side. Magnetic resonance imaging revealed she had a timorous lesion at her left cerebellopontine portion of the brain. She was physically active but she reported having sudden attacks of pain in the V2-V3 regions. Her eye movement's electrocardiographic tests, blood tests and other neurological tests were normal.

MRI of the brain shows at her left cerebellopontine angle, she had a 1 cm timorous lesion which was compressed to the left trigeminal nerve. The signal intensity of the lesion was high. T1 images and fluid-attenuated inversion recovery shows there was a Dural tail sign at the cerebellar tentorium. Furthermore, no vessel tortuous or vascular malformation was shown when she was brought a magnetic resonance angiogram. (Fig. 1a-d).

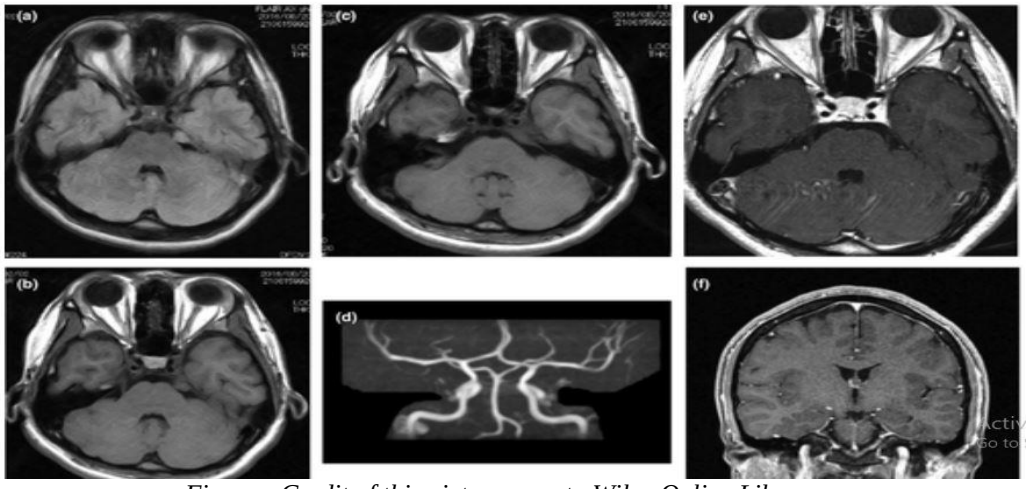

Figure : Credit of this picture goes to Wiley Online Library
Figure (a) shows fluid-attenuated inversion recovery.
Figure (a&d) shows 18 days postpartum with the MRI technique.
Figure (b&c) shows the tumour at the left angle of cerebellopontine using the T1 weighing imaging technique.
Figure (d) shows no malformations with magnetic resonance angiogram
Figure (e&f) shows findings of 55 days postpartum with MRI scanning technique, in T1 weighted imaging gadolinium are increased.
Figure (d) axial view and (e) coronal examination show tumour is reduced in volume in the left cerebellopontine angle 0

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VI. FINDINGS:

Based on this imaging, the clinical findings show the trigeminal nerve on her left side was compressed with a tumor which causes trigeminal neurilemmoma or meningioma.

As she experienced facial pain, she decided to experience potential treatment with a gamma knife to remove the tumor. After 55 postpartum days, she undergoes an MRI and T1 weighted imaging with enhanced gadolinium which clearly shows her tumor was increased in volume anterior side of the rostral portion at the left cerebellopontine angle and vertebral body. After gamma knife treatment, the tumor volume was reduced significantly and its compression at the left trigeminal nerve was also reduced.

They identified a zone of root entry adjoining the pons and her tumor invade her Meckel cave. Her pain on the left side of the face disappeared but they were unable to examine the presence of meningioma due to plaque appearance in the tumor portion. Her optimal standard dose was 18 GY; 25 cycles with 4mm of collimator size. After treatment, the 60 days postpartum showed positive consequences, her trigeminal neuralgia was completely cured and she had no neurological complications.

VII. DISCUSSION

In this case study, the patient was not examined pathologically. However, there is no single test to examine trigeminal neuralgia but experiencing its shocks and pain is a key for complication diagnosis.

Mostly laboratory testing and imaging techniques are used such as CAT scanning or MRI to detect trigeminal nerves. Trigeminal motor functioning is examined with masseter muscle palpation in which the patient is asked to open their mouth against resistance and to clinch his/her teeth. The jaw deviates to a side if pterygoid muscles are weak. There could be various reasons for this disease such as lymphoproliferative disease, G4-related disease, meningioma, pregnancy, or granulomatous autoimmune disorders.

Studies reported that hormone-induced proliferation can cause the development of meningioma. Various studies reported this type of tumor grows rapidly as a result of pregnancy because of hormonal changes and increased blood volume. The above case study reported that trigeminal neuralgia was developed in 30 weeks of pregnancy and puerperal period, tumor growth was reduced and she improved TN symptoms. There can be possibilities that tumor growth was increased due to malignant meningioma or progesterone receptor-positive meningioma or both. In the puerperal period, the tumor can grow dramatically and it may reduce in postpartum.

VIII. CONCLUSION

All the above study concludes that TN is a serious complication associated with facial trauma that can be caused by several reasons. Pregnant women can experience this disease but its coexistence in pregnant females is uncommon. It is believed that in most cases TN is caused by trigeminal nerve compression. The blood vessel compression against the trigeminal nerve (vascular compression) causes facial pain. If it afflicts pregnant females and causes pregnancy complications. Commonly used drugs can have a tetragonal effect on the fetus limiting pharmacological treatment. It can be safely cured by gamma knife treatment or conventional radiofrequency ablation of Gasserian ganglion.

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