ISSN 2582 - 7480

Neurocosm International Journal

Volume No. 6

Issue No. 2

May - August 2025

ENRICHED PUBLICATIONS PVT.LTD

JE - 18,Gupta Colony, Khirki Extn,
Malviya Nagar, New Delhi - 110017.
E- Mail: info@enrichedpublication.com
Phone :- +91-8877340707

ISSN 2582 - 7480

Neurocosm International Journal

Aims and Scope

The primary objective of the Neurocosm International Journal (NIJ), popularly known as the Neurocosm journal, is to serve as a comprehensive, open-access platform that is dedicated solely to facilitating the progress and advancement of the field of Neurology, Brain & Spine Learning by -

- offering gifted and talented researchers engaged within the domain of Neurology, Brain & Spine a unique setting for them to get their work published and elevate their reputations/standing within the global community, as well as,
- providing professionals, students, academics, and scholars free access to the latest and most advanced research outcomes, findings, and studies, being carried out in the field of Neurology, Brain & Spine, all across the world.

ISSN 2582 - 7480

Neurocosm International Journal

ISSN 2582 - 7480

ISSN 2582 - 7480

Neurocosm International Journal

(Volume No. 6, Issue No. 2, May - August 2025)

Contents

ISSN 2582 - 7480

ISSN 2582 - 7480

Preeclampsia: A Plausile Playground for Stroke During Pregnancy and Puerperium

Dr. S. Mathura Vardhini 1, Dr. P. Nagaraj 2
Resident - Obs & Gyn,Salem, Tamil Nadu, India.
2 Lead Consultant - Neuro Science Sports Medicine Rehabilitation And Lifestyle, Chennai, India

A B S T R A C T

Preeclampsia is emerging as a serious, threatening problem during pregnancy and puerperium. Stroke which is a neurological emergency is becoming a distressing debilitating reason for the disability and morbidity among reproductive age group women.Across the globe, studies have delineated the fact that women are at a higher risk for developing stroke in comparison with men as well as higher mortality rates. Most strokes occurring in relation to pregnancy, either manifest during labor and delivery or in the puerperium phase. In this article we outline the importance in understanding the correlation between preeclampsia and stroke, the inter relational factors favoring its development and the positive effects of diagnosing the etiological factor at an earlier stage with good diagnostic modalities and treating accordingly in a timely manner with an individualized approach, taking into consideration the possible side effects without compromising the maternal and fetal health which is of prime importance

BACKGROUND AND PURPOSE

Preeclampsia is emerging as a serious, threatening problem during pregnancy and puerperium, accounting for about 2 to 8 in 100 pregnancies worldwide and it is imperative in this setting, that we understand the correlation between this condition and the probability of it leading to cerebral stroke, which is a neurological emergency that is becoming a distressing debilitating reason for the disability and morbidity among reproductive age group women.

Across the globe, studies have delineated the fact that women are at a higher risk for developing stroke in comparison with men as well as higher mortality rates. Furthermore, with the incidence of strokes in pregnancy ranging from 1.5 to 71 per 100,000 pregnancies, it has been evidently demonstrated that pregnancy increases the chances of development of ischemic stroke or hemorrhagic stroke be in in the immediate peurperium or at a later date, the risk prevails and it is on the higher side during the postpartum period.

INTRODUCTION:

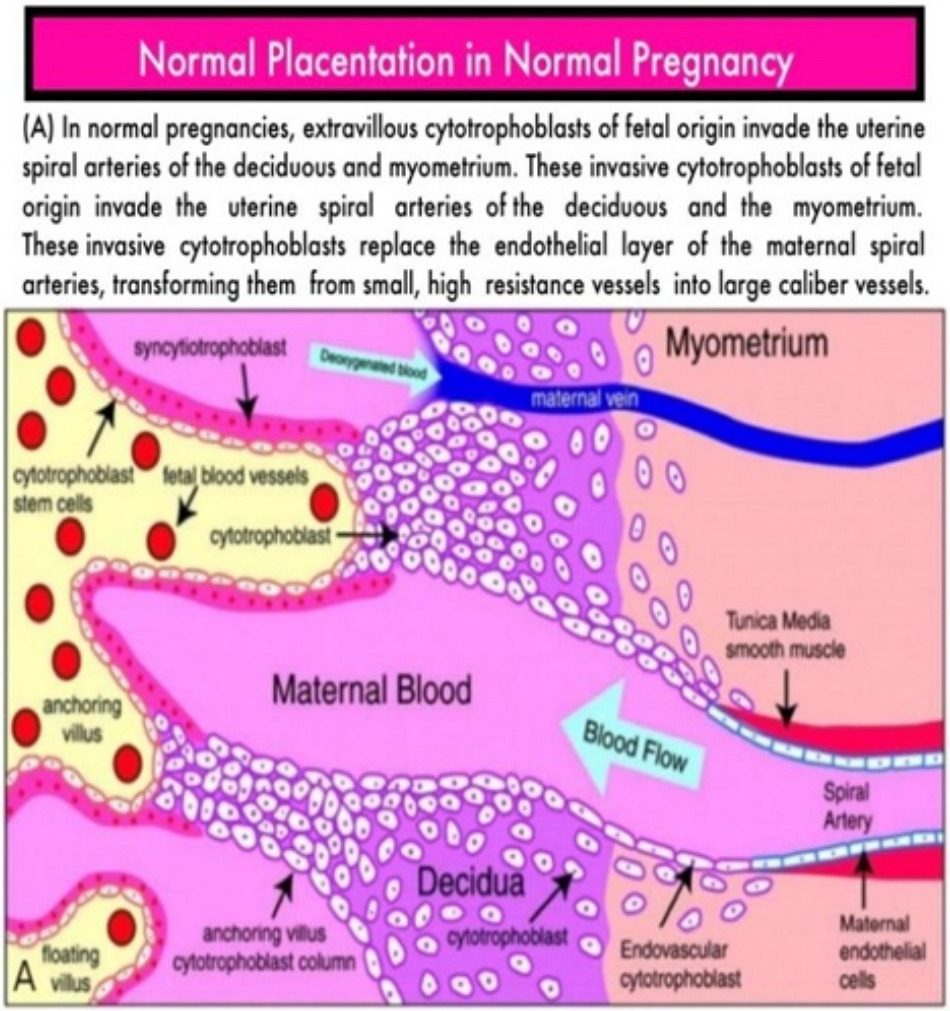
Preeclampsia being a pregnancy - specific syndrome affecting virtually every organ, the manifestations are more complex than defining it as just hypertension in pregnancy with associated proteinuria. Young and nulliparous women are particularly more vulnerable among many other variables.

Most strokes occurring in relation to pregnancy, either manifest during labor and delivery or in the puerperium phase. With the pregnancy associated hypertensive disorder by far, being the most common risk factor in the development of stroke, it is a notable thing thatthree- to eightfold the possibility of development of stroke is delineated in hypertensive when compared with normotensive women.

After a pre eclamptic woman with cerebrovascular symptoms delivers the baby, it is usually presumed that she is quite out of the danger. Yet, the risk for her developing stroke and other cardiovascular disease far from the mere postpartum period still remains on the higher side.

THE PLAUSIBLE LINK:

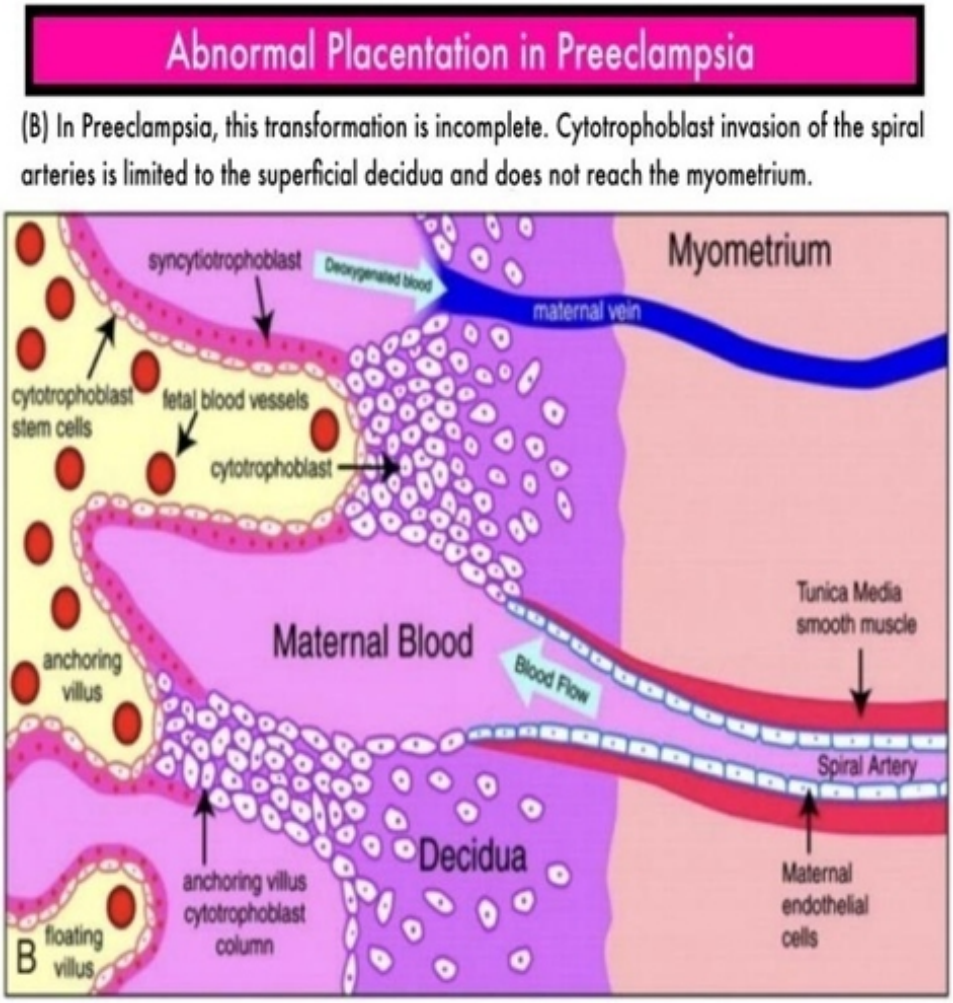
Pre-eclampsia is a condition in which the tone of the vasculature inclusive of the blood vessels is increased which is partly due to their increased sensitivity towards the vasoconstrictors. The vasoconstrictors are on the rise due to hypertension. There is also concurrent organ hypo perfusion due to the vaso spasmicity characterizing the disorder. Endothelial dysfunction causes derangement of the natural processes like alteration in the tone of the blood vessel walls, mechanism of activation of platelets, and also alteration in thrombotic events leading to infarction thereby contributing to a major role in its pathogenesis predisposing to stroke.



The etiology that confers and precipitates the development of pre eclampsia may be varied. The damage to the endothelium is profound in case of pre eclampsia with vasospastic changes and plasma transudation leading to events which occurs in a cascade pathway with the common sequelae being thrombotic and ischemic changes.

Women having pre eclampsia undergoing general anesthesia are at higher risk of stroke compared with those undergoing neuraxial anesthesia. Another risk pertaining to peripartum stroke is cesarean

delivery, which increases the risk 1.5-fold compared with vaginal delivery.

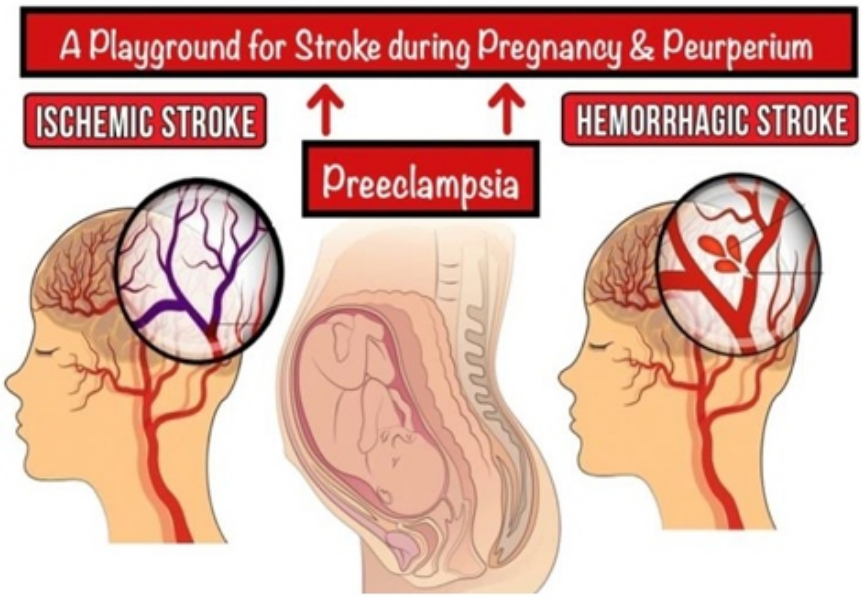


DISCUSSION:

The studies have concluded that there is a 2.4 times higher risk in case of pregnant women than in the non pregnant women who are in the same age group and ethnicity in comparison. The attributable risk of developing stroke was found to be 8.1 in 100,000 pregnant cases combining both the pregnancy and also the period post pregnant state. Women with a previous history of pregnancy related ischemic or hemorrhagic stroke was found to be at a lower risk category in the context of development of recurrent stroke during the pregnancies that follow, unless there is a specific, persistent cause. Preeclampsia poses a threat for the development of stroke that is not only confined to pregnancy or peurperium but also during remote times far from those maternal and post peurperial stages.

Average maternal mortality is estimated to be around 17.8% among all strokes, 3.9% amounting for strokes of ischemia as etiology, and 13.8% accounting for strokes of hemorrhagic cause. There is a finding that concluded that strokes which developed following pregnant state had a lower morbidity

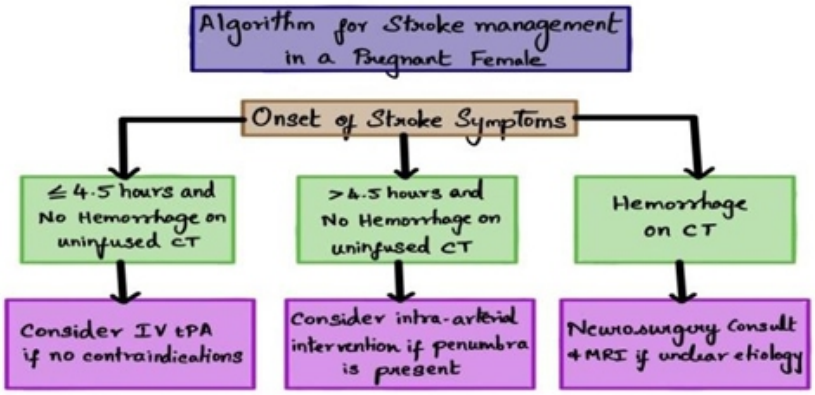
rate than for a classical stroke. It is also proved from previous experience that the probabilities of stroke to recur in the future pregnancies are found to be on the lower side.



MANAGEMENT METHODOLOGY:

The management methodology of stroke in case of a pregnant patient follows the same protocols just like any other case of stroke in general. Oxygen supplementation must be adequately provided, blood pressure variations must be attended to immediately and glycemic control should meet the standard values. Following the general management of the patient, we have to confirm the etiological factor. To determine whether it was of ischemic or hemorrhagic etiology should be made clear before taking any appropriate steps. The etiology must be ascertained in order to carry out further ways to manage like retrieval of clots or thrombolytic procedure whichever is more suitable for the individual.

Thrombolysis in the early stages of evolving stroke utilizing the tPA (tissue Plasminogen Activator) intravenously or the potent agents for thrombolysis intraarterially or mechanical methods pertaining to remove the clot are proven methodologies to be followed in case of ischemic stroke.



The use of Aspirinto begin after 24 hours after the procedure undertaken during its acute management has been recommended and debated for reducing the risk of stroke recurrence.

When a patient presents to us six hours within the start of the symptoms, Mechanical thrombectomy is advised and taken up for the procedure especially in those patients who typically have an arterial block in the anterior circulatory field.

In case of hemorrhagic stroke, first preference should be given to bring down the raised blood pressure. After managing hypertension other aspects should be taken care of. Diuretics that functions primarily through osmotic mechanisms should be given in order to relieve the intracranial tension. It is given for the benefit of the mother. In case of compressive symptoms, immediate evacuation of the hematoma surgically mast be resorted to in order to prevent further complications.

CONCLUSION:

Thus, it is evident that preeclampsia during pregnant state or in the puerperal period serves as a plausible playground for the occurrence of stroke. The physiological mechanisms of circulation and coagulation do not function normally in the case of preeclampsia which becomes a favorable etiology and a risk factor for ischemic or hemorrhagic stroke to occur. It has been noted that risk for stroke due to hemorrhage is on the higher side during the final stages of pregnancy.

Stroke in a normal setting differs much from that occurring in relation to pregnancy. In this case, there are factors to be considered with reference to the well-fare of the mother and the child before the tests to be done for the diagnosis and management procedures.

While taking these factors to consideration, it may lead to some compromises pertaining to management methodologies, even though keeping in mind the probable and potential distressing side effects and aftermath of stroke in such pregnant females.

Taking all aspects into consideration, individualized protocol must be followed for stroke in pregnant and puerperal females with the tests and interventions allowing rapid diagnosis, promoting best outcomes.

BIBLIOGRAPHY:

1. James, AH, Bushnell, CD, Jamison, MG. Incidence and risk factors for stroke in pregnancy and the puerperium. Obstet Gynecol 2005; 106: 509–516.

2. Brown, DW, Dueker, N, Jamieson, DJ. Preeclampsia and the risk of ischemic stroke among young women: results from the Stroke Prevention in Young Women Study. Stroke 2006; 37: 1055–1059.

3. Skidmore, FM, Williams, LS, Fradkin, KD. Presentation, etiology, and outcome of stroke in pregnancy and puerperium. J Stroke Cerebrovasc Dis 2001; 10: 1–10.

4. owers, WJ, Derdeyn, CP, Biller, J. 2015 American Heart Association/American Stroke Association Focused Update of the 2013 guidelines for the early management of patients with acute ischemic stroke regarding endovascular treatment: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke 2015; 46: 3020–3035.

ISSN 2582 - 7480

Outline and Benefits of Multi-Modality Intraoperative Neuromonitoring in Spine Surgery Explained with a Case Report

Dr. Nimesha Cheruku, MBBS, MS, MBA, CNIM
Neurophysiology, OverWatch Neuro

ABSTRACT

The major complication of any form of spinal surgery is neurological insult which can result in serious post-operative sensory or motor deficit. Intraoperative neuromonitoring has evolved to identify and help to avert these insults through real time assessment of the spinal cord function. This paper is to provide an outline of the major modalities utilised in Intraoperative neuromonitoring during spine surgery, how they help in identifying neurological insults and aid in reducing post operative deficits, all explained through a case report.

Keywords : Neuromonitoring, Spine Surgery

I. INTRODUCTION

Intraoperative neuromonitoring (IONM) is widely used in spine surgeries and is now part of standard medical practice. The purpose of IONM is to allow early intervention by identifying neural insults intraoperatively which can help minimize or eliminate irreversible damage to the neurological structure thereby preventing a postoperative neurologic deficit. The American Society of neurophysiological monitoring defines neurophysiologic monitoring as "includes any measure employed to assess the ongoing functional integrity of the central or peripheral nervous system in the operating theatre or other acute care setting. Its mission is protection of the patient's nervous system. Neurophysiologic signals are monitored continuously during surgery for adverse changes, detection of which enables corrective action. Risk of postoperative neurological deficit, such as weakness, loss of sensation, hearing loss and impairment of other bodily functions is thereby reduced."

II. IONM TECHNIQUES

IONM helps to improve patient outcomes by preventing post-operative neuro deficits. Multi-modality neuromonitoring with commonly used modalities or techniques for spinal surgeries include (Figure 1): SSEP-The somatosensory evoked potentials (SSEP) are electrical potentials recorded from the somatosensory cortex in response to stimulation of a peripheral nerve (most commonly the median or ulnar nerve at the wrist for upper extremities or the posterior tibial nerve at the ankle or peroneal nerve at the knee for lower extremities). These potentials are recorded by subdermal needle electrodes placed along the medial lemniscus dorsal column pathway and over the scalp, using the 10-20 international system, as they travel from the peripheral nerve through the pathway to the sensory cortex. Cortical responses are usually recorded at a latency of 20msec for the uppers and 37msec for the lower extremities. The patient is his own control, all changes are measured against his baseline. A decrease in amplitude of greater than 50% or an increase in latency of greater than 10% is considered as alarm criteria for post-operative deficit.

SSEP is monitored continuously throughout procedures to assess the functional integrity of the somatosensory pathway. Though they are a good indicator of spinal cord function, SSEP are also susceptible to anesthetic and physiologic changes. Halogenated agents, hypothermia, hypotension are some factors that should be taken into consideration when a change in amplitude or latency is noticed.

TcMEP-Transcranial motor evoked potentials (TcMEP/ MEP) monitor the descending motor pathways (corticospinal tracts) from the motor cortex to the peripheral muscles. The blood supply for the motor tracts is from the anterior spinal artery while the somatosensory tracts are perfused by the posterior spinal arteries, hence there can be motor deficits without changes in SSEPs. This is where TcMEP monitoring plays a significant role.

MEP responses are generated by transcranial electrical stimulation on the scalp by using subdermal needle electrodes placed at C1 and C2 or C3 and C4 positions of the 10-20 international system or via direct cortical stimulation. The transcranial electrical stimulation is a multipulse stimulation and compound muscle action potentials (CMAP) are measured over the spinal cord or in the muscle of interest. At the spinal level, the response is measured in the epidural or intrathecal space and is called a D-wave (direct). The muscle responses are recorded from electrodes placed in the muscle innervated by specific nerve root, brain region or cranial nerve. Muscles are selected based on the surgical procedure and spinal levels involved. Frequently used sites are thenar muscles for the hand, tibialis anterior and abductor hallucis for the leg. The muscle groups rostral to the surgery level are typically used as a control. For interpretation of MEP responses, either a all or none response criteria or a decrease in amplitude of greater than 50% is considered as alarm criteria for post-operative deficit.

MEP responses are highly sensitive to anesthetic and physiologic changes. Total intravenous anesthesia using propofol and fentanyl is used to achieve reliable recordings. To record CMAPs from the muscles there should be no neuromuscular blockade, hence there may be patient movement during stimulation. Having a defibrillator, cochlear implant, deep brain stimulator and other implanted devices are relative contraindications for MEP monitoring and the benefits of monitoring should be assessed in these situations. Despite the limitations, TcMEP monitoring is highly beneficial in assessing motor cord function and preventing permanent motor deficits or paraplegia.

EMG-Electromyography (EMG) is real time recording of selective nerve root function specific to a muscle during spine surgery. One muscle group per nerve is monitored by using spontaneous EMG or triggered EMG technique. Since one muscle can have multiple nerve innervations or vice versa, multiple muscles should be used to maximize coverage. In Spontaneous EMG(SpEMG), subdermal needle electrodes are directly placed in the specific muscle to record its activity without any stimulation. SpEMG is sensitive to surgical manipulation such as compression or stretching of nerves which produces firing in the corresponding innervated muscles. Spikes, bursts or trains are indicative of injury. Continuous, repetitive firing or train indicates a high probability of nerve injury. SpEMG is highly dependent on having no neuromuscular blockade, hence train of four (TOF) is measured at

regular intervals. A minimum TOF of 2/4 twitches is necessary to say EMG monitoring is reliable.

Triggered EMG for pedicle screw stimulation- Triggered EMG is used to check pedicle integrity and proper positioning during pedicular screw placement. The most common complication is a potential medial breach of pedicle wall into the spinal canal. A monopolar electrode stimulates the top of the pedicle screw with increasing current intensities. Subdermal needle electrodes are placed in the appropriate muscle groups to record CMAPs in response to the stimulation. Direct stimulation of nerve root can also be performed with less than 5mA intensity to identify target muscle activity. A screw that breaches the medial or inferior pedicle wall reduces the stimulation threshold and increases the risk of damage. An irritated or damaged nerve root produces a response at a significantly lower stimulation intensity. A muscle response at less than 10mA intensity is considered an alert for a possible breach. As in SpEMG, triggered EMG is also dependent on having no neuromuscular blockade. Train of four is measured and 4/4 twitches are required for optimal recording.

Train Of Four (TOF)- TOF is used to monitor degree of neuromuscular blockade. 4 single pulses of supramaximal stimulation are applied at a peripheral nerve and amplitude of corresponding muscle responses are recorded for each pulse. 1/4= 90% blockade, 2/4=80%, ¾=75% and 4/4=0-75%. Ideal is 4/4. Usually, the ulnar nerve is stimulated, and responses recorded from abductor pollicis brevis for upper extremities, posterior tibial nerve stimulated, and responses recorded from abductor hallucis for lower extremities.

EEG-Limited Electroencephalography (EEG)is monitored during surgeries as an adjunct to anesthesia, to measure depth of anesthesia.

Figure 1: IONM screen showing all modalities monitored.

Left side of picture- Left and Right Median Nerve and Posterior Tibial Nerve SSEP responses.

Right upper corner- Left and Right Upper and Lower extremity MEP responses.

Right lower corner- Spontaneous EMG responses from muscles specific to surgical levels.

Below- TOF with analysis and EEG with CSA

III. KEY PLAYERS

For IONM to be reliable and prevent neurological insult, communication, and cooperation between intraoperative neuromonitoring (IONM) technician, anesthesiology team, and surgery team, is essential. CNIM certified technologist will setup and monitor the patient and identify changes. Interpreting Physician (remote or in room) confirms changes, interprets them to relay to surgeon. Surgeon plays a role in management with surgical manoeuvres or patient positioning to try to reverse the changes. Anaesthesia maintains the physiological, pharmacological, anaesthetic regime management. Discussion with anaesthesia about optimal monitoring requirements prior to a case is required. SSEPs and TcMEPs are susceptible to anaesthetic and physiologic changes, EMG relies on absence of neuromuscular blockade to be significant. SSEPs may be dampened or show false positive changes due to changes in concentration of inhalational agents, BP fluctuations or positional compression of limbs. TcMEPs require placement of bite block to prevent tongue lacerations. TcMEPs are also dampened by increased inhalational agents and require absence of neuromuscular blockade. TIVA (Total Intravenous Anaesthesia) is ideal for TcMEPs.

Case Report highlighting multi-modality IONM monitoring:

A 58-year-old diabetic male presenting with low back pain radiating down left leg with numbness and tingling all the way to the feet. He had a previous spinal fusion L2-4 with hardware. The planned surgical procedure was T12-L2 PLIF (Posterior lumbar interbody fusion), L2-4 Revision. Multi-modality IONM with SSEP, TcMEP, EEG, EMG, triggered EMG and TOF planned. Optimal Anaesthesia requirements were discussed with Anaesthesia team. IONM Protocol:

• SSEP- Ulnar Nerve at 25mA Posterior Tibial Nerve (PTN) at 40mA

• Montages used for cortical C3'–C4', C3'–Fz C4'–C3', C4'–Fz. Additional Cz-Fz for lowers. responses:

• EMG muscles- abdominals, psoas, quadriceps, anterior tibialis, gastrocnemius, and abductor hallucis (AH) muscles.

• Muscles used for MEP recording- Abductor Pollicis Brevis-Adductor Digiti Minimi (hand), abdominals, psoas, quadriceps, anterior tibialis, gastrocnemius, and abductor hallucis (AH) muscles

• MEP stimulating electrodes placed at C3 and C4, 350-450V with train of 7-9 pulses.

• TOF recorded from AH with PTN stimulation. Baselines obtained after patient intubated, positioned

prone on Jackson table:

SSEP and TcMEP present in all extremities (Figure 2), EEG symmetric, EMG quiet, TOF 4/4

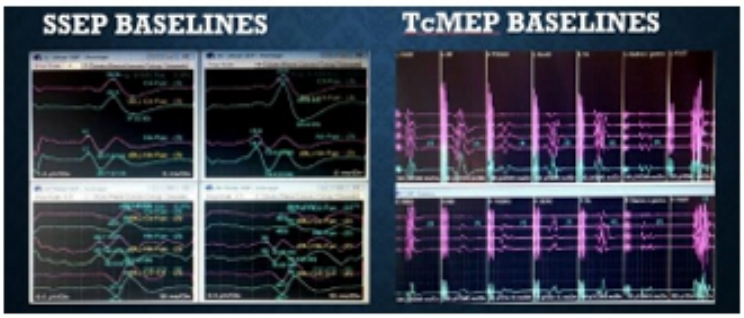


Figure 2: SSEP and TcMEP present in all extremities

As the procedure progressed, Anaesthetic measurements were recorded at regular intervals. Surgeon began removing previous hardware, replacing them with new screws and dissecting bone spurs. At this time, reduction in cortical response amplitudes is noticed in the LEFT PTN SSEP (Figure 3). After troubleshooting, checking electrodes, wires, stimulation parameters and confirming it was not technical, Surgeon is informed of the change in responses. TcMEPs were run on the surgeon's request. The MEPs showed loss of responses in Gastrocnemius and Abductor Hallucis (AH, foot) muscles (Figure 3). Surgeon is alerted of these changes. At this time, anesthetic measurements showed no significant changes. Increase in stimulation voltage from 350V to 800 V yielded no change in the MEP responses. SSEP is monitored continuously, the left PTN responses continue to be diminished.

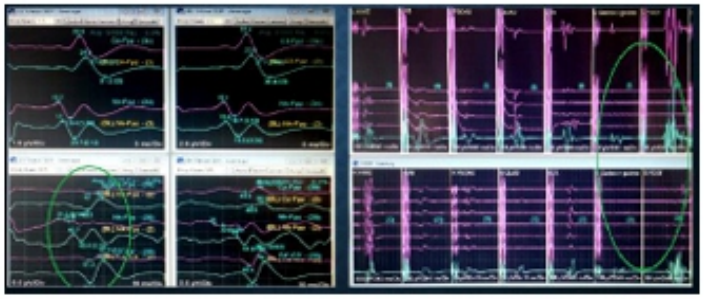


Figure 3: SSEP and MEP changes. Left PTN SSEP, Bilateral Gastrocnemius and AH MEP responses as highlighted.

After checking for patient positioning, monitoring anesthesia measurements, Surgeon decided to explore the surgical field. On running TcMEPs after exploration, a return of the Gastrocnemius and AH responses was noted. Subsequently the left PTN responses also returned to baseline (Figure 4). The Surgeon explained that during hardware removal some of the bone spur had become lodged in the canal and it was compressing the cord. He also stated that this was not easily visible and would not have been caught had the signals not changed.

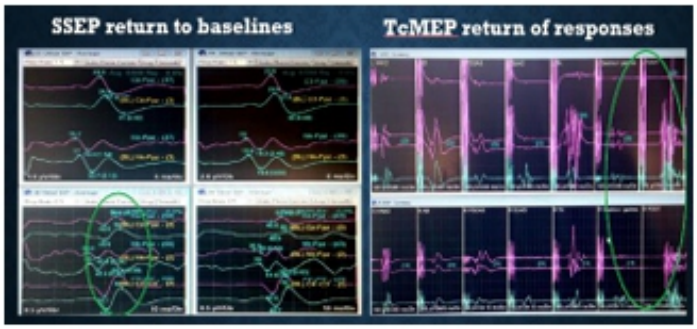


Figure 4: Return of SSEP and MEP responses.

Multi-Modality IONM was significant in this case for alerting the surgeon and averting a critical neurological insult. IONM has shown to have high sensitivity and specificity in detecting sensory and motor injury.

IV. CONCLUSION

Intraoperative neurophysiological monitoring (IONM) use during spine surgery, with a multimodality approach including SSEP, MEP and EMG, aids in early recognition of a neurological insult and, by management of signal changes during the procedure, can predict a favorable surgical outcome. Any significant variation from baseline IONM signals or a loss of signal during surgery indicates a neural insult and predicts a possible postoperative deficit. Effective communication between multidisciplinary teams is critical to provide efficient patient care by decreasing adverse events and improving outcomes. IONM team works with the surgical and anesthesiology team to optimize signal acquisition and provide reliable monitoring. The goal of IONM is to detect surgical or physiological insults early while they are still reversible and help prevent damage to the neural structures by continuously evaluating the neural pathways while the patient is anesthetized, where clinical evaluation is not possible

REFERENCES

1. The American Society of Neurophysiological Monitoring https://www.asnm.org/page/Guidelines

2. Intraoperative neurophysiological monitoring in spinal surgery https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4568525/

3. Intraoperative neurophysiological https://www.ncbi.nlm.nih.gov/books/NBK563203/ monitoring

4. Intraoperative neurophysiological neuromonitoring: Basic principles and recent update https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3763097/

5. Intraoperative neurophysiological monitoring during spine surgery: a review https://thejns.org/focus/view/journals/neurosurg-focus/27/4/article-pE 6.xml

6. A review of intraoperative neuromonitoring for spine surgery https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3422092/ 7. Neurophysiologic monitoring of spinal nerve root function during instrumented posterior lumbar https://pubmed.ncbi.nlm.nih.gov/12131744/ spine surgery

8. The use of intraoperative neurophysiological monitoring in spine surgery https://pubmed.ncbi.nlm.nih.gov/31934514/

9. Intraoperative Neurophysiological Monitoring in Spine Surgery: A Significant Tool for Neuronal Protection and Functional Restoration https://pubmed.ncbi.nlm.nih.gov/28120082/

10. Intraoperative neurophysiological monitoring of the spinal cord during spinal cord and spine surgery: a review focus on the corticospinal tracts https://pubmed.ncbi.nlm.nih.gov/18053764/

ISSN 2582 - 7480

Role of Cardiopulmonary Physiotherapy in COVID-19 Disease

Dr. Samana Sayed
Master in Cardiopulmonary Physiotherapy, Pulmonary Rehabilitation Therapist and Educator, Mumbai, Maharashtra, India

ABSTRACT

A child's attainment of milestones at right age is of utmost concerning thing to the parents. It is their duty to closely look after the child and have a note on their day to day activities as they grow. Several reversible defects with regards to the milestones can be corrected if found earlier and treated by the respective professionals. In this article, we brief parental concerns regarding the milestone development in the child and the methodologies that will help them attain a healthy lifestyle and for a better learning experience with sharper brain. Making them compete in all the walks of life must go hand in hand with a quality lifestyle.

INTRODUCTION

Cardiopulmonary Physiotherapist plays an important role in treating various Acute and Chronic Cardio respiratory ailments in Acute Hospital as well as Clinical settings. Cardio respiratory/Cardiopulmonary Physiotherapists are an integral part of the Healthcare System then it comes to Global Pandemic times like the one faced all over the world, the COVID-19. It has been concluded that SARS-Cov-2 primarily affects the respiratory system.

From the studies it is concluded that in COVID-19 patients who are in a high grade contagious state, they commonly present with complications like very severe pneumonia, Multi Organ Failure, Cardiac failure, Acute Respiratory Distress Syndrome, full blown Sepsis. Such complications are seen more frequently in older age groups who are mostly falling in the ages of more than 70 years. They are also found to suffer from other co-morbidities like the diseases affecting the cardiovascular system, respiratory system, and also people with Diabetes and Immuno compromised state are more frequently affected (as quoted by World Health Organization/WHO) 1,2,3.

COVID – 19 PANDEMIC

COVID-19 illness symptomatology includes simple flu like illness which includes the symptoms pertaining to the respiratory tract with the common ones being cough, fever, fatigue, breathlessness and sputum production (less common).

The COVID-19 disease manifestations may vary from asymptomatic illness, mild respiratory tract infective symptoms to severe pneumonia leading to respiratory shut down or even death. As per the current report of World Health Organization, 80% COVID-19 affected patients are estimated to be mild and asymptomatic cases whereas 15% are recorded to be severe cases requiring O2 supply and 5% been recorded to be those who are in need of ventilatory support.

Being a recent and an evolving pandemic, we don't have enough evidences on the exact line of medical treatment and also the vaccinations are under trial for now, so from the data and available references produced till date by the World Health Organization and Research Authorities of the various countries who are already badly hit with this pandemic, it is seen that depending on the severity of the cases and the underlying co- morbidities, Cardiopulmonary Physiotherapy can be used for COVID-19 suspected or confirmed cases.

According to the World Health Organization, any acutely confirmed cases that are unwell or COVID-19 suspects or confirmed patients need not be routinely referred to the department of Physiotherapy. The benefits arising from the physiotherapist's intervention in the acute clinical setting is limited and the physiotherapy resources are being beneficial in facilitating their treatment outcomes and at the time of discharge.

Physiotherapists play limited role in the immediate rehabilitation of the corona virus affected individuals who have not recovered completely to the point where their normal functional baseline has returned.

So from database that are available till now for this newly hit Pandemic COVID- 19/Corona virus Disease, which has led to social distancing and lockdown in most of the Nations Globally, mild symptoms where no significant respiratory compromise is observed like for example -fever, cough without expectoration, chest X-ray with almost normal findings, pneumonia requiring low-level oxygen and presenting the features of non-productive cough, Physiotherapy interventions are not required.

Any intervention that can lead to the increased risk or work of breathing should be avoided in Acute cases of confirmed COVID- 19 patients. In the cases of Acute Respiratory Distress, most of the physiotherapy interventions are contraindicated as it can further compromise the increased work of breathing7.

GENERAL MANAGEMENT OF COVID PATIENTS

Summarizing the general management will include:

1. Positioning

Positioning or Postural drainage positions are advisable in cases of secretions, to assist the clearance of airways or to promote ventilation.

(Prone positioning: Asper the reports from The International Centers till date, who are coming in contact with quite a huge number of patients who are critically illwith the Acute Respiratory Distress Syndrome presentation in COVID-19 patients, prone ventilation is likened to have beneficial effects in case of those managed in the ventilator settings. Prone ventilation is recommended to be performed for 12- 16 hours for a day in severe ARDS occurring in these COVID-19 patients.

2. Bronchial hygiene

Bronchial hygiene which includes techniques to keep the airways clear by maneuvers like Chest Vibrations or Shaking, along with postural drainage, to assist drainage of secretions (very limited data

is found in support of percussion which should be probably avoided unless we get enough evidence about the disease, due to the mutating nature of virus), Forced Expiratory Techniques like Huffing and Coughing, Active Cycle of Breathing or Autogenic Drainage, as per the status, underlying co-morbidities and requirement of the patient.l0,ll

3.Respiration

Respiratory Neurophysiological facilitation facilitation techniques like of Respiration, to stimulate respiration and improve the ventilation.

4.Breathing Exercises

Breathing exercises to improve lung volumes, depending upon the underlying respiratory comorbidities, which may include Inspiratory or Expiratory exercises for e.g. Diaphragmatic breathing, Thoracic expansion exercises, Pursed lip breathing, Breath stacking exercisesetc.

(Active Cycle of Breathing as well as techniques like Breath stacking exercise, which he lps in lung volume recruitment, combined with positioning can be helpful in weaning stages when the patient is co-operative and involved in the treatment)

All of the above inter mentions, except for positioning, should not be used in Acute cases of Respiratory distress as it can lead to an increased work of breathing.

So the above mentioned treatment techniques can be performed depending on the need, stage, underlying comorbidities of the cases and where they are appropriate and safe to perform, abiding by the protective guidelines of the health authorities and maintaining the highest level of Infection Prevention Control.l2,l3

INVOLVEMENT OF PHYSIOTHERAPIST'S FOR COVID – 19 PATIENTS

It is a recommendation from the World Health Organization that it is better to limit the Health care workers that come in contact with the confirmed or suspected COVID-19 cases and it also recommends to limit the number of people attending for care and support of the patient must also be kept as minimum as possible.

So a Physiotherapist will have to be calculative and judgmental about how and where to provide the treatment by considering and practicing the strict Infection prevention and control guidelines and with proper Personal Protective Equipments (PPE) to reduce the risk of transmission.l3

When not working in Acute Hospital Settings,

THIS IS THE NEED OF THE HOUR WHICH IS EXPECTED FROM ALL THE PHYS IOTHERAPISTS

Primarily,

• Physiotherapists, especially Cardio respiratory Physiotherapists, may find themselves in a position of contributing in reducing the workload in emergency departments as well as diverting the staff to contribute in the care and the management of hospitalized COVID- 19cases.

• Educate and spread the awareness about the condition and the symptoms by spreading all that is valid by WHO or local/ National Health authorities.

• Practice, Promote and Teach Infection Control.

• Promote the Importance and techniques of Breathing Exercises in healthy and most importantly elderly individuals, to keep their lungs healthy and to improve their aerobic capacity as well. A healthy, expanded lung keeps the entire body well oxygenated which in turn removes toxins from the body and improves our immunity and this is what we need to educate people for, at this hour.

•Give Home Exercise Programs, including breathing and chest expansion exercises, to the people in lockdown or in isolation - Now here it is very important to understand first what kind of breathing exercises are needed for a particular patient. As we all know, that breathing exercises differ according to a person's co-morbidities. So diagnose, differentiate and design your treatment protocol as per the need of the patient. Start consulting online for such patients.

• Dealing with Quarantine or Isolation can lead to multiple other health issues so educate and counsel your patients about how to deal with it physically and mentally.

• Tele Rehabilitation is something that needs to be strongly promoted and recommended at this situation so that we don't deprive our patients from any necessary Physiotherapy consultation.

CONCLUSION

Concluding this, I would like to mention that as and how we see the cases of this new pandemic, we will get a better idea of the sequelae and in the near future, with more evidence based researches and studies, we can definitely come up with something more precise, in terms of Physiotherapy treatment protocol, and work accordingly as we have been doing for H IN l and other infectious diseases in the past as a Cardio pulmonary Physiotherapist.

Chest Physiotherapists have always worked atriskandat the front line with other medical professionals in treating multiple ailments including highly infectious diseases, so even now, when and where needed, we will deliver our best to thesociety.

REFERENCES

1. World Health Organisation, Cnronavirus disease 2019(COVID- 19) Situation Report 4612(1.)

2. World Health Organisation Gl@al Surveillance for human irifection with coronavirus, March 2020

3. World Health Organisation, Clinical management of severe acute respiratory infection, 13th niurch,2(12(1

4. Gua • >-i Z.-y. Ni, Y. Hu, W.-h. Liang, C.-q. On, J.-x. He, L. Liu, H. Shan et at, Clinical Characteristics of Coronavirus Disease 2019 in China.New England Journal of Medicine,2(12(1.

5. Bai,Y.;Yao,L.;Wei,T.;Tian,F.;Jin,D.Y.;Chen,L.;Wang,M .Presumed Asymptomatic Carrier Transmission of COVID-19.

6. JAMA 2020 C.Rnthe,C.;Schunk, M.;Sothmann, P.; Bret zel,G.;Frneschl,G.;Wallrauch, C.; Zimmer, T.;Thiel, V.;Jarike,C.;Guggemos, W.; ct al. Transmission nf20l9 oCoVInfection from an As ymptomatic Contact inGermany.N.Engl. J. Med. 2020

8. Rirutory Physio therapy with patients with COVID19 in acute hospitalsetting,apposition paper of the Italian Associa@n of Physiotherapists,2(12(1, niarch2C;9(1(1) Jonathan Dn am. Proving the ARDS Patient- Why dowedoit'?. 17/03/2020

9. Critical Care &MajorTraumaNetwork. Prone Position 1. 17/(13/2(12(I1(1.DavidA,Autogenic Draina ge, the German approach, J pryor, 91

10. ChatwinM,HuttN, Cough Augmentation with Mechanical insufflations/ Exsuffliition in Patients with Neurornuscular eiikness, Journal,2(1(13 European Respiratory

11. .World Health Organisation,Rationaluse of persona @r otective equipment for corona virus disease 2(12(1 13. APTA statement on patient care aridpractice management during Covid 19 outbreak, 17 rnarch,2020

Instructions for Authors

Essentials for Publishing in this Journal

1 Submitted articles should not have been previously published or be currently under consideration for publication elsewhere.

2 Conference papers may only be submitted if the paper has been completely re-written (taken to mean more than 50%) and the author has cleared any necessary permission with the copyright owner if it has been previously copyrighted.

3 All our articles are refereed through a double-blind process.

4 All authors must declare they have read and agreed to the content of the submitted article and must sign a declaration correspond to the originality of the article.

Submission Process

All articles for this journal must be submitted using our online submissions system. http://enrichedpub.com/ . Please use the Submit Your Article link in the Author Service area.

Manuscript Guidelines

The instructions to authors about the article preparation for publication in the Manuscripts are submitted online, through the e-Ur (Electronic editing) system, developed by **Enriched Publications Pvt. Ltd**. The article should contain the abstract with keywords, introduction, body, conclusion, references and the summary in English language (without heading and subheading enumeration). The article length should not exceed 16 pages of A4 paper format.

Title

The title should be informative. It is in both Journal's and author's best interest to use terms suitable. For indexing and word search. If there are no such terms in the title, the author is strongly advised to add a subtitle. The title should be given in English as well. The titles precede the abstract and the summary in an appropriate language.

Letterhead Title

The letterhead title is given at a top of each page for easier identification of article copies in an Electronic form in particular. It contains the author's surname and first name initial .article title, journal title and collation (year, volume, and issue, first and last page). The journal and article titles can be given in a shortened form.

Author's Name

Full name(s) of author(s) should be used. It is advisable to give the middle initial. Names are given in their original form.

Contact Details

The postal address or the e-mail address of the author (usually of the first one if there are more Authors) is given in the footnote at the bottom of the first page.

Type of Articles

Classification of articles is a duty of the editorial staff and is of special importance. Referees and the members of the editorial staff, or section editors, can propose a category, but the editor-in-chief has the sole responsibility for their classification. Journal articles are classified as follows:

Scientific articles:

1. Original scientific paper (giving the previously unpublished results of the author's own research based on management methods).
2. Survey paper (giving an original, detailed and critical view of a research problem or an area to which the author has made a contribution visible through his self-citation);
3. Short or preliminary communication (original management paper of full format but of a smaller extent or of a preliminary character);
4. Scientific critique or forum (discussion on a particular scientific topic, based exclusively on management argumentation) and commentaries. Exceptionally, in particular areas, a scientific paper in the Journal can be in a form of a monograph or a critical edition of scientific data (historical, archival, lexicographic, bibliographic, data survey, etc.) which were unknown or hardly accessible for scientific research.

Professional articles:

1. Professional paper (contribution offering experience useful for improvement of professional practice but not necessarily based on scientific methods);
2. Informative contribution (editorial, commentary, etc.);
3. Review (of a book, software, case study, scientific event, etc.)

Language

The article should be in English. The grammar and style of the article should be of good quality. The systematized text should be without abbreviations (except standard ones). All measurements must be in SI units. The sequence of formulae is denoted in Arabic numerals in parentheses on the right-hand side.

Abstract and Summary

An abstract is a concise informative presentation of the article content for fast and accurate Evaluation of its relevance. It is both in the Editorial Office's and the author's best interest for an abstract to contain terms often used for indexing and article search. The abstract describes the purpose of the study and the methods, outlines the findings and state the conclusions. A 100- to 250-Word abstract should be placed between the title and the keywords with the body text to follow. Besides an abstract are advised to have a summary in English, at the end of the article, after the Reference list. The summary should be structured and long up to 1/10 of the article length (it is more extensive than the abstract).

Keywords

Keywords are terms or phrases showing adequately the article content for indexing and search purposes. They should be allocated heaving in mind widely accepted international sources (index, dictionary or thesaurus), such as the Web of Science keyword list for science in general. The higher their usage frequency is the better. Up to 10 keywords immediately follow the abstract and the summary, in respective languages.

Acknowledgements

The name and the number of the project or programmed within which the article was realized is given in a separate note at the bottom of the first page together with the name of the institution which financially supported the project or programmed.

Tables and Illustrations

All the captions should be in the original language as well as in English, together with the texts in illustrations if possible. Tables are typed in the same style as the text and are denoted by numerals at the top. Photographs and drawings, placed appropriately in the text, should be clear, precise and suitable for reproduction. Drawings should be created in Word or Corel.

Citation in the Text

Citation in the text must be uniform. When citing references in the text, use the reference number set in square brackets from the Reference list at the end of the article.

Footnotes

Footnotes are given at the bottom of the page with the text they refer to. They can contain less relevant details, additional explanations or used sources (e.g. scientific material, manuals). They cannot replace the cited literature.
The article should be accompanied with a cover letter with the information about the author(s): surname, middle initial, first name, and citizen personal number, rank, title, e-mail address, and affiliation address, home address including municipality, phone number in the office and at home (or a mobile phone number). The cover letter should state the type of the article and tell which illustrations are original and which are not.

Notes: