

## COVID-19 Forum: Transformation of Our World and Mental Health Promotion

# COVID-19 PANDEMIC AND THE PROVISION FOR ELECTROCONVULSIVE THERAPY AND OTHER NON-INVASIVE BRAIN STIMULATION IN INDIA: A TEMPLATE FOR FUTURE PANDEMICS

Santanu Nath<sup>1</sup> & Susanta Kumar Padhy<sup>2</sup>

<sup>1</sup>Department of Psychiatry, All India Institute of Medical Sciences, Deoghar, India, India

<sup>2</sup>Department of Psychiatry, All India Institute of Medical Sciences (AIIMS), Bhubaneswar, Odisha, India

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### SUMMARY

The coronavirus disease (COVID-19) has emerged as a major public health concern worldwide. While containing the infection and caring for the ill has been a focus over the last 2 years, there has also been a burgeoning concern for mental health issues during this never-ending pandemic. The focus of health care machinery prioritized confronting and containing the pandemic that had majorly side-lined other aspects of public health. This also impacted persons with mental illness (PMI) requiring Electroconvulsive Therapy (ECT), an often essential and life-saving treatment and thus an essential procedure. ECT and other non-invasive brain stimulation (NIBS) services have seen a setback during this pandemic both in terms of its accessibility by the PMI and in effectively delivering its benefits by psychiatrists. In this article, we will be discussing the problems with provision and delivery of ECT services as well as other NIBS during this pandemic with a brief outline on the solutions for such with special focus on a developing country like India. This article will also endeavour in providing a roadmap in the delivery and provision of NIBS modalities of therapy for future pandemics, if any.

**Key words:** electroconvulsive therapy - non-invasive brain stimulation - COVID-19 - pandemic

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### INTRODUCTION

The coronavirus disease (COVID-19) has emerged as a major public health concern worldwide in the last 2 years. While a promising trend of flattening and down-sloping of the infection curve has been a relief to us, the burgeoning mental health issues as a direct or indirect consequence of COVID-19 has been a widely discussed topic during this pandemic. Reports were abundant on various mental health conditions proportionate to the various aspects of the infection, the nationwide lockdowns and its consequent impact on the social, political, economic, religious and cultural domains of human life (Jakovljevic et al. 2020). With the pandemic receding down, there were emerging literatures on long-term mental health sequelae of COVID-19, otherwise also known as the long-COVID (Aiyegbusi et al. 2021). While a prompt mental health care delivery was the need of the hour, the pandemic and the ensuing lockdown had globally impacted both its delivery and access; with India being no exception. During the pandemic, the focus of health care machinery had prioritized confronting and containing the pandemic that majorly sidelined other aspects of public health as was evident from stopping non-essential services like elective surgeries, discharging stable admitted patients, shutting down outpatient services and earmarking more beds for admitting and

managing COVID-19 patients (Grover et al. 2020). This also impacted persons with mental illness (PMI) requiring Electroconvulsive Therapy (ECT), an often essential and life-saving treatment and thus an essential procedure (American Psychiatric Association. 2020). ECT and other non-invasive brain stimulation (NIBS) services had seen a setback during this pandemic both in terms of its accessibility by the PMI and in effectively delivering its benefits by psychiatrists. In this article, we will be discussing the problems with provision and delivery of ECT services as well as other NIBS during this pandemic with a brief outline on the solutions for such. We shall also attempt in providing a roadmap for future pandemics, if any, with respect to the provision and delivery of NIBS modes of therapies.

### THE PROBLEM WITH ECT SERVICE DELIVERY AND ITS CONSEQUENCES

ECT has been traditionally used both as an elective and an emergency treatment modality in psychiatry. The major indications for its use are suicidality, catatonia, treatment resistance, food and water refusal, past response with ECT and in conditions (pregnancy, geriatric population) where psychopharmacological agents can possibly pose a risk (Kellner et al. 2020). The major concern with ECT during this pandemic is in the risk of

spreading the infection either during patient enrolment to administering anesthesia, using the anaesthesia workstation, administering ECT to them and the consequent post-ECT period. The SARS-COV-2 virus spreads by droplets and aerosols and hence apart from patients, the psychiatrists, anaesthesiologists, nursing staffs and other supporting staffs are at risk of contracting this infection if adequate precaution is not warranted at appropriate steps (Colbert et al. 2020). The reasons for stoppage/lessening of ECT services during this pandemic can be manifold. Firstly, the fear of spread of this viral infection to patients and the treating team. Secondly, lack of adequate anaesthesiologists for ECT who are otherwise rescheduled to be posted in critical care units managing critically ill SARS-COV-2 patients. Thirdly, in many earmarked COVID-19 hospitals, specialist doctors who are not directly involved in treating COVID-19 patients, like psychiatrists and others are diverted to provide care to COVID-19 patients which is leading to paucity of enough psychiatrists in administering ECT and lastly, a perceived step-motherly attitude towards psychiatry by other speciality disciplines, which is otherwise considered to be a non-essential medical discipline and ECT being not prioritized as an essential medical procedure in hospitals (Henderson et al. 2014, Slade et al. 2017). Discontinuation of ECT services can impact those patients who were planned for ECT, those who were midway in completing the ECT course and those who were on maintenance ECT. This will reciprocate in worsening of their mental health conditions and can manifest in more treatment resistance, suicidality, loss of functionality and productivity. The 6-months relapse rate with ECT discontinuation in major depression has been estimated to be as high as 37% which is also similar in those patients whose maintenance ECT is discontinued (Jelovac et al. 2013, Huuhka et al. 2012). In schizophrenia, the relapse rates at 6 months, 1 year, and 2 years are as high as 29.3%, 42.7%, and 51.6%, respectively following a course of ECT (Shibasaki et al. 2015). For many patients, who have relapsed with an acute course of ECT, maintenance ECT remains a viable option. Discontinuation of maintenance ECT also results in a higher proportion of relapse, around 61.1% after its discontinuation (Martínez-Amorós et al. 2020). In a country like India that has a treatment gap for mental disorders of 70-92% (National Mental Health Survey of India 2016), discontinuation of an essential medical service like ECT during this tough pandemic times can lead to breakdown of essential psychiatric services doing more harm than good and further exacerbating this gap.

## THE SOLUTION

The possible solutions to these difficulties lies in continuation of this essential mental health service with necessary precautions during this era of respiratory viral pandemic. This will ensure minimizing infection spread to and from the patients, the psychiatrists, the anaes-

thesiologists, nursing staffs and other supporting staffs involved in the ECT procedure. Different countries and psychiatric societies have come up with various advices and guidelines for psychiatrists to be followed while giving care to PMI during this pandemic. A significant proportion of them also speaks of ECT service delivery in these times. The National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, India, a premier institute in the country, has come up with guidelines for ECT practices in this COVID-19 times (Baliga et al. 2020). This was followed by a viewpoint in the October 2020 edition of the national journal of the Indian Psychiatric Society (Indian Journal of Psychiatry) that focuses on specific advices with regards to ECT practices (Grover et al. 2020). There are also guidelines and viewpoints on anaesthetic practices for ECT during this pandemic (Lapid et al. 2020, Schumann et al. 2020). The following suggestions can be considered to ensure safety and to contain the infection spread during the ECT procedure. These recommendations can also be considered when one needs to administer ECT to a PMI who also has a concurrent active COVID-19 infection. They can be also followed for future pandemics involving respiratory viral infections.

## GENERAL CONSIDERATIONS BEFORE ENROLLING PATIENTS FOR ECT

- To reserve ECT for emergency cases (eg harm to self and others, catatonia, food and water intake refusal) and to postpone its use for elective cases considering risk-benefit analysis.
- Judicious use of pharmacotherapy and non-pharmacological approaches in cases where a decision for ECT can be put aside.
- To consider cases where clinical benefits should outweigh risks (transmission of the infection) while administering ECT.
- ECT is generally provided twice or thrice weekly to ensure its benefit (American Psychiatric Association. 2001). During this pandemic, considering risk-benefit analysis, it can preferably be administered only twice/ week. This will ensure lesser exposure for both patients and the treating team to this deadly virus and will also give ample time for adequate disinfection of the ECT area.
- Before enrolling patients for ECT, they should be adequately screened to rule out a possible infection. This should be adequately supplanted with a negative Reverse transcriptase-Polymerase Chain Reaction (Rt-PCR) report for SARS-COV-2. We recommend that if two sessions are administered in a week (refer to point 4), they can be planned on Tuesdays and Fridays for an even distribution in a week. A negative Rt-PCR report can be sought for at least not more than 72 hours before a session.

- Patients receiving maintenance ECT generally travel from their residence to the psychiatry set-up on the day for of the procedure. They can be communicated to undergo a mandatory Rt-PCR test before they can be taken for ECT.
- Emphasis should be there while taking written consent from the patient or his/her relative in which the risk of infection spread through ECT should be elaborately discussed.

## **PRECAUTIONS DURING THE PROCEDURE**

- The ECT room including the pre-ECT and the post-ECT area should be well ventilated. Air-conditioners have been often implicated in infection spread though reports are conflicting (Jan 2020). It will be necessary to follow the hospital norms regarding its functionality while working in a closed ECT room.
- Minimum number of patients be transported to the pre-ECT room where they better be rested maintaining physical distancing. This will also be needed in the post-ECT room which calls for a swift movement of post-ECT patients to their respective beds.
- There should be minimum number of staffs in the ECT room who should stand separately maintaining adequate physical distancing. All should wear a personal protective equipment (PPE) kit. There should be provision for hand washing and/or sanitizing. The staffs should avoid unnecessary touching their faces.
- All the staffs should be aware of their role so as to ensure promptness in their functioning which will reciprocate into a swift transport of the patient inside the ECT room to a rapid ECT delivery and a quick mobilization of the patient out of the ECT area. There should be pre-decided clear instructions about when to enter the ECT room and when to leave the area after their designated roles have been duly executed.
- PPE after doffing should be disposed appropriately as per the Indian Council for Medical Research (ICMR) guidelines (Ministry of Health and Family Welfare; Government of India 2020).
- Equipment used during the procedure should be handled as per the standard infection control protocols.
- Some modifications can be forthcoming in lessening infection spread while administering ECT. To ensure a seizure at a single attempt, modified bilateral electrode placement with a brief-pulse ECT can be preferred over any other forms (Grover et al. 2020, Baliga et al. 2020). Also, using a suprathreshold stimulus in each ECT session (after proper calculation of threshold stimulus) can ensure an ictal event thus minimizing repeated administration, lesser stay in the ECT room and a faster recovery.

- There should be designated waste bins (colour coded) which should be well-covered and they should be routinely emptied maintaining adequate waste disposal techniques.
- Agitated patients are at risk of spreading the virus through droplets/aerosols. In such cases, agents like midazolam (having a very low half-life) can be judiciously used to rapidly calm the patient before taking him to the procedure table.
- All disposable equipments like breathing circuit, reservoir bag, patient mask, gas sampling tubing should be discarded after use for each patient. The ECT electrodes after each patient should be sanitized using a 70% alcohol-based sanitizer. Other exposed surfaces like including the railing cots should be sanitized with a disinfectant (e.g., 1% sodium hypochlorite) after which these surfaces can be wiped off with a disposable wipe (Baliga et al. 2020).
- The linen of the bed should be adequately washed with a detergent along with other hospital laundry.

## **PRECAUTIONS AFTER THE ECT PROCEDURE**

- The treating team should foresee possible complications including tachypnea, prolonged apnea, hypoxia and desaturation, excessive secretions and be prepared to manage them efficiently.
- Procedures like upper respiratory suctioning often induces cough which is aerosol generating. Necessary safety measures should be employed at this step.
- The waiting period in the post-ECT recovery room should be minimized so as to avoid crowding when the next patient enters this area after receiving ECT.
- Agitation during the post-ECT confusion state should be judiciously and carefully tackled so as to minimize the spread of infection, if any.

## **ANAESTHESIA RELATED PRECAUTIONS DURING ECT**

The primary concern with regards to anaesthesia during ECT in COVID-19 times is related to Bag-Mask Ventilation (BMV) which is a highly aerosol generating procedure (Luccarelli et al. 2020). A high-quality mask seal and manual ventilation with a High Efficiency Particulate Air (HEPA) filter equipped BMV apparatus produces minimal aerosolization, and can be a preferred airway management technique during ECT (Chan et al. 2018). The mask should be snugly fit in a non-suffocating manner and use of mask straps can be employed. Anti-sialogogues like glycopyrrolate/ atropine should be considered in every patient for drying the upper respiratory secretions which will lessen viral spread during and after the ECT. Post-ECT, oropharyngeal suctioning, if needed, can be done before recovery of muscle

strength. If the patient is coughing, cough suppression can be achieved with agents like remifentanyl and/or lidocaine or propofol or other medication after seizure completion (Schumann et al. 2020).

Still today, standing on the 12<sup>th</sup> month of this pandemic, there is only a single report of a patient diagnosed with severe depression with catatonia who also had COVID-19 related pneumonitis and who was administered ECT with adequate precaution leading to a good outcome (Braithwaite et al. 2020). With anonymity regarding how long this pandemic is going to last, psychiatrists and anaesthesiologists are required to come forward in delivering this essential medical service to persons with mental illness.

### **POSITION OF OTHER BRAIN STIMULATION THERAPIES DURING COVID-19: LOOKING FORWARD TO THE FUTURE**

There is dearth of literature on the use of other Non-invasive brain stimulation (NIBS) modalities during this COVID pandemic in comparison to that of ECT. Among them, Transcranial Magnetic Stimulation (TMS) and low intensity transcranial Electrical Stimulation (tES) - including transcranial Direct Current Stimulation (tDCS) and transcranial Alternating Current Stimulation (tACS) has been prominently discussed in the COVID-19 context. An expert consensus paper on the use of the above modalities in this pandemic time has recently been published in the journal of 'Brain Stimulation' that aimed at providing a roadmap to facilitate rapid, prudent, and coordinated NIBS operations both from a therapeutic and a research-oriented purpose (Bikson et al. 2020). This came after a multi-country survey that addressed the impact of the COVID-19 pandemic (phase-wise) to institutions applying NIBS world-wide including India (Kasturba Medical College, Manipal, India). The consensus reached were in lines to that mentioned above for ECT services and it ended with a provision for 'tele-neuromodulation' (Bikson et al. 2020). Currently tele-neuromodulation is only limited for tDCS (home-based) in cases of limited in-center accessibility (eg geographical distance, financial issues, mobility problems and others) for a wide range of diagnosis like depression, Parkinson's disease, stroke, multiple sclerosis etc. Though this home-based approach is beyond reach for ECT and TMS, there are reports of a consideration to explore opportunities for transition to home-based tDCS as a valid alternative option with successful results (Clayton et al. 2018, Wysokinski 2020). These are obviously after considering risk-benefit analysis on an individual basis.

Another form of NIBS is the theta burst stimulation (TBS) which is a modification of the conventional fixed frequency TMS and have emerged as a highly potent and temporally efficient form of brain stimulation in recent years (Bikson et al. 2020). The advantages of

intermittent TBS (iTBS) during this COVID-19 times is in the fact that it does not necessitate the need for anaesthesia, thus negating the chance of spread of infection and secondly, a briefer duration of contact between the treating team and the patient which is an added advantage over both TMS and ECT (Konstantinou et al 2020). Till evidences accumulate, psychiatrists can harvest on these types of NIBS, if facilities are available, till we are out of the grip of this pandemic. With evidences in hand, such newer NIBS therapies can hold promise for the future, whether we fall in the prey of any future pandemics or otherwise.

### **NIBS AS A THERAPEUTIC MODALITY FOR COVID-19: A HOPE FOR FUTURE RESPIRATORY INFECTION PANDEMICS?**

The role of NIBS in treating respiratory problems due to COVID-19 has recently quite intriguingly been a focus of newer research. Azabou et al., 2020 proposed a research protocol (The tDCS-DYSP-COVID Protocol) which plans to assess the efficiency of low intensity tDCS for dyspnea relief in mechanically ventilated COVID-19 patients in intensive care units. The literature supporting this study lies on the action of tDCS on pain perception, modulating the excitability of the respiratory neurological pathways (Azabou et al. 2020) and also in mitigating anxiety and stress in COVID-19 sufferers (Shinjo et al. 2020. Vagal Nerve Stimulation (VNS) (an invasive brain stimulation modality) has also been reported to have a similar effect albeit in a different manner by mitigating the cholinergic inflammatory response in COVID-19 and providing symptomatic relief (dyspnoea, cough and chest tightness) that even decreased requirement for opioid anti-tussives (Staats et al. 2020). Although in a very nascent stage, with accumulating data, we can probably expect NIBS modalities to supplant the usual management protocol for COVID-19 in months or years to come taking into consideration that this pandemic is probably not going to get over soon. Since, researchers have already started to work on this novel use of NIBS modalities, we can remain optimistically expectant of their rational use as novel therapeutic options for any future pandemics involving respiratory infections.

### **ROLE OF TELEMEDICINE IN PROVISION FOR ECT SERVICES AND OTHER NIBS METHODS: STRENGTHENING THE FUTURE**

The current pandemic has seen a phenomenal shift into the implementation and practice of telemedicine when in-person mode of medical consultation has been a challenge (Nath et al. 2020, Kannarkat et al. 2020). NIBS modalities like ECT, TMS, tDCS etc can never be delivered through telemedicine approach. The current



telepsychiatry guidelines of India is silent on whether NIBS can be prescribed through a teleconsultation (Bada Math et al. 2020), but some components of their application and service provision can be tailored through this ever-evolving novel consultation model. Any form of NIBS involves at least three essential physician-patient contact viz during obtaining written consent for the procedure, during the initial screening procedure and in following up the effects of the procedure (Bikson et al. 2020). A part or all of them can be smoothly tailored through telemedicine approach. The consent can be taken through a teleconsultation whereby a video/ audio call can suffice explaining the NIBS procedure to the patient/ relatives followed by electronically signing an informed consent form. The patient can also be easily screened for possible COVID-19 infection through a teleconsultation with an online prescription requesting a nasal swab test for Rt-PCR. A preliminary pre-anaesthetic checkup, wherever necessary, can also be done through telemedicine. Follow up visits can be also done efficiently through this approach with keeping a high degree of clinical suspicion looking for possible signs of a relapse. The world is acclimatizing to the new-founded concept of the 'new normal' during this ongoing pandemic and telemedicine can play an important role albeit cautiously with ECT and other NIBS therapies.

## CONCLUSION

The COVID-19 pandemic, just like all crises, has yielded challenges for researchers, clinicians, participants and patients, but also lessons to learn from and new opportunities to pursue. Shutting down of essential ECT services during this pandemic is never a rational option. A strict vigilance into the do's and don'ts in this tough time can pave a long way in ensuring safety from COVID-19 infection for both the patients and the treating physicians, thus easing the safe delivery of ECT and other NIBS treatment modalities. There are issues with mental health as long-term sequelae of COVID-19 infection (long COVID) that includes depression, anxiety disorders etc which may require ECT (Aiyegbusi et al. 2021). When indicated, ECT should not be withheld in these conditions if benefits outweigh risks. ECT being a life-saving medical intervention, whenever indicated, it should be actively pursued. The current practices can serve as a template in years to come preparing us for any future pandemics.

### Contribution of individual authors:

Santanu Nath wrote the full manuscript and looked for relevant literature for drafting the manuscript, reviewed the manuscript in the last before submission.

Susanta Kumar Padhy conceptualized the topic in view of the current needs, drafted few areas of the paper and reviewed the final manuscript before submission.

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Correspondence:

Assistant Professor Santanu Nath, MBBS, MD, DNB  
Department of Psychiatry, All India Institute of Medical Sciences  
Deoghar, India  
E-mail: beta.santanu@gmail.com