Clinical Practice Guidelines for the Use of Electroconvulsive Therapy

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INTRODUCTION

Electroconvulsive therapy (ECT) is a clinical procedure where a small dose of electric current is passed through the brain for a brief period to induce seizures for therapeutic purposes in psychiatric (and certain neurological) conditions. Modified ECT is the modern form of ECT where the electrical stimulus is given under general anesthesia and muscle relaxation. This is one of the most effective treatments for many psychiatric conditions. Modern modified ECT is a safe treatment when practiced with adequate knowledge, skills, and expertise. Following the basic standards of ECT practice is necessary for better clinical outcomes including minimal cognitive adversities. This guideline document is aimed at enabling consistent, safe, and effective practice of ECT in patients in applicable psychiatric disorders.

METHODS

These guidelines are developed as part of the initiative of Clinical Practice Guidelines (CPG) subcommittee of Indian Psychiatric Society. The initial draft guideline was developed by the authors. The information was sourced from key research articles, national/international guidelines on psychiatric care, and ECT. No formal systematic literature search was conducted. The current guideline was prepared to suit the existing Indian mental health care system and legislations. The draft was further presented and discussed in the in-person workshop of CPG-2022. The draft was revised following the discussion in the workshop based on the consensus-based recommendation method.

This guideline is not a directive or mandatory instruction but a guidance document for professional practitioners administering ECT. This is not a full and complete review of ECT procedure. But it is intended to improve patient outcomes by facilitating best practice standards by maximizing benefits and minimizing adversities.

USE OF ELECTROCONVULSIVE THERAPY

Indications

Table 1 shows the indications for ECT. Evidence exists for the efficacy of ECT in depressive episodes, manic episodes, and acute exacerbations of psychosis in schizophrenia. Treatment-resistant depression, mania, and schizophrenia, including clozapine-resistant schizophrenia, are well-recognized indications,[1-6] with evidence from comparative trials (comparison across types of ECT or with waitlisted patients). ECT should not be withheld until the failure of several medication/psychotherapy trials in severe depression. Health economics suggest that it is beneficial to consider ECT as a second or third line agent in severe depression. ECT is considered as first-line (primary) treatment for emergency psychiatric conditions across diagnoses. These include high suicidality, catatonia, excitement, aggression, poor oral intake, acute psychotic symptom exacerbations, and severe physical debilitation secondary to psychiatric disorders.[7-13] The rigor of the evidence base is limited for such indications due to ethical and pragmatic considerations in conducting sham-controlled trials in these emergency life-threatening transdiagnostic situations. It may be noted that almost all international standard guidelines suggest ECT as a first-line treatment option for these indications.[8-13]

Predictors of response

In general, older age, psychotic symptoms, and shorter episode duration are predictors of response to ECT. Melancholic features and greater baseline depressive symptom severity are also associated with better ECT response. Past good response to ECT is considered a good predictor of response for the current episode.

Continuation/Maintenance (C/M) ECT should be considered for patients with a history of severe, recurrent episodes who have failed to remain well on medications.[14]

ECT is a first-line treatment when rapid and/or definitive response to avert harm to self/others is needed. Acute suicidal risk, agitation, catatonia, and deteriorating physical status secondary to psychiatric conditions are some of such situations. After an acute course of ECT, C/M treatment with pharmacotherapy and/or psychotherapy is needed.

All the indications mentioned above have to be individualized and should be based on the clinical needs, patient's preferences, and putative risk of adverse effects.

ECT staffing

ECT without anesthesia and muscle relaxation is now

Table 1: Indications of ECT

Disorders	Indications
	Common Indications
Major depressive disorder	Poor oral intake High suicidal risk High level of distress requiring rapid symptom remission Psychotic features Melancholic features Peripartum depression Treatment resistance With severe mixed affective features
Mania	Require rapid clinical improvement Persisting/clinically significant agitation and aggression. Treatment resistant mania With severe mixed affective symptoms Delirious mania
Schizophrenia and related disorders	Acute psychosis requiring high-intensity management Acute exacerbations of positive psychotic/affective symptoms of schizophrenia and schizoaffective disorder requiring high-intensity management. Good response in the past exacerbations Treatment-resistant schizophrenia Clozapine augmentation in clozapine-resistant schizophrenia Postpartum psychosis
Catatonia	Resistant to benzodiazepine trial Good response in past episodes Malignant catatonia, risk of imminent mortality
	Uncommon indications
Autism	Severe repetitive self-injurious behavior
Dementia	Agitation and aggression
Obsessive compulsive disorder	Comorbid depression Difficult-to-treat OCD, before invasive neurosurgical procedures
Parkinson's disease	Comorbid severe depression/psychosis On-off phenomenon with nonresponse to medicines Wearing-off phenomenon
Epilepsy	Intractable temporal lobe epilepsy Status epilepticus
Neuroleptic malignant syndrome	With any dopamine antagonist (irrespective of underlying indication) Withdrawal of a dopamine agonist (irrespective of underlying indication)

prohibited under the Mental Health Care Act, 2017. Hence, the staffing shown in Table 2 is advisable for administering modified ECT.

Treatment site and equipment

The treatment suite ideally involves three distinct areas, but which are nearby or closely connected:[9,10]

a. Waiting/preparation room: should have the following facilities:
   i. Waiting area for patients and caregivers
   ii. Space for assessment: for interviewing, examining, verifying the records, and to ensure adequate preparation
   iii. Sphygmomanometer and stethoscope
b. ECT administration room
   i. ECT apparatus including bite block, electroencephalogram (EEG) monitor, and ECG monitor
   ii. Anesthetic agents (e.g., thiopentone, propofol, etomidate, ketamine, isoflurane, sevoflurane, etc.) and muscle relaxants (along with succinylcholine, at least one nondepolarizing agent like atracurium or rocuronium should be available)
   iii. Emergency medication tray to manage uncontrolled hypertension, hypotension, cardiac arrhythmia, cardiopulmonary arrest, anaphylactic shock, prolonged seizure, and status epilepticus. This should include intravenous fluids, epinephrine, dopamine, atropine or glycopyrrolate, cholinesterase inhibitors (neostigmine, physostigmine), anticonvulsants (lorazepam, diazepam, phenytoin), steroids, beta blockers (esmolol, labetalol), alpha-blockers (prazosin, clonidine), vasodilators (nitroglycerin, hydralazine), antiarrhythmics (lidocaine), analgesics (paracetamol), antiemetics (domperidone, metoclopramide), antihistamines (chlorpheniramine, cetirizine), bronchodilators (aminophylline) among others)
   iv. Vitals monitoring: sphygmomanometer, reflex hammer, oxygen saturation, ECG
   v. Intubation set: oral and naso-pharyngeal airways
   vi. Oxygen delivery system with intermittent positive pressure ventilation capabilities through a mask as well as endotracheal tubes
   vii. Suction apparatus, iv infusion set, syringes with needles, cotton and gauze pads, hand gloves.
   viii. Defibrillator
   ix. Portable cots/beds, disposable containers
c. Recovery room: should have all items iii to ix listed above

Informed consent (Supplements 1–4)

Written informed consent has to be taken before initiating ECT based on principles of shared decision-making. Consent should be taken following due procedures in accordance with the highest ethical standards and applicable laws/regulations. Written information material may be provided to the patient and caregivers, and adequate time should be provided for reverting with any clarifications. Information should be provided regarding the anticipated benefits and possible short-term and long-term adverse effects of modified ECT, including possible risks with both anesthesia and ECT, in the given individual. Discussion on the type of ECT, modification procedure, electrode placement, and expected outcomes should be included in this process. Unless the patient disagrees, it is recommended to make caregivers a part of the consenting process. If a patient does not have the capacity to consent, the same needs to be documented.

Table 2: Staffing for ECT

Staff	Number	Remarks
ECT Psychiatrist	1	Psychiatrist trained in ECT. The role is to assess patients before ECT, ensure indication of ECT, pre-ECT evaluation, determination of how each treatment is administered and documentation of these aspects.
Anesthesia provider	1	Anesthetist/Anesthesia technician. This person requires skill in conducting preanesthetic evaluation, airway management, cardiopulmonary resuscitation, emergency life-support, management of acute adverse events/medical emergencies arising during or soon after ECT. High-risk cases should be handled only by an anesthetist.
ECT nurse	1	Staff nurse trained in ECT. This can be an OT nurse with basic training in ECT-related aspects including pre-ECT assessments and consent, assisting in anesthesia, monitoring vitals, coordinating logistics and ensuring availability of supplies and ECT equipment.
Recovery nurse	1	Staff nurse trained in postanesthesia recovery care. The recovery nurse should be capable of monitoring vital signs, pulse oximetry, electrocardiogram (ECG); administering oxygenation, intravenous fluids, suctioning provide supportive care for disorientation, delirium, and/or agitation.

The advance directives, if any, have to be examined and, in accordance with that, consent may be obtained from the nominated representative. In the case of minors, oral/verbal assent (as per the age) should be obtained along with written informed consent from parents/nominated representative; the decision about initiating ECT has to be taken only after concurrence by two independent psychiatrists or a psychiatrist + a physician, and due permission from the mental health review board as per the law. As and when a patient regains the capacity to consent or attains 18 years of age, his/her consent has to be obtained for continuing ECT sessions then onwards.[15,16] Consent has to be obtained again before initiating C/M ECT, as the clinical condition, purpose (consolidation/relapse prevention), and character of treatment (frequency of ECT sessions and end-point) would have changed.

Pre-ECT evaluation (Supplement 5): This should be performed as close to the ECT course as possible.

Psychiatric and physical evaluation

Psychiatric evaluation is needed to ascertain indications. Rating scales can be used to determine these indications systematically and measure the changes during the ECT course. If the patient has received ECT in the past, details of the electrode placement and electrical parameters in earlier ECTs, level of achieved response, and associated cognitive deficits would guide the current course of ECT.

It is important to evaluate the psychotropic medications that can potentially interfere with anesthesia and ECT. For instance, anticonvulsants increase seizure threshold; antipsychotics like chlorpromazine and clozapine are known to be pro-convulsants; lithium can increase the risk of postictal delirium; tricyclic antidepressants are known to increase the risk of cardiac adverse events during ECT/anesthesia.

Physical examination is needed to identify any relative contra-indications and prevent complications [Table 3]. It should mandatorily involve fundoscopic examination along with other systemic examinations. Dental evaluation for loose or missing teeth, cardiovascular examination for arrhythmias, assessment for neurological comorbidities, and pulmonary clinical evaluation are mandatory.

Preanesthetic evaluation is recommended to plan for an anesthetic agent and a muscle relaxant. Also, suitable investigations or interventions can be planned in the presence of medical conditions associated with a substantial risk for general anesthesia-related complications. Liaison with other specialist physicians if deemed is necessary by the psychiatrist/anesthetist.

Baseline cognitive screen

Monitoring of cognitive adverse effects would be necessary for patients receiving ECT. Baseline knowledge of cognitive abilities is crucial in attributing the changes in cognitive abilities with ECT. Hindi Mental Status Examination and Mini Mental Status Examination are simple tools for monitoring, but are not sensitive to subtle cognitive changes associated with ECT. Montreal cognitive assessment battery (MoCA) and brief ECT cognitive screen are assessment tools used internationally. "Battery for ECT-Related Cognitive Deficits" (B4ECT RECODE) is a tool validated in the Indian population and is recommended to be used during the initiation and course of ECT.[10]

Investigations

For general anesthesia: hemoglobin levels, blood sugar, electrolytes, blood urea, and serum creatinine would facilitate the detection of common risk-enhancing medical comorbidities but are not mandatory. Similarly, X-ray, electrocardiography, echocardiogram, and other tests would be indicated based on physical evaluation and associated medical comorbidities

TREATMENT PROCEDURE

ECT is mandatorily used as a modified procedure, as per the law in India. The modification involves using muscle relaxants to reduce the neuromuscular injuries and using anesthetic agents to induce sedation and amnesia for the procedure involving muscle relaxation and electrical stimulation.

a. Anesthesia
   i. Preparation before anesthesia [Figure 1, Table 4 and Supplement 6]
   The procedure may be anxiety provoking. So, reassure patients while initiating the procedure including while securing iv access and placing the mask for oxygenation.
   ii. An ideal anesthetic agent for ECT would be rapidly inducing and short acting (early emergence from effects of anesthesia), has a good amnesic effect and stable systemic/cerebral hemodynamics during ECT, and would not have any effects on seizure threshold. Tables 5 and 6 provide information helpful in selecting anesthetic agents.[17]
   A combination of propofol and ketamine called ketofol can be used to balance seizure duration and hemodynamic effects. Adjunctive short-acting opiates (remifentanyl, alfentanil, fentanyl) or dexmedetomidine have dose-sparing effects and can be used, but they need more evidence of their exact role in ECT. The differential effects of anesthetic agents are dependent on their dose, and this needs to be considered while choosing the anesthetic agent.
   iii. Muscle relaxation is an important component of modified ECT. Ideal muscle relaxants should have the ability to avoid musculoskeletal injury without affecting cerebral seizure activity and provide rapid recovery without residual paralysis. Succinylcholine (0.3–1 mg/kg) is a preferred muscle relaxant due to its rapid onset and recovery. Nondepolarizing muscle relaxants may be considered in certain conditions. These include peudocholinesterase deficiency, recent organophosphorus poisoning, severe, widespread burns, hypercalcemia, severe neuromuscular disease or injury (e.g., quadriplegia, amyotrophic lateral sclerosis, muscular dystrophy), history of malignant hyperthermia in the patient or his/her family. In a patient with suspected/known history of a recent (4 weeks) suicide attempt and referred to ECT, a high suspicion of organophosphorous poisoning should be considered. There are reports of prolonged apnea even after 4 weeks of poisoning. Clinicians may consider the assessment of pseudocholinesterase level when in doubt or may use of nondepolarizing agents in such cases.

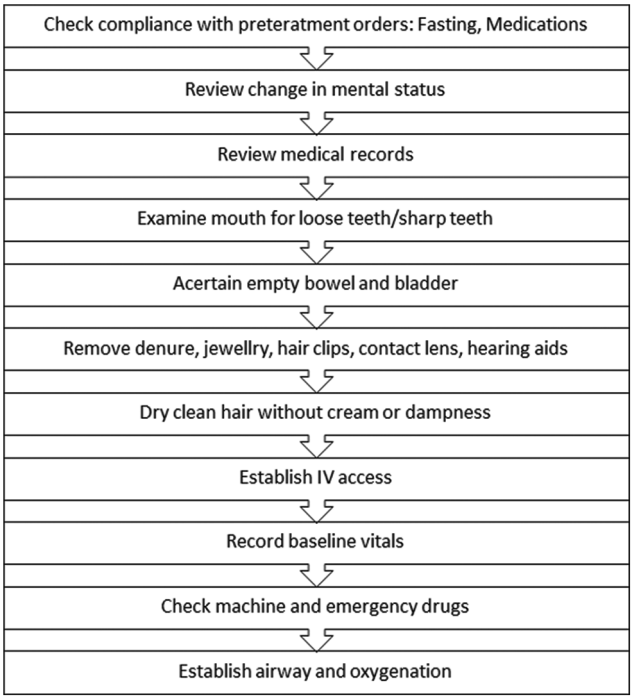

Figure 1: Steps of preanesthesia preparation

Table 3: Clinical conditions requiring caution while administering ECT

Cerebral	Ocular	Cardiac	Neuromuscular
Raised intracerebral pressure – Intracerebral space occupying lesions Unstable cerebral aneurysm Pheochromocytoma Recent intracerebral hemorrhage/stroke	Raised intraocular pressure Retinal detachment	Recent myocardial infarction Poor cardiac output Unstable arrhythmias Medical conditions associated with high-risk for general anesthesia (ASA level 4 or 5) Third degree burns	Spinal injuries Bone fractures Recurrent dislocations

Table 4: Preparation for ECT procedure

a) ECT is administered in fasting condition, after last intake of clear liquids of minimum 2 h, milk and light meals of 6 h, and fried food, fatty food, or meat over 8 h.
b) Head should be dry and clean for the procedure.
c) Medications that should preferably be avoided before the procedure: Morning dose of oral hypoglycemics, lithium, diuretics, anticonvulsants, theophylline, and benzodiazepines can be withheld, and requirement should be considered only on individual basis.
d) Medications that should not be avoided before the procedure: Morning doses of scheduled medications like antihypertensives, thyroxine, antiemetics, antireflux, antianginal, bronchodilators, and anticholinergics should not be withheld and can be taken orally 2 h before the procedure with small sips of water.

Table 5: Summary of critical properties of anesthesia agents in choosing for ECT

Properties	Propensity of the anesthetic agents
Seizure threshold: Proconvulsant >neutral >anticonvulsant	Ketamine >Etomidate>Methohexital >Sevoflurane >Thiopentone >Propofol
Heart rate (HR): Propensity to increase HR	Ketamine >Methohexital >Thiopentone >Etomidate >Propofol
Mean arterial pressure (MAP): Propensity to increase MAP	Ketamine>Etomidate >Methohexital >Thiopentone >Propofol
Emergence time: Longest to shortest	Ketamine >Etomidate >Thiopentone >Methohexitone >Propofol >Sevoflurane

Table 6: Dosage and selected properties of anesthetic agents used during ECT

Inducing agent	Influence on seizure quality	Advantages	Disadvantages
Propofol (0.75-1 mg/kg)	Shortens seizure duration Increases seizure threshold	Better hemodynamic stability in patients with cardiovascular risks Quicker emergence	Pain during injection
Etomidate (0.15-0.3 mg/kg)	Prolongs seizure duration May reduce seizure threshold	Useful in patients with high seizure threshold	Hyperdynamic response more pronounced; longer emergence time Potential for adrenocortical suppression
Methohexital (0.5-1 mg/kg)	Considered 'Gold standard'	Long history of use	Sparse availability in market; lack of familiarity with use
Thiopentone (3-5 mg/kg)	Reduces seizure duration, though less than propofol	Fast acting agent	Increased risk of arrhythmias
Ketamine (0.5-3 mg/kg)	Unclear Modest seizure enhancing effect	Useful in patients with high seizure threshold Sedative and analgesic	Emergence phenomena Reduced hemodynamic stability Potential for increased intracranial pressure Questionable amnesia
Sevoflurane (Inhalation)	Comparable to thiopentone	Useful when venous access is difficult Better hemodynamic stability Pregnancy: Reduces uterine contraction Enhances muscle relaxation	Special equipments required Time-consuming Potential for QT prolongation

Pseudocholinesterase level can be assessed in patients with high suspicion (e.g., patients belonging to Arya Vysya community, an earlier history of prolonged apnea). Routine determination of pseudocholinesterase level is not recommended. Routine prophylactic use of anticholinergics (atropine/glycopyrrolate), beta-blockers, calcium channel blockers, nitrates, hydralazine, and ganglionic blockers for cardiovascular stability is not recommended. Wherever used, the rationale for using such an agent should be noted.

b. ECT Dosing

The protocol of ECT varies considerably and choice on the protocols should be based on individual needs of a given patient. The rapidity of needed response, effectiveness, and potential cognitive adverse effects of the protocols should guide the choice.

Rather than any set of protocols, it is important to have knowledge of each parameter in the protocol, and personalization of protocol can be done based on clinical situations.[18,19]

i. Electrical Parameters

A brief or ultrabrief pulse is strongly recommended and should be administered with a constant current device. Sinewave ECT and constant voltage systems are not recommended in the modern practice of ECT due to safety concerns.

Electrical charge is generally considered as a linear measure and chief parameter of dosing. But this approach is faulty, and the combination of electric current intensity, pulse width, pulse frequency and train duration (number of pulses) along with electrode placement (stimulation site), frequency of sessions and duration of session should be carefully considered in choosing a protocol.

Electrical current intensity: Historically, 500–1000 mA has been used in the practice of ECT. Most devices come with a default current of 800–900 mA. The current intensity is known to linearly correlate with tolerability, cognitive as well as seizure quality but is generally kept constant and not modified during dose incrementation. Recently, low amplitude (200–400 mA) has been explored as part of individualized low-amplitude seizure therapy.[20] Its clinical utility is yet to be understood.

Pulse width: ECT is classified as brief pulse (0.5–2 ms) and ultrabrief pulse (0.2–0.4 ms). Pulse width is likely to have a linear effect on cognitive adverse effects with broader widths being associated with worse cognitive effects. Ultrabrief pulse of 0.3 ms has been shown to have a cognitive advantage over brief pulses with right unilateral placement in depressive disorders. But the antidepressant efficacy may be compromised with it. A lower range of brief pulse (0.5–1 ms) may be considered optimal to obtain a rapid clinical effect. But when cognitive effects are of major concern, a stimulus with ultra-brief pulse width may be chosen.[21]

Pulse frequency: The number of biphasic pulses every second is the electrical parameter that is inverse of the interpulse interval. It is an important electrical parameter that generally ranges from 20 to 240 pulses/s (10–120 Hz, i.e., bidirectional pulse pair per second). Stimuli with lower frequencies are generally more efficient, i.e., a seizure can be elicited at a lesser charge with lower frequency than with higher frequency when all other parameters are kept constant. Many ECT devices in the default increment method involve an increase in frequency. ECT clinicians should be aware of this aspect while using a default way of

increasing stimulus charges to address the issue of high seizure threshold.

Train duration: This is the most commonly modified parameter to set the dose. Generally, the pulse duration is limited by the devices. Most devices have a range of 0.2–8 s, but certain devices come with the highest limit of up to 16 s. No limit has been examined/recommended on the highest duration. An increase in charge is achieved by increasing train duration till the upper limit of the device is reached.

The number of pulses: It is directly a factor of train duration and will also be influenced by pulse frequency. The number of pulses may intuitively suggest a direct correlation with seizure. But as "crowding of pulses" is inefficient in eliciting seizure, the number of pulses by itself may not be a good indicator for setting electrical parameters.

Directionality: The default ECT parameter widely applied is bidirectional current. There are preliminary trials of unidirectional current – anodal at one site and cathodal at the other. But the evidence is limited to suggest the clinical utility of unidirectional current.

Patterned doses: Bursts of pulses are provided similar to theta bursts in transcranial magnetic stimulation. The available evidence is for continuous pulses with similar intervals, which is supported by most commercially available devices. Currently, patterned pulses cannot be recommended for routine clinical application.

ii. Electrode placement

The electrodes are placed in different ways [Figure 2]:[22-25]

1. Bilateral:
   a. Bitemporal: Classical method. One electrode is placed in the frontotemporal region (one inch above the imaginary line joining the outer canthus and external auditory meatus).
   b. Bifrontal: Electrodes placed on frontal regions (2 inches above outer canthus on an imaginary vertical line perpendicular to the imaginary line joining two pupils). Clinical trials have shown that bifrontal is equally if not more effective than bitemporal placement, but with lesser cognitive effects in patients with mania, depression as well as schizophrenia.
   c. Left anterior right temporal: Asymmetrical placement of electrodes with the left side on the frontal region and right on frontotemporal regions is reported. Evidence from systematic studies is lacking for this placement.
2. Unilateral:
   a. Right unilateral: One electrode is placed on the right frontotemporal region and another electrode 1 inch right to vertex (point of crossing of two imaginary lines, one joining two tragi and other joining nasion-inion). This is shown to have lesser cognitive adversities but requires nearly 4–6 times the threshold dose when provided as an ultrabrief pulse for efficacy, equaling that of bilateral placements.
   b. Left unilateral: Same as right unilateral on the left hemisphere. This is found to be equi-efficacious to the right unilateral. This placement can be chosen when sparing nonverbal and visual memory is needed more than sparing verbal memory. It is also considered in those having the right dominant brain function.

The evidence for the efficacy of unilateral ECT is available only for depression. The evidence of unilateral ECT is lacking for other common indications (namely, schizophrenia or mania).

iii. Dose of ECT

ECT dosing is discussed in terms of charge (milliCoulombs, mC). A higher charge is associated with better efficacy and higher cognitive adverse effects. But as discussed earlier, the charge is not a linear measure but a combination of multiple electrical parameters [Figure 3].

Electrical charge = Current intensity × pulse width × pulse frequency × train duration.

The total dose for optimal efficacy through repeated ECT sessions is considered with respect to the seizure threshold;

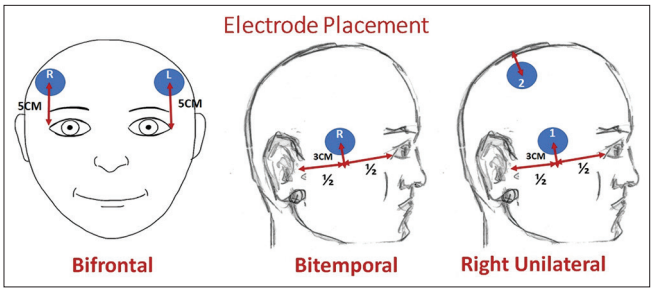

Figure 2: ECT electrode placements

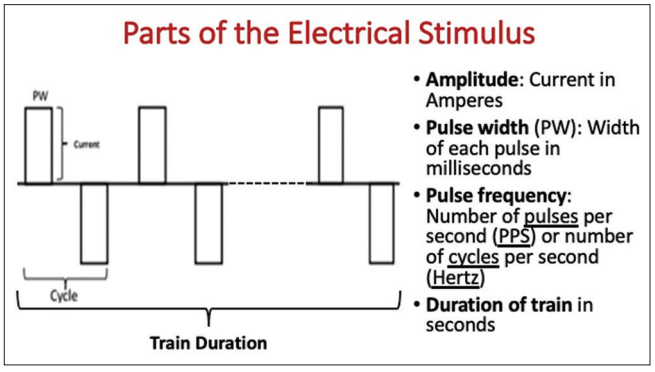

Figure 3: Electrical parameters

efficacy is also dependent on pulse width and electrode placement.

Marginally suprathreshold charge (1.5 × seizure threshold) is recommended in bilateral (Bitemporal/Bifrontal) ECT with brief pulse ECT (pulse width of 1 ms or more). Some evidence suggests a requirement of a higher charge (2.5 × seizure threshold) when a lower range of brief-pulse (0.5 ms) is used with bilateral ECT. There is strong evidence that a markedly suprathreshold (6 × seizure threshold) is required with ultrabrief (0.3 ms) ECT, with the evidence available for primarily right unilateral ECT, specifically in depression. For right unilateral ECT with brief pulse width, electrical charge is to be considered 4–6 times the seizure threshold. Ultrabrief bilateral (bifrontal/bitemporal at 0.3 ms) is found to be less effective and may not be advisable with the existing evidence. Ideally, the dose increment has to happen for a fixed current amplitude, pulse frequency, and pulse width. Hence, the suprathreshold dose should also be a function of train duration. But most of the standard devices have a limitation of train duration at 4–8 s in default settings, and they increase pulse frequency to increase the total duration. Most studies have used these default increments, and hence this guideline should be read with caution. More studies are needed to ascertain this need.

Dose estimation methods:[26,27]

1. *Stimulus titration method*: This will be the recommended method in regular practice. The first session can be spared in finding the lowest dose needed for seizure threshold estimation. Formula-based methods can be used as guidance for identifying the first dose of titration. Faster titration may be attempted with higher increments between stimuli in elderly patients, and slower titration with smaller increments may be attempted in adolescents/younger adult patients. Subsequent sessions can be provided at suprathreshold doses as discussed above.
2. *Formula-based methods*: Based on the age and sex of the patient, different formulae are derived. There is a need to be cautious in using the formula, as medications and anesthetic agents may impact the seizure threshold. The stimulus should have the same amplitude, pulse width, pulse frequency, and electrode location from which the formula was derived.
3. *Fixed high dosing*: This uses a single high dose, commonly the maximum for all the sessions. The use of a high fixed dosing strategy should be reserved only for patients with sufficiently serious concomitant medical conditions in which avoidance of subconvulsive stimulation is a priority
4. *Dosing from benchmark*: A high dose will be administered at the first session. The peak heart rate and tonic-clonic convulsions would be observed. In subsequent sessions, the doses are down-titrated to continue at the lowest dose producing a similar outcome. This could be a better alternative to the continued fixed high dosing method, wherever it is used.

c. Procedure and monitoring [Supplements 7 and 8]
   i. ECT procedure [Figure 4]

Seizure monitoring

Hamilton cuff method is recommended for monitoring motor seizures by isolating the ipsilateral limb (right limb in the right unilateral ECT) from muscle relaxants.

EEG gives a direct measure of seizure activity and is recommended wherever available. Bilateral EEG recording from at least two channels (FP1 and FP2) referenced to the ipsilateral mastoid is preferred. When only a single channel is available, a contralateral channel is preferred.

EEG recording can have artifacts due to muscle movements and other technical issues. Hence, motor monitoring should always be used to supplement EEG.

Adequate seizure

- Good quality seizure should be given more importance than any specific duration. A good quality seizure, even of shorter duration, has been demonstrated to be efficacious in elderly depressed patients.
- Earlier definition of 15 s of motor seizure and 25 s of EEG seizure to define adequate seizure is found to be of little clinical or prognostic benefit.
- Good quality motor seizure involves different stages. Initially, there is a gradual seizure induction during (or soon after the end of) the stimulation. This will be

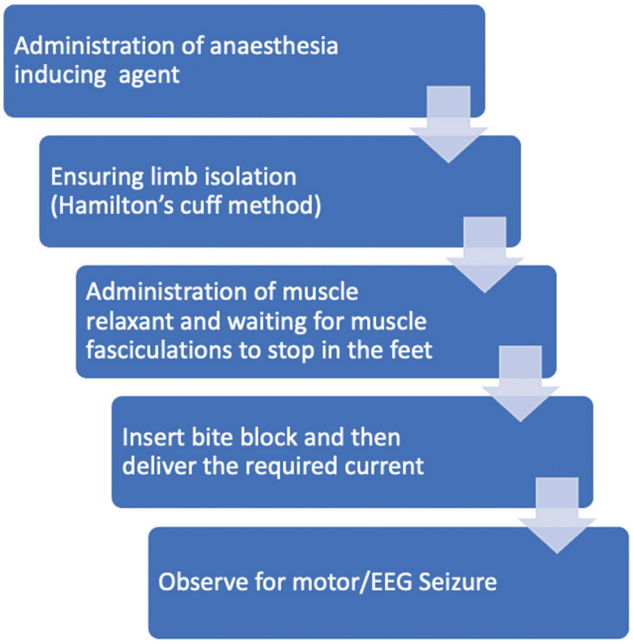

Figure 4: Steps of ECT procedure

followed by tonic contraction. Bilateral convulsions will emerge, which will end gradually. A comatose stage will succeed the convulsions, with the gradual regaining of consciousness and orientation. The motor manifestation should be monitored even in the presence of EEG monitoring.

- Hamilton cuff method of isolation and monitoring of the convulsion in the ipsilateral limb (in case of unilateral electrode placements) is preferred in modified ECTs, as it indicates generalization of seizures.
- Time from the beginning of ECT stimulus till the end of the last clonus in any part of the body (usually ends in the limbs) shall be considered for motor seizure duration.
- Good quality EEG seizure involves the visualization of seizure activity in contralateral channels.
- Good quality EEG seizure will have four phases [Figure 5]:
    - Phase 1: Recruitment stage involving high-frequency waves with gradually increasing amplitude.
    - Phase 2: Hypersynchronous high amplitude polyspike bursts at around 10 Hz lasting 10–20 s corresponds to tonic contraction.
    - Phase 3: Hypersynchronous polyspikes intermixed with slow waves for 20–40 s correspond to the tonic-clonic phase.
    - Phase 4: Postictal suppression – a flat isoelectric line is seen. The onset of this phase heralds the end of seizures.
    - Phase 5: The last phase is recovery from delta to theta to alpha waveform.
- Visualization of EEG is better in younger patients than in elderly patients.

Missed seizure: If there is no motor or EEG seizure even after 20 s of completion of electrical stimuli administration, then restimulation may be attempted by increasing the stimulus dose. Delayed onset seizure should be watched out for.

Inadequate seizure: If the EEG seizure is of low quality or the motor seizure is nongeneralized, limiting to one side of the body or restricted to the facial region only, restimulation at higher doses may be attempted after 45 s. Restimulation may be attempted till the patient comes out of anesthesia/muscle relaxant. Generally, four to five restimulations can be attempted. If needed, reinduction of anesthesia, or "top-up" dose, can be requested from the anesthetist. It may be noted that top-up doses reduce the quality of seizures. If the seizures are very brief (e.g., 5–10 s duration), and if the patient is showing the expected clinical response, then restimulation with a higher dose need not be administered. Restimulation on the same day after adequate seizure, called the multiple monitored ECT (MMECT), is not recommended. Even in cases of unilateral ECT, markedly suprathreshold stimulation would not be necessary on the first day of titration. This might be considered only extremely rare life-saving conditions like neuroleptic malignant syndrome or intractable seizures.

In the case of a prolonged seizure (seizure longer than 180 s), termination can be attempted if a seizure extends beyond 120 s. Airway and respiration should be closely monitored till the complete cessation of seizure. A seizure may be terminated using benzodiazepines, phenytoin, valproate, or barbiturate (usually, the anesthetic agent used for induction). If the patient is on theophylline or lithium, stopping them temporarily or alternatives may be considered. Shifting to anticonvulsant anesthetic agents may also be considered.

Left lateral positioning and monitoring in the ECT suite should continue under the care of an anesthetist till spontaneous breathing is gained. Then, the patient can be shifted to the recovery room.

ii. Monitoring in the recovery room
    - Monitoring of the vitals should be continued: pulse rate, blood pressure, and oxygen saturation.
    - ECG should be monitored in high-risk patients (history of cardiac disease).
    - Patient should be monitored for agitation/delirium, aspiration, arrhythmia, tardive seizure, enuresis/encoperesis, and neuroleptic syndrome.
    - Feeding should be avoided until the patient regains full consciousness.
    - Any adversities during the procedure should be evaluated for: tongue bite/mucosal injury, musculoskeletal injuries (fractures, dislocations).
    - Orientation and gait should be assessed for recovery to baseline or near baseline before shifting the patient from the recovery room.

iii. During the course of ECT treatment.

The number of ECTs should not be predetermined but should be based on the needs of individual patients. Progress in terms of clinical symptoms and cognitive and other adverse effects should be monitored at least once a week during the course of ECT. ECT may be terminated at any time if complete clinical improvement/remission is achieved. If satisfactory clinical improvement is not observed, a minimum of 8–12

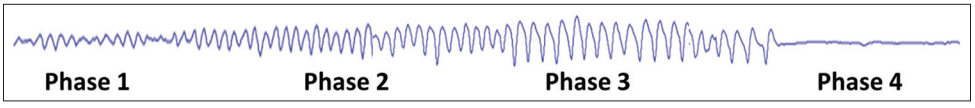

Figure 5: Phases of electroconvulsive therapy-induced electroencephalogram-monitored seizures

ECT sessions should be provided in acute courses before considering the failure of response to ECT. A longer course may be needed in some slow responders, and this decision to continue more than 12 sessions should be taken after a risk–benefit analysis. In general, the response to ECT is seen after more sessions in schizophrenia than in depression and mania. Switching from unilateral to bilateral and/or ultrabrief pulse to brief pulse ECT can be considered after a risk–benefit analysis if clinical improvement is not noted after four to eight sessions.

Monitoring clinical improvement: A clinical, indication-specific, structured symptom rating tool may be used weekly for assessment wherever feasible. A clinical assessment is a must after every ECT, preferably within 24 h following the ECT session, but certainly before the next session.

Monitor adverse effects: ECT-specific cognitive assessment tools can be used. MoCA, brief ECT cognitive screen, and battery for ECT-Related Cognitive Deficits (B4ECT-RECODE) may be used serially during the course of ECT.[28,29]

1. It should be noted that there could be an improvement in some cognitive functions with improvement in clinical symptoms.
2. Retrograde amnesia is one of the most distressing adverse effects, which is difficult to measure using objective cognitive tests.
3. Subjective assessment of memory impairment should be given due importance alongside objective assessment and should be a part of routine cognitive assessment.
4. Some cognitive domains would be difficult to reliably and sensitively assess using standard cognitive assessment tools. This could lead to a higher subjective reporting of cognitive impairment. Other reasons include:
    - The functional impact of the cognitive impairment in the given individual may be significant even though the severity of cognitive impairment is milder.
    - Cognitive decline could be a part of the natural course of illness. Patients/caregivers would be able to recognize the cognitive impairments after symptom improvement/regain of insight with ECT.
    - Cognitive deficits could be associated with a preoccupation with psychopathology

Continuation and maintenance ECT

ECT can be used as a continuation-phase treatment (up to 6 months of remission) for consolidation of effects and maintenance treatment (after 6 months of treatment) as prophylaxis in major depressive disorder, bipolar disorder, and schizophrenia. Acute courses (of 2–3 sessions/week), if effective, can be gradually tapered down from twice a week to weekly, fortnightly, and monthly. The tapering and frequency of continuation should be tailored to the individual patients' clinical needs. The course should not be prefixed. It should be planned dynamically during the course and scheduled based on periodic clinical reviews.[7,29]

After 6 months of continuation based on clinical needs, maintenance ECT may be planned. It is usually given at a frequency ranging from one session every 1–12 weeks. Alternative pharmacological and psychological interventions should be considered for risk–benefit analysis while planning maintenance treatment.

Management of adverse effects

Frequent inadequate/missed seizures or prolonged seizures:

- EEG monitoring is advisable in such patients for subsequent sessions.
- Treatment chart should be checked for electrolyte disturbances, seizure history and use of pro/anticonvulsants, past traumatic brain injury, hypoxia in the past, and pregnancy.
- Dose or type of anesthetic agent should be revised based on its expected effects on convulsions.
- Vigorous hyperventilation and preoxygenation may be attempted in cases of inadequate or missed seizures.
- In case of missed/inadequate seizures, the stimulus may be modified to lower pulse frequency and/or briefer pulse width. The frequency of sessions may be reduced. If the patient is receiving bilateral ECTs, shifting to unilateral ECT may be considered, as the seizure threshold is much lower with the latter.
- In case of recurrent prolonged seizures: Consider dose reduction. But it is pertinent to note that seizure duration would be highest near the threshold dose. Hence, in certain situations (like longer duration noted during dose titration), increasing the dose in subsequent sessions may be effective in shortening the seizure duration.

Tardive seizure: Seizures may happen within hours of an ECT session. This requires investigating for other causes of seizures. There may be nonmotoric manifestations of tardive seizures. Seizures need to be aborted using anticonvulsant medicines.

Post-ictal confusion/delirium: Generally, patients regain orientation within 5–45 min after an adequate seizure. If confusion and poor response to commands with or without behavioral agitation continue after this period or if they are very severe during this period, supportive intervention should be considered.

Patients should be secured in a safe environment, and airway, breathing, and circulation should be maintained (IV line should be secured from getting damaged). Environmental stimuli should be reduced and gentle, temporary physical restraint may be used if necessary to prevent the patient from harming himself. IV enzodiazepines or anesthetic agents may be used if agitation is persistent or severe. Low-dose antipsychotics (e.g., haloperidol IM 2–5 mg with repeated dose when necessary) may be used if the benzodiazepines

are ineffective. Physical conditions like electrolyte imbalance or infections should be evaluated in cases of recurrent postictal delirium. Nonconvulsive prolonged seizures, status epilepticus, or tardive seizures should be considered as differential diagnoses. A prophylactic higher dose of anesthetic agent or benzodiazepines may be considered in cases of recurrent postictal delirium.

Cognitive adverse effects

One or more of the following steps may be considered to address these. The decision should be taken balancing with the possible reduction in effectiveness with these methods.

1. Spacing of ECT sessions.
2. Switching to unilateral ECT.
3. Switching to briefer pulse width.
4. Reduction of stimulus dose.
5. Reduction or stopping of medications like lithium (serum levels >0.6 meq/l) that are known to affect cognition.
6. Reduction of the dose of anesthesia if given in higher doses.
7. Termination of ECT if the risks outweigh benefits.

Pain: May manifest as headache, muscle soreness, and joint pains.

Headache: It is generally mild. If severe, analgesics like paracetamol, aspirin, or nonsteroidal anti-inflammatory drugs may be used.

Muscle soreness: Can be addressed similar to a headache. Generally, it is intense after the first session and would not be much with later sessions. Intense fasciculations with succinylcholine could contribute to muscle soreness. Reduction of dose or change to another muscle relaxant can be considered.

Joint pain: Temporomandibular joint dislocations due to uncoordinated contractions of the temporalis, pterygoid, and masseters may happen with modified ECT due to direct stimulation. Firm holding of jaws during the stimulus would reduce the risk. Examine for dislocations and relocate using appropriate maneuvers in such situations.

Nausea/Vomiting: These are generally associated with headaches, and they respond to analgesics. If severe, butyrophenones, phenothiazines, and metoclopramide may be used. Ondansetron may also be used as next-line agent.

Treatment-emergent mania: ECT may be continued or frequency may be reduced based on clinical needs.

Phobia and anxiety toward ECT

Patients and families should be given the opportunity to express apprehensions, concerns, and ask questions. Information and fact sheets should be provided, supplementing the consent form. Video materials can be a value addition to this. Group sessions of patients and family caregivers, including those who have received ECTs, would enhance mutual support and enhance knowledge. Anxiety about ECT developing during a course of ECT may sometimes be due to awareness of the effect of muscle relaxants under anesthesia. In such cases, the dose of the anesthetic agent should be modified to ensure unawareness; muscle relaxants should be administered after clearly noting that the patient is deeply sedated.

Special population

Children and adolescents: Literature regarding ECT in this population is limited.[30-32] There is no evidence for differential efficacy or safety in this group. The Mental Health Care Act of 2017 of India mandates preapproval from the mental health review board to administer ECT under dire needy situations in this population. Having two psychiatrists' opinions regarding the need for and specifics of ECT would be beneficial. ECT is generally chosen only after other options have failed. Prolonged seizures are commoner in this age group, and hence, it is best to avoid proconvulsant/neutral anesthetic agents like etomidate and ketamine.

Pregnancy: ECT is safe and effective in pregnancy and is a preferred option, given its lesser risk of teratogenicity compared to many psychotropics. The risk evaluation should be a joint activity of the psychiatrist, anesthetist, and obstetrician. A few additional steps should be considered in pregnancy (most applicable in second and third trimesters):

- Adequate hydration should be maintained while fasting. IV fluids should be used if any signs of dehydration are noted.
- Left lateral or pelvic tilt should be provided to maintain aorto-caval circulation.
- Preoxygenation should be provided, but hyperventilation should be avoided.
- Premedication with H2 blocker/antacids should be considered to reduce the risk of aspiration. Routine use of anticholinergic premedication should be avoided even though it would reduce the risk of fetal arrhythmias.
- Before, during, and after ECT, Doppler or cardiotocography monitoring should be used for fetal monitoring along with the vitals monitoring of the pregnant woman, as per regular standards.
- After 20 weeks of gestation, ECT should preferably be administered in settings with the availability of obstetric support. Availability of tocolytics and preferably tocodynamometer should be ensured to handle any risk of labor induction/abortion.

Elderly

ECT is safe and effective in elderly patients.[33] Evidence suggests a higher response rate of elderly depression than the mixed age group population. Cognitive adverse effects would be of greater concern primarily when ECT is indicated

Table 7: Special care during ECT in patients with medical comorbidities

Organ system	Special care in specific conditions
Cardiac disease	Hypertension: Optimal control of blood pressure is necessary. Use short acting antihypertensives during ECT, if needed
	Myocardial infarction (MI): Consider waiting for 4–6 weeks in case of recent MI
	Valvular diseases: consider the need for anticoagulation
	Congestive heart failure: avoid multiple restimulations. Assess functional cardiac capacity (2D Echocardiogram and treadmill test)
	Aneurysms: consider maintaining blood pressure with short-acting parental antihypertensives
	Cardiac conduction defects and pacemakers: generally safe but to be given only in consultation with cardiologists
	Choice of anesthesia, muscle relaxants, preanaesthetic medications, and ECT stimulus parameters have to be preplanned by the psychiatrist and anesthetist liaising with a cardiologist
Endocrine	Evaluate for the status of the diabetes mellitus, hypothyroidism and other known endocrine disorders in a given patient
	Avoid hypoglycemic agents before ECT during fasting
	Uncontrolled hypothyroidism may lead to a delay in recovery
	Steroids may be needed just before ECT in Addison's disease to maintain stress reaction
Cerebral	Recent ischemic/hemorrhagic stroke, and symptomatic intracranial mass may warrant postponement of ECT until the risks of complications are minimized
	Ensure patency of ventriculo-peritoneal shunt, when placed, before ECT
	Postcraniotomy: place electrodes away from the site to avoid very high charge densit
	Depolarizing muscle relaxants to be avoided in multiple sclerosis
	Cerebral implants and foreign bodies are not absolute contraindication and ECT may be administered in consultation with neurologists.
	Keep electrodes as far as possible from metallic implants/foreign bodies
Renal	Adequate muscle relaxation is necessary: can prefer nondepolarizing agents
	Hypoventilation can lead to respiratory acidosis, hyperkalemia, and further acid-base imbalance
	Hemodialysis patients: potassium levels should be done within 24 h before ECT
Pulmonary	Asthma and chronic obstructive pulmonary disease (COPD): careful monitoring of oxygenation
	Morning medications can be taken before ECT
	Avoid hyperventilation in COPD as it may lead to delayed awakening and decreased respiratory drive
	Theophylline to be discontinued 24 h before ECT due to risk of prolonged seizures and status epilepticus

for dementia-related behavioral disturbances. Risks of high seizure threshold, missed seizures, medical comorbidities, and postictal delirium are higher in old age. Certain general consideration regarding ECT in older age:

- Propofol may be avoided as an anesthetic agent and anticonvulsants may be minimized.
- One should minimize nonconvulsive shocks: higher initial dose and faster increments can be considered.
- Right unilateral or bifrontal ECT would be preferred to Bitemproal ECT. A lower range of brief or ultrabrief pulse may also be considered.
- Concomitant high-dose lithium (>0.6 mq/l) should be avoided due to a higher risk of postictal delirium.
- Interdisciplinary medical management should be ensured, and close monitoring would often be necessary with high rates of comorbidity.

Medical comorbidities: Table 7 describes the concerns related to medical comorbidities and special care to be taken while administering ECT for patients with different medical comorbidities. In all cases, there should be a thorough consideration of the risk–benefit ratio and a multidisciplinary approach to minimize complications. Appropriate risks should be explained to the patient/caregivers while taking consent.

COVID-19 (Corona Virus Disease) related precautions

ECT is an aerosol-generating procedure. Certain additional precautions to curtail the spread of COVID may be taken as per risk assessment by clinicians [Table 8].

Table 8: Special precautions during COVID pandemic

1. Atropine/Glycopyrrolate can be used to reduce oral secretions
2. High-efficiency particulate air (HEPA) filters, reusable masks, heat moisture exchanges can be used during ventilation
3. Use of appropriate personal protective equipment (PPE)
4. Posting patients with suspected COVID at the end of the ECT day
5. Administering ECT in isolation wards for patients known to have active COVID

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Conflicts of interest

There are no conflicts of interest.

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SUPPLEMENTARY MATERIALS:

Supplement 1: ECT consent form (for patients)

Supplement 2: ECT consent form (for the nominated representative in case the patient is considered not competent to provide consent for ECT)

Supplement 3: ECT consent form (for patients after regaining competency to provide consent for ECT)

Supplement 4: Continuation/Maintenance ECT consent form (for patients)

Supplement 5: Pre-ECT evaluation and anesthesia consultation form

Supplement 6: Pre-ECT preparation record

Supplement 7: ECT procedure record

Supplement 8: ECT vitals monitoring record

SUPPLEMENT: 1

ECT Consent form
(*for patient***)**

Please feel free to ask for clarification if you do not understand any part of this form

Information
Considering all aspects of your mental and physical health, we believe that you would benefit from Electro Convulsive Therapy (ECT) as a form of treatment. In this treatment, a controlled dose of electricity will be passed through your head and a brief-lasting convulsion is produced. It is administered under anaesthesia so that you do not experience any discomfort. The treatment will be done in morning in the ECT suite. You will be required not to eat or drink anything, including water, for 8 hours before the procedure. To provide anesthesia, the doctors would give you an injection and after you are put to sleep, they would apply a small electric current to your head. You would wake up after a few minutes. A team of doctors and nurses supervise your condition throughout this time. You will receive ECT on alternate days or twice a week for about 2–3 weeks. We will observe you daily for the effects of ECT and, with your consent, decide on the number of treatments that you may require.

ECT is expected to improve your health. It is not expected to cure your illness. The improvement achieved with ECT should be sustained with the help of medications, counselling (psychotherapy) and/or other treatments. We will attempt to reduce the side effects of ECT by careful evaluation before and through the course of ECT and by adjusting your medications. The side-effects are usually mild and temporary: e.g., headache and confusion for some time following ECT session. You may also notice minor lapses in memory for events around the course of ECT. Memory for your past, including all you have learnt weeks or months before the ECT will not be affected in any major way. Overall, the advantages of ECT are expected to outweigh the risks in your case.

The **Information Leaflet** providing more information on ECT is available. We urge you to go through it and seek clarification if you have questions. You may also discuss with us about alternative treatments suitable for your case and possible course of your illness with and without ECT. We urge you to make a decision about ECT considering all these aspects. ECT will be administered to you only after you provide consent for it. You can refuse your consent now as well as withdraw your consent during the course of the treatment. In either case, the best available alternative treatments will be provided to you without any prejudice.

Information about high-risk (*Strike off if not applicable*): As you may be aware, in addition to the psychiatric problem for which we have suggested ECT, you are suffering from _____ (name of the high-risk condition/s). In this background, administration of anesthesia and ECT may have additional risks to your health. The team of doctors and nurses will do their best to minimize these risks by taking appropriate precautions and measures. Please be informed that your doctors have suggested ECT to you with the full knowledge of your above-mentioned condition and have consulted the anesthetists in this regard.

DECLARATION OF CONSENT FOR ECT

I have been advised that my present health condition requires ECT. I have been sufficiently informed about the procedure of ECT with its benefits and possible risks. I am aware that I have the right to refuse this treatment now or at any time during the course of treatment without compromising my right to obtain all other services in the hospital. I, Mr./Mrs./Ms _____ (Name of the patient) hereby provide my consent for the administration of ECT to me. I have received a copy of this informed consent for my record.

High-risk consent (strike off if not applicable):

I am aware that I have _ _____ in addition to my psychiatric condition. The doctors have explained to me that administration of anesthesia and ECT in this background may have additional risks to my health and that they will be taking additional precautions and measures to minimize these risks. I hereby declare that the doctors have explained to me the additional risks involved in providing ECT to me and I am consenting with full knowledge of these risks.

_____ _____

(Signature of the Patient) (Signature and Name of the relative)

_____

(Signature and Name of the witness) (Preferably Nursing Staff)

_____

(Name of the Doctor) (Doctor's signature) (Designation of the Doctor)

Date: Place:

SUPPLEMENT: 2

ECT Consent Form

(for the nominated representative in case the patient is considered not competent to provide consent)

Please feel free to ask for clarification if you do not understand any part of this form

Information

Considering all aspects of the mental and physical health condition of your relative Mr./Mrs./Ms _____ we believe that he/she would benefit from Electro Convulsive Therapy (ECT) as a form of treatment. In this treatment, a controlled dose of electricity will be passed through the patient's head and a brief-lasting convulsion is produced. It is administered under anaesthesia so that he/she doesn't experience any discomfort. The treatment will be given in morning in a specially equipped area. The patient will be required not to eat or drink anything, including water since last night for at least 6-8 hours. To provide anesthesia, the doctors will give him/her an injection and after he/she put to sleep, they will apply a small electric current to his/her head. He/she would wake up after a few minutes. A team of doctors and nurses supervise his/her condition throughout this time. Your relative will receive ECT on alternate days or twice a week for about 2–3 weeks. We will observe him/her daily for the effects of ECT and, with your consent, decide on the number of treatments that he/she may require.

ECT is expected to improve your relative's health. It is not expected to cure his/her illness. The improvement achieved with ECT should be sustained with the help of medications, counselling (psychotherapy) and/or other treatments. We will attempt to reduce the side-effects of ECT by careful evaluation before and through the course of ECT and by adjusting your relative's medications. The side-effects are usually mild and temporary: e.g., headache and confusion for some time following ECT session. The patient may notice some lapses in memory for events around the course of ECT. Memory for the past including all he/she has learnt weeks or months before the ECT will not be affected in any major way. Overall, the advantages of ECT are expected to outweigh the risks in your relative's case.

The **Information Leaflet** providing more information on ECT is available. We urge you to go through it and seek clarification if you have questions. You may also discuss with us about alternative treatments suitable for your relative's case and possible course of his/her illness with and without ECT. We urge you to make a decision about ECT for your relative considering all these aspects. ECT will be administered to your relative only after you provide consent for it. You can refuse your consent now as well as withdraw it during the course of the treatment. In either case, the best available alternative treatments will be provided to your relative without any prejudice.

Information about high-risk (*Strike off if not applicable*): As you may be aware, in addition to the psychiatric problem for which we have suggested ECT, your relative is suffering from ……. (name of the high-risk condition/s). In this background, administration of anesthesia and ECT may have additional risks to your relative's health. The team of doctors and nurses will do their best to minimize these risks by taking appropriate precautions and measures. Please be informed that your relative's doctors have suggested ECT to him/her with the full knowledge of his/her above-mentioned condition and have consulted the anesthetists in this regard.

DECLARATION OF CONSENT FOR ECT

I have been advised that present health condition of my _____ (Relation and name of the patient) requires ECT. I have been sufficiently informed about the procedure of ECT with its benefits and possible risks. I am aware that I have the right to refuse this treatment for my relative now or at any time during the course of treatment without compromising my right to obtain all other services in the hospital. I, Mr./Mrs./Ms _____ (Name of the relative) hereby provide my consent for the administration of ECT to my _____ (Relation and name of the patient). I have received a copy of this informed consent for my record.

High-risk consent (strike off if not applicable):

I am aware that my _____ (Relation and name of the patient) have _____ in addition to my psychiatric condition. The doctors have explained to me that administration of anesthesia and ECT in this background may have additional risks to my relative's health and that they will be taking additional precautions and measures to minimize these risks. I hereby declare that the doctors have explained to me the additional risks involved in providing

ECT to my _____ (Relation with the patient) and I am consenting with full knowledge of these risks.

_____

(Signature and Name of the Relative)

_____

(Signature and Name of the witness) (Preferably Nursing Staff)

_____

(Name of the Doctor) (Doctor's signature) (Designation of the Doctor)

Date: Place:

SUPPLEMENT: 3

ECT Consent Form

(for patients after gaining competence to provide consent for ECT)

Considering all aspects of your mental and physical health, we believed that you would benefit from Electro Convulsive Therapy (ECT) as a form of treatment. Since you were unable to comprehend the information about ECT and decide regarding ECT because of your condition, your relative, _____ (Name of the relative who gave consent for patient's ECT) was explained about your situation, and risks and benefits of ECT. He/she has consented for ECT. We believe that you are now in a position to understand the information regarding ECT and to make a decision about continuing this treatment.

Please feel free to ask for clarification if you do not understand any part of this form.

Information:

In this treatment, a controlled dose of electricity will be passed through your head and a brief-lasting convulsion is produced. It is administered under anaesthesia so that you do not experience any discomfort. The treatment will be done in morning in the ECT suite. You will be required not to eat or drink anything, including water, for 8 hours before the procedure. To provide anesthesia, the doctors would give you an injection and after you are put to sleep, they would apply a small electric current to your head. You would wake up after a few minutes. A team of doctors and nurses supervise your condition throughout this time. You receive ECT on alternate days or twice a week for a total of about 2–3 weeks. We observe you daily for the effects of ECT and, with your consent, will decide on the number of treatments that you may require.

ECT is expected to improve your health. It is not expected to cure your illness. The improvement achieved with ECT should be sustained with the help of medications, counselling (psychotherapy) and/or other treatments. We attempt to reduce the side-effects of ECT by careful evaluation before and through the course of ECT and by adjusting your medications. The side-effects are usually mild and temporary: e.g., headache and confusion for some time following ECT session. You might have noticed minor lapses in memory for events around the course of ECT. Memory for your past, including all you have learnt weeks or months before the ECT will not be affected in any major way. Overall, the advantages of ECT are expected to outweigh the risks in your case.

The **Information Leaflet** providing more information on ECT is available. We urge you to go through it and seek clarification if you have questions. You may also discuss with us about alternative treatments suitable for your case and possible course of your illness with and without ECT. We urge you to make a decision about further ECT considering all these aspects. ECT will be administered from now onwards to you only after you provide consent for it. You can refuse your consent now as well as withdraw your consent during the course of the treatment. In either case, the best available alternative treatments will be provided to you without any prejudice.

Information about high-risk (*Strike off if not applicable*): As you may be aware, in addition to the psychiatric problem for which we have suggested ECT, you are suffering from ……. (name of the high-risk condition/s). In this background, administration of anesthesia and ECT may have additional risks to your health. The team of doctors and nurses will do their best to minimize these risks by taking appropriate precautions and measures. Please be informed that your doctors have suggested ECT to you with the full knowledge of your above-mentioned condition and have consulted the anesthetists in this regard. And the ECTs you have received till now has not led to untoward consequences to your physical health.

DECLARATION OF CONSENT FOR ECT

I have been advised that my present health condition requires further ECT. I have been sufficiently informed about the procedure of ECT with its benefits and possible risks. I am aware that I have the right to refuse this treatment now or at any time during the course of treatment without compromising my right to obtain all other services in the hospital. I, Mr./Mrs./Ms _____ (Name of the patient) hereby provide my consent for the administration of further ECT to me. I have received a copy of this informed consent for my record.

High-risk consent (strike off if not applicable):

I am aware that I have _____ in addition to my psychiatric condition. The doctors have

explained to me that the administration of anesthesia and ECT in this background may have additional risks to my health and that they will take additional precautions and measures to minimize these risks. I hereby declare that the doctors have explained to me the additional risks involved in providing ECT to me and I am consenting with full knowledge of these risks.

_____ _____

(Signature of the Patient) (Signature and Name of the relative)

_____

(Signature and Name of the witness) (Preferably Nursing Staff)

_____

(Name of the Doctor) (Doctor's signature) (Designation of the Doctor)

Date: Place:

SUPPLEMENT: 4

Continuation/Maintenance ECT Consent Form
(for Patient)

After examination and considering all aspects of your mental and physical condition we opine that you would require ECT (Electro Convulsive Therapy) beyond the sessions you have received to date. You would be aware of the procedure of ECT. This is to inform you again its details and to discuss about continuation of ECT.

Please feel free to ask for clarification if you do not understand any part of this form

Information
In this treatment, a controlled dose of electricity will be passed through your head and a brief-lasting convulsion is produced. It is administered under anaesthesia so that you do not experience any discomfort. The treatment will be done in morning in the ECT suite. You will be required not to eat or drink anything, including water, for 8 hours before the procedure. To provide anesthesia, the doctors would give you an injection and after you are put to sleep, they would apply a small electric current to your head. You would wake up after a few minutes. A team of doctors and nurses supervise your condition throughout this time.

Initially, ECT is given on alternate days or twice a week for a total of about 2–3 weeks. As in your situation, further ECTs would be given on possibly twice a week and gradually would be spaced out up to once a month. We would observe you regularly for the effects of ECT and, with your consent, decide on the number of treatments that you may require. Presently, the continuation of ECT is required for you as there is further scope of improvement with it and/or possibility of re-emergence of symptoms if ECT is stopped at this stage, even if medications, counselling (psychotherapy) and other required treatments are given concurrently. We hope that further ECTs would lead to a situation where improvement can be sustained with the help of other treatments.

Concurrent with your experience, the side-effects are usually mild and temporary:
e.g., headache and confusion for some time following ECT session. You might have noticed minor lapses in memory for some events around ECT. Memory for your past, including all you have learnt earlier and yours learning capacity will not be affected in any major way. Overall, the advantages of ECT are expected to outweigh the risks in your case.

The **Information Leaflet** providing more information on ECT is available. We urge you to go through it and seek clarification if you have questions. You may also discuss with us about alternative treatments suitable for your case and possible course of your illness with and without ECT. We urge you to make a decision about further ECT considering all these aspects. ECT will be administered from now onwards to you only after you provide consent for it. You can refuse your consent now as well as withdraw your consent during the course of the treatment. In either case, the best available alternative treatments will be provided to you without any prejudice.

DECLARATION OF CONSENT FOR ECT

Information about high-risk (*Strike off if not applicable*): As you may be aware, in addition to the psychiatric problem for which we have suggested ECT, you are suffering from …… (name of the high-risk condition/s). In this background, administration of anesthesia and ECT may have additional risks to your health. The team of doctors and nurses will do their best to minimize these risks by taking appropriate precautions and measures. Please be informed that your doctors have suggested ECT to you with the full knowledge of your above-mentioned condition and have consulted the anesthetists in this regard. And the ECTs you have received till now has not led to untoward consequences to your physical health.

DECLARATION OF CONSENT FOR ECT
I have been advised that my present health condition requires further ECT. I have been sufficiently informed about the procedure of ECT with its benefits and possible risks. I am aware that I have the right to refuse this treatment now or at any time during the course of treatment without compromising my right to obtain all other services in the hospital. I, Mr./Mrs./Ms _____ (Name of the patient) hereby provide my consent for the administration of further ECT to me. I have received a copy of this informed consent for my record.

High-risk consent (strike off if not applicable):

I am aware that I have _____ in addition to my psychiatric condition. The doctors have explained to me that administration of anesthesia and ECT in this background may have additional risks to my health and that they will be taking additional precautions and measures to minimize these risks. I hereby declare that the doctors have explained to me the additional risks involved in providing ECT to me and I am consenting with full knowledge of these risks.

_____ _____

(Signature of the Patient) (Signature and Name of the relative)

_____

(Signature and Name of the witness) (Preferably Nursing Staff)

_____

(Name of the Doctor) (Doctor's signature) (Designation of the Doctor)

Date: Place:

SUPPLEMENT: 5

Pre-ECT Evaluation and Anaesthesia Consultation Form

Name (First Middle Last Name):

Age (years): Gender:

Department: Unit:

Date of Submission:

Out-patient/In-patient (If 'in-patient' is selected → write Ward)

Psychiatric Diagnosis:

Medical Diagnosis:

Neurological Diagnosis:

Past history of ECT: Yes/No (If 'Yes' is selected → *Write specific details pertaining to procedure of ECT, response to ECT and adverse effects with ECT*)

Reasons for prescribing ECT *(You may select multiple options)*

1. Catatonia
2. Less food intake without other catatonic symptoms
3. Suicidal risk
4. Speed up response to the medications for reasons other than stated above
5. Inadequate response to other kinds of treatment
6. Intolerability to medications
7. Poor compliance to medications

ECT Parameter details

Electrode Placement Details *(Only 1 option to be selected)*

1. Bifrontal
2. Bitemporal
3. Right Unilateral

Pulse width *(Only 1 option to be selected)*

1. 1mm
2. 0.5mm
3. 0.3mm

Pulse Frequency: (pps)

Medical and Neurological History *(If any illness is present, mention at least its total duration, current treatment, any related surgery done in the past, and current level of control of its symptoms; following illness to be specifically marked for)*

1. Diabetes Mellitus
2. Hypertension
3. Any cardiac illness
4. Hypothyroidism
5. Cerebrovascular accident (Infarct, haemorrhage)

Medications Prescribed

(current psychotropic and other medications for psychiatric illnesses; if any medication is in tapering mode or increasing mode, write the related details as well)

General Physical Examination *(Write positive findings)*

Handedness: Right/Left Weight: (kg) BMI: (kg/m^2) BP: mm of Hg HR:/min

Airway: Mouth opening Adequate/Mouth opening restricted

Respiratory System:

Cardiovascular System:

Per Abdomen:

Central Nervous system:

Fundus:

Investigations

Hb: RBS: Urea: Creatinine: Na: K: ECG:

(If TFT done, write its values; If patient is on lithium or valproate, it is better to mention its serum levels; Also mention any test which has positive findings)

Suspected Pseudocholinesterase Deficiency: Yes/No; If 'Yes' is selected → then write details.

Anaesthesiologist:

Submitted by

(*Name, Designation and Signature* of the physician in-charge)

SUPPLEMENT: 6

Supplement: 6

Name: _____Age: ____ Gender: ____Hospital No. _____

PRE-ECT PREPARATION RECORD

ECT Session →	**1 or 9**	**2 or 10**	**3 or 11**	**4 or 12**	**5 or 13**	**6 or 14**	**7 or 15**	**8 or 16**
Date								
Tick if the following respective item is confirmed								
Identity Matched								
Overnight fasting								
Removal of personal things*								
Bowel and Bladder emptied								
Pre-anesthesia preparation* completed								
Write the details for the following items								
GRBS Pre-ECT If Diabetes Mellitus; Otherwise put NA (Not applicable)								
Pre-ECT medication taken (*If yes, Name of drug*)								
ECT Nursing staff								
Name								
Sign.								

*Details mentioned in ECT Procedure document

SUPPLEMENT: 7

Supplement: 7

Name: _____Age: ____ Gender: ____Hospital No. _____

ECT PROCEDURE RECORD

ECT Session No. →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Date								
Cognitive Deficits								
Thiopentone[#] (mg)								
Succinylcholine[$] (mg)								
Glycopyrrolate/Any other durg[£] (mg)								
Electrode Placement								
Pulse Width (ms) & Pulse Frequency (pps)								
Charge (mC)								
Motor Seizure (sec.)								
EEG Seizure (sec.)								
Remarks (Any complication* during or Post ECT or advice to be followed before or during next ECT including electrical charge, any tests, any medication, any referral)								
Psychiatrist								
Name								
Sign.								
Anesthesiologist								
Name								
Sign.								

*Prolonged seizures/apnea, bradycardia/tachycardia, hypotension/hypertension, post-ECT confusion/delirium and how it was handled. Please write in the file in details if required. [#]Write the name also if any other anesthetic agent is used in place of Thiopentone; [$]Write the name also if any other muscle relaxing agent is used in place of succinylcholine;. [£]Write the name if medication other than glycopyrrolate is used. If no medication including atropine is administered, write 'Nil'.

SUPPLEMENT: 8

Supplement: 8

Name: _____Age: ____Gender: ____Hospital No. _____

ECT VITALS MONITORING RECORD

ECT Session →	**1 or 9**	**2 or 10**	**3 or 11**	**4 or 12**	**5 or 13**	**6 or 14**	**7 or 15**	**8 or 16**
Date								
Pre-Anesthesia Monitoring								
Heart Rate (/min)								
Blood Pressure (mm Hg)								
Respiratory Rate (/min)								
Oxygen Saturation (%)								
Sensorium[#]								
Post-ECT Monitoring								
Heart Rate (/min)								
Blood Pressure (mm Hg)								
Respiratory Rate (/min)								
Oxygen Saturation (%)								
Sensorium[#]								
Fit to be shifted to Post-ECT Recovery Area (Yes/No)								
Post-ECT Recovery Area Monitoring								
Heart Rate (/min)								
Blood Pressure (mm Hg)								
Respiratory Rate (/min)								
Oxygen Saturation (%)								
Sensorium[#]								
Suction of secretions done (*Yes/No*)								
Gait (*Cannot Stand/Walk with support/Walk without support*)								
Anesthesiologist								
Sign.								
Name								

[#]A – alert; V – response to verbal commands; P – response to pain; U – unresponsive