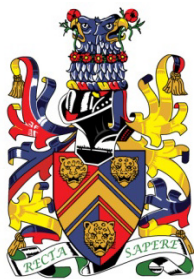


PRACTICE GUIDELINES

ELECTROCONVULSIVE THERAPY

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**ACADEMY OF MEDICINE
SINGAPORE**



COLLEGE OF PSYCHIATRISTS

A. INTRODUCTION

Electroconvulsive Therapy (ECT) has been in use by psychiatrists in Singapore since 1947 for the treatment of psychiatric disorders like severe Depressive illness, Schizophrenia and Mania. The procedure involves the medically controlled induction of a grand mal seizure under general anaesthesia by means of passing an electrical current through the brain.

B. AIM

This set of guidelines aims to recommend minimum standards for ECT in Singapore to ensure safe and effective ECT in Singapore.

C. INDICATIONS FOR ECT

Indications for ECT must take into account the type of illness, the degree of suffering and distress of the patient, the prognosis and consequence if treatment is withheld. Diagnostic indications include:

- a) Depression
- b) Psychosis
- c) Catatonia
- d) Mania
- e) Schizoaffective Disorder
- f) Neuroleptic Malignant Syndrome
- g) Parkinson's Disease
- h) Catatonia in Autism
- i) Self-Injurious Behaviour in Intellectual Disability

D. HIGH RISKS SITUATIONS

There are times and situations when ECT is associated with high risks of serious morbidity and even mortality. These must be weighed against the risk of the illness itself. They include:

- Raised intracranial pressure
- Recent myocardial infarction with unstable cardiac function
- Space occupying intracranial lesion
- Recent intracerebral haemorrhage
- Bleeding or unstable vascular aneurysm or malformation
- Retinal detachment
- Pheochromocytoma
- High anaesthetic risks

E. CLINICAL RESPONSIBILITY FOR ECT

The psychiatrist ordering ECT takes ultimate clinical responsibility for the decision to treat a patient with ECT. The anaesthetist will be responsible for determining physical fitness of the patient to undergo general anaesthesia. All medical information as well as appropriate investigation results should be made available to the anaesthetist for him to make his evaluation.

F. CONSENT FOR ECT

- (1) Before consent is sought for, explanations on the procedure and the possible side effects should be explained to the patient and /or relatives so that they are adequately informed. As far as possible the actual proceduralist should take consent. If this is not possible, a standard informational sheet should be used to ensure that adequate information is given to the patient / relatives in a manner tailored to their level of understanding.
- (2) Consent should be obtained from the patient himself / herself whenever possible if the patient is above 21 years of age. If the patient lacks capacity, a Lasting power of attorney (LPA) done or court appointed deputy can give consent if provided for within the LPA or court order. The doctor needs to check if the patient has an LPA Donee / court appointed deputy within reasonable effort. However this should not delay ECT care for the patient. If the patient lacks capacity and does not have an LPA Donee / court appointed deputy, the doctor can prescribe ECT to the patient in best interests. This should be clearly recorded in the casenotes of the patient.
- (3) For patients under the age of 21, Consent should be obtained from patient's parent / legal guardian, UNLESS
 - Treatment is required in the best interests of the patient, and patient is assessed to have mental capacity to consent for treatment, and parental consent cannot be obtained in time or;
 - The patient has strongly objected to the parents / legal guardians being involved, and he/she has been assessed to have the mental capacity to give consent for his/her own medical treatment; or
 - There are valid reasons to believe that the parents / legal guardians are refusing to act in the patient's best interests and may be subjecting the patient to significant risk of harm.
- (4) Consent then will be signed by patient under (i) & (ii), as well as (iii) whenever patient is assessed to have the required mental capacity.
- (5) All informed consent obtained should be in writing, with the names and dates properly documented.

G. PROCEDURAL ISSUES

(1) Type of Instrument

The ECT machine must have electroencephalogram (EEG) monitoring capability, provide brief pulse square wave stimulus and be serviced at least annually to ensure that it is in good working order. Currently, the Thymatron or MECTA series are the most often used instruments.

(2) Pre-ECT Evaluation

A thorough medical history should be obtained and physical examination done prior to performing ECT. The assessment must focus in particular on the cardiovascular, respiratory, neurological, skeletal and dental systems.

Standardized ratings of the patient's symptoms, cognition and quality of life should be documented before and after the acute course of ECT to document effectiveness and side effects. A non-exhaustive list of recommended scales is listed in Annex C

A Full Blood Count, Urea I Electrolytes and ECG should be done. A CXR may be done if indicated (see below).

- i. Symptoms / signs of active respiratory disease e.g. acute dyspnea, productive cough, crepitations, rhonchi.
- ii. History of pneumonia within the last 6 months
- iii. History of pneumothorax.
- iv. History of childhood tracheostomy to assess for tracheal stenosis.
- v. Large multinodular goiters to assess the tracheal shift / compression.
- vi. Thoracoscopic procedure or thoracotomy.
- vii. Cervical lymph node biopsy under GA.
- viii. Cardiac pacemaker.

(3) Patient Preparation

- a) Appropriate medication adjustments should be considered before starting ECT (See Annex A for details)
 - Anticonvulsants could be withdrawn to reduce the seizure threshold and decrease the electrical stimulus required and minimize possible cognitive side effects.
 - Benzodiazepines should be kept at the minimal dosage during ECT
 - Lithium can be continued during ECT but dosage increases should be avoided to minimize the risk of post ECT delirium

- b) The patient should have nothing by mouth for at least 6 hours prior to a treatment, except for any necessary medications (e.g. hypertensive medication), which may be given with a small sip of water. The patient is also asked to empty the bladder, and the head checked for pins and jewellery. Eye glasses, contact lenses, hearing aids and dentures should be removed.
- c) Prior to anaesthesia, the psychiatrist, with the assistance of nursing staff, should ensure the following:
 - treatment orders are properly recorded in the medical records since the last treatment reviewed.
 - the patient's mouth is free of foreign bodies and loose or sharp teeth.
 - that the case records belong to the correct patient, and note any significant problems recorded in them.
 - a valid consent has been obtained or ECT documented to be prescribed in patients best interest.
 - all necessary pre-ECT evaluation have been performed.

(4) Administration of ECT

- a) An anaesthetist must be present during the entire ECT procedure to deliver anaesthesia.
- b) Either Age-based or Seizure Titration based methods for ECT dosing are possible.
- c) Acceptable electrode placements include bitemporal, right unilateral and bifrontal placements.
- d) The choice of electrode placement, stimulus parameters and electrical dosage for each patient should be individualized to the patient's need based on effectiveness and cognitive considerations in accordance with current evidence base.
- e) Use of right unilateral (RUL) ECT requires seizure titration dosing methods for effective dosing.
- f) Time-out must be conducted with the whole ECT team before each induction to ensure that the right patient, and right dose of anaesthesia and right type and dose of ECT are checked.
- g) Ensure that patient is given adequate oxygen via a face mask both before and after Suxamethonium induced apnoea to avoid cerebral hypoxia during the seizure. Oxygenation also has the added advantage of lowering the seizure threshold.
- h) Care must be applied in the placement of the electrodes, which should be suitably moistened with electrolyte solution or conductive gel. The inter-electrode area should be dry. Hair beneath the electrodes should be parted and the electrodes applied firmly. Firm pressure should be

continued throughout the passage of the current. A baseline EEG should be obtained before ECT.

- i) A patient's seizure threshold is determined by the lowest energy level at which a generalised tonic clonic (GTC) seizure is elicited. The right calf should have a pneumatic cuff inflated above systolic blood pressure before the anaesthetist administers the muscle relaxant, and removed immediately after the ECT procedure. The doctor administering ECT must follow the respective ECT titration and treatment schedule (Standard or Ultrabrief Pulsewidth) and start at the lowest energy level for the patient to determine the occurrence of a GTC seizure via positive EEG or tonic clonic movements of the right foot.
- j) If no seizure is elicited at the lowest energy level, the doctor administering ECT should increase the treatment level to the next level and administer another dose of electricity until a GTC seizure is elicited.
- k) If no GTC seizure is elicited after 3 doses of electricity, the doctor administering ECT can increase the treatment level by 2 levels for the final dose of electricity. Up to 4 doses of electricity can be administered during an ECT session.
- l) The absence or presence of seizure should be noted. The duration of seizure, timed from the beginning of the tonic phase, should also be noted. The quality of the EEG and changes over ECT sessions should be used as a guide for adequacy of ECT and required dosing changes.
- m) In the event that a seizure fails to be induced, restimulation at a higher intensity should be carried out after a 20 to 40 second delay for up to 4 stimulations per ECT session. This is to take into account the possibility of delayed seizure onset. It is also useful to check if the machine has malfunctioned or if the electrodes had been properly applied (Poor electrode contact). The patient's medication should also be reviewed to see if any antiepileptic medication is being administered.
- n) Should the EEG quality of the seizure be suboptimal, the dosage of treatment can be increased. Medications given should be reviewed, which may include the dosage of the anaesthetic agents.
- o) The EEG should return to pre-ECT baseline before EEG monitoring is removed and the seizure declared as terminated.
- p) Prolonged seizures lasting more than 120 seconds may be aborted with IV Valium 10 mg or IV Dormicum 5 mg. The help of the anaesthetist should be enlisted as intubation may be necessary to ensure adequate ventilation.

(5) Post ECT Management and Monitoring

- a) Intensive monitoring of the patient after ECT is not routine practice. Nevertheless, management in the recovery area should be under the supervision of the anaesthetist who should be readily accessible though not necessarily present during that period.
- b) The patient's blood pressure, pulse oxygenation and cognition should be monitored after ECT
- c) Maintaining patency of patient's airway and ensuring that there is spontaneous respiration is of utmost importance during the immediate post-ECT period. Each patient should be monitored till he or she recovers and breathes well.
- d) The patient should not be allowed to leave the recovery area until he or she is awake with stable vital signs. For outpatients, the patient should only be released to the care of a responsible other person.
- e) Post-ictal confusion or agitation should be managed supportively. Use of sedative/hypnotic drugs should only be considered if non-pharmacological methods fail. When recurrent, post-ictal confusion can be prevented by the prophylactic use of the anaesthetic agent, benzodiazepine or haloperidol. This should only be administered after the return of spontaneous respiration.
- f) Headaches, nausea and muscle aches or soreness are common during the first few hours after treatment and warrant symptomatic relief. Prophylaxis should be considered if they are particularly bothersome or recurrent.

(6) Outpatient ECT

Outpatient ECT can be safely given. The following should be observed:

- a) Clear instructions should be given to the patient to fast overnight. The patient should be able to comply with the instruction. A relative should be informed of this and enlisted to help compliance. The patient and his relative should be clearly instructed of the procedure and if possible, given a prepared information sheet for compliance.
- b) The anaesthetist should be informed of the patient's outpatient status.
- c) After treatment, the patient should remain in the recovery room until fully orientated. Pulse and blood pressure should be checked before being allowed home.
- d) In general, outpatient ECT should not be given to people who live alone, especially the elderly.

(7) Number and Frequency of ECT

ECT is generally given 2 -3 times a week in a course of six to twelve treatments. Daily ECT can also be given but the risks of confusional state are increased.

(8) Continuation and Maintenance ECT

Continuation and Maintenance ECT may be used on some medication resistant patients after careful evaluation. It is recommended that most patients who respond to ECT have a gradual taper of ECT rather than an abrupt termination to reduce the chance of relapse post ECT.

(9) ECT treatment locations

ECT treatment locations should adhere to the requirements stated in Annex B.

(10) ECT staff training and credentialing

- In order to provide ECT as an extension of an inpatient service in an outpatient setting, the following personnel must be available:-
- Lead psychiatrist must have completed formal training in ECT with at least 2 years in treating patients with ECT and be credentialed to provide ECT in an outpatient setting.
- The nurse must be certified competent in dealing with patients receiving ECT.
- An anaesthetist is available and on call during the procedure

(11) Clinical Governance

- It is recommended that there be a Head of ECT service to be responsible for training standards, staff certification and drive quality improvements
- There should be regular and systematic collection of effectiveness and adverse effects for quality improvement.

H. CONCLUSION

ECT is a very effective treatment in psychiatry. Its use had stood the test of time despite countless attempts by its opponents to discredit and ban its use. When used judiciously, its safety and efficacy has been confirmed. It is hoped that this set of guidelines will ensure that ECT remains a safe and effective treatment tool in Psychiatry.

Medications adjustment for ECT

LEVELS OF EVIDENCE AND GRADES OF RECOMMENDATION (MOH)

Levels of Evidence

Level	Type of Evidence
1++	High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias
1+	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1-	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2++	High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2+	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2-	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, e.g. case reports, case series
4	Expert opinion

Grades of Recommendation

Grade	Recommendation
A	At least one meta-analysis, systematic review of RCTs, or RCT rated as 1++ and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+
C	A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+
GPP (good practice points)	Recommended best practice based on the clinical experience of the guideline development group.

DRUG EFFECTS REPORTED IN PATIENTS UNDERGOING ECT		
DRUG(s)	EFFECT(s) ON ECT	SUGGESTED MANAGEMENT STRATEGIES
ANTI-DEPRESSANTS		
Bupropion 1-7	Reported to be epileptogenic at higher doses. Bupropion SR greater than 450mg/day increased seizure incidence by 0.4%. ¹ Mixed results on seizure duration in case reports. Three cases reported prolonged seizures more than 120 seconds, ^{2,3,5} while two cases reported safe during ECT. ^{4,6}	Use with caution, consider discontinuation or dose reduction prior to ECT. ⁷ (Grade D, Level 3) <u>If were to be continued:</u> Avoid dose adjustments during course of ECT. (GPP)
MAOIs ⁷⁻¹¹	Minimal effect on seizure duration and hemodynamic response ⁹⁻¹¹ Multiple interactions with drugs used during anesthesia⁸: <ul style="list-style-type: none"> • Indirect acting sympathomimetics may precipitate potentially fatal hypertensive crisis and are absolutely contraindicated with any MAOIs. Caution when used with direct acting sympathomimetics (adrenaline, noradrenaline and phenylephrine). • Patients on MAOI may experience additive hypotensive effect with propofol. 	MAOIs may be continued with routine monitoring during the course of ECT. (Grade C, Level 2-) Moclobemide, a selective reversible MAO-A inhibitor may be preferred to reduce risk of hypotension and interactions with anesthetic agents. ⁷ (Grade D, Level 4)
Mirtazapine ¹²⁻¹³	Minimal effect on seizure duration.	Reported safe to use during ECT. No omissions required. (Grade D, Level 2-)
SNRIs ¹⁴⁻¹⁸	Minimal effect on seizure duration at standard doses of venlafaxine and duloxetine. ¹⁴⁻¹⁸ Limited information on	Venlafaxine is reported safe to use during ECT. No omissions required. (Grade B, Level 1+)

	<p>other SNRIs.</p> <p>Interactions with drugs used during anaesthesia¹⁴:</p> <ul style="list-style-type: none"> • Venlafaxine higher than 300mg/day in combination with propofol was reported to cause transient asystole and bradycardia in a case series. 	<p>Duloxetine is reported safe to use during ECT. No omissions required. (Grade D, Level 3)</p> <p>Caution for cardiac side effects when venlafaxine higher than 300mg/day is administered with propofol. (Grade D, Level 3)</p>
SSRIs ^{7,19-23}	<p>Widely used in combination with ECT. Minimal effect on seizure duration reported.¹⁹⁻²¹</p>	<p>Reported safe to use during ECT. No omissions required.^{7, 22-23} (Grade C, Level 2+)</p>
TCA ^{7,21,24-27}	<p>Minimal effect in seizure duration reported. Cardiac patients who received TCAs were reported to have higher rates of cardiac complications including transient arrhythmias and hypotension during ECT.^{21, 24-27}</p> <p>Interactions with drugs used during anaesthesia⁸:</p> <ul style="list-style-type: none"> • Indirect acting sympathomimetics may precipitate hypertensive crisis when used with TCA. • Increases risk of confusion when used with IV anticholinergics, such as atropine. 	<p>Avoid TCA use in elderly and cardiac patients.⁷ (Grade D, Level 2-)</p> <p>Use lowest effective dose in non-cardiac patients, monitor for emergent arrhythmias and hypotension. (GPP)</p>
Trazodone ²⁸⁻²⁹	<p>Theoretically reduce seizure threshold. Limited studies are available on concomitant use of trazodone and ECT.</p> <p>A case control study reports no cardiovascular complications when low dose (50-100mg /day) trazodone is used with ECT.²⁸</p>	<p>Low dose trazodone may be used in combination with ECT without significantly increasing the risk of cardiovascular complications.²⁸ (Grade C, Level 2+)</p> <p>Consider discontinuing trazodone if patient has history of trazodone-induced prolonged seizure duration.²⁹ (Grade D, Level 3)</p>

ANTI-EPILEPTICS DRUGS (AEDs)/ MOOD STABILISERS

AEDs^{22,23,30-38}

Theoretically may increase seizure threshold, resulting in lower seizure duration or failure to elicit ECT seizure.

Phenytoin, Phenobarbitone, Levetiracetam, Pregabalin, and Gabapentin:

Case reports have reported some patients requiring higher electrical dose or AED dose reduction to elicit seizures or sustain seizures of adequate duration while on these AEDs.³⁰⁻³²

Lamotrigine:

Some patients may require higher electrical dose or AED dose reduction to elicit seizures or sustain seizures of adequate duration while on lamotrigine >100mg/day.^{33,34} Lamotrigine up to 300mg/day has been safely used with concurrent ECT.³⁵

Carbamazepine:

Shorter seizure duration or failure to elicit seizures during ECT have been reported with concomitant carbamazepine use in a case series.³⁰ A cohort study also reported greater likelihood of failure to have adequate seizures while on carbamazepine. Increased number of ECTs may also be required to achieve clinical improvement.³⁶

Valproate:

One double blind RCT suggest safe concomitant use of Valproate and ECT in non-epileptic patients, with

For Management of Bipolar disorder:

Carbamazepine: Consider taper off and discontinue prior to initiation of ECT whenever possible.³⁶ (Grade C, Level 2)

All other AEDs, consider taper off and discontinue prior to initiation of ECT if no clear clinical benefit.^{22,23,38} (Grade D, Level 4)

Use lowest effective dose and avoid dose adjustments during the course of ECT. (GPP)

For management of Epileptic disorders or other indications:

Continue all AEDs during course of ECT.^{30,33-35} (Grade D, Level 3)

If difficult to elicit seizure, discuss with neurologist &/or specialist and consider reducing AED dose (Grade D, Level 3) or omitting dose 12 hours prior to ECT, resume after patient recovers from the ECT session.^{22,23,38} (Grade D, Level 4)

No recommendations for topiramate in patients undergoing ECT.

	<p>dosage maintained at Sodium Valproate 750mg/day³⁷. A retrospective cohort study, however, discouraged the use of valproate in ECT patients as concomitant use was associated with negative outcome, including higher seizure threshold, significantly higher number of ECT sessions, and longer inpatient stay³⁶</p> <p>Very limited evidence found for Topiramate.</p>	
<p>Benzodiazepines 22,38,39-43</p>	<p>Theoretically benzodiazepines may raise seizure threshold.</p> <p>Several retrospective and cohort studies reported shorter seizure duration and prolonged treatment duration when benzodiazepines are used in unilateral ECT.³⁹⁻⁴¹</p> <p>A retrospective cohort study reported that use of benzodiazepines did not affect efficacy of bitemporal ECT.⁴⁰⁻⁴²</p>	<p>Avoid concomitant use of benzodiazepine in ECT, whenever possible^{22,38} (GPP); unless for the management of catatonia, in which omission is not recommended.⁴³ (Grade C, Level 2+)</p> <p>If were to be continued, use the lowest effective dose and consider omission 12 hours prior ECT. (GPP)</p> <p>Small doses of benzodiazepines (equivalent up to 1mg Lorazepam) may be prescribed 30-60minutes before ECT session for patients with agitation or anxiety about the ECT procedure.²² (GPP)</p>

<p>Lithium^{7,44-49}</p>	<p>Reported safe when used in combination with ECT.⁴⁴⁻⁴⁶ Elderly may be at higher risk of post-ECT delirium when lithium is used concomitantly.^{7,45,47-49}</p> <p><u>Interactions with drugs used during anaesthesia:</u> May prolong neuromuscular blocking effects of depolarising and non-depolarising neuromuscular blockers. Watch for respiratory depression, bradycardia, cardiac arrhythmias, and asystole.^{7,28}</p>	<p>If no clear clinical response, discontinue lithium within 2-5 days prior to ECT initiation. (Grade D, Level 3)</p> <p><u>If were to be continued:</u></p> <ul style="list-style-type: none"> • Target lower therapeutic dose range to minimize post ECT delirium.⁷ (Grade D, Level 3) • Avoid dose adjustments during the course of ECT. (GPP) • Start succinylcholine at lower dose and titrate up to desired degree of blockade. (Grade D, Level 4)
<p>ANTI-PSYCHOTICS</p>		
<p>Antipsychotics^{50-54, 63-64}</p>	<p>Antipsychotics are generally considered safe with concurrent use of ECT.⁵⁰⁻⁵⁴</p>	<p>Reported safe to use during ECT. No omissions required.⁵⁴ (Grade D, Level 3)</p> <p><u>Grade and Level of evidence for specific antipsychotics:</u></p> <ol style="list-style-type: none"> 1. Flupenthixol, Quetiapine, Olanzapine, Ziprasidone, Risperidone, Chlorpromazine⁶³ and Reserpine⁵⁰ (Grade A, Level 1++) 2. Clozapine⁵¹ (Grade A, Level 1+) 3. Sulpiride⁵² (Grade C, Level 2+) 4. Amisulpiride⁶⁴ and Aripiprazole⁵³ (Grade D, Level 3)

OTHERS

Dextromethorphan ⁵⁵	Limited studies on dextromethorphan use in ECT. One case report reported reduced motor seizure with concomitant dextromethorphan. ⁵⁵	Consider discontinuation prior to ECT if has inadequate seizure quality. (Grade D, Level 3)
Diphenhydramine ⁵⁶	Limited studies on diphenhydramine use in ECT. One small RCT reported no effect on seizure duration ⁵⁶	Reported safe to use during ECT. No omissions required. (Grade C, Level 1-)
Theophylline ⁵⁷⁻⁶¹	<p>No observation of increased risks of ADR (such as arrhythmia, tachycardia) or increased risks of toxicity in patients taking theophylline undergoing ECT.⁵⁷⁻⁶⁰</p> <p>A case report of prolonged seizure (longer than 150 seconds) was observed in a patient taking theophylline and undergoing ECT, despite serum theophylline was within therapeutic range of less than 12mcg/ml.⁶¹</p>	Suggest to maintain serum theophylline level lower than 15mcg/ml, whenever possible. ⁵⁷ (Grade C, Level 2+)
Z-hypnotics ⁶²	<p>Zopiclone may reduce seizure duration and/or reduce expression of seizure.⁶²</p> <p>Nil literature found for concomitant use of zolpidem and ECT.</p>	<p>Consider omitting 12-hours before ECT if patient has history of poor seizure quality while on zopiclone.⁶² (Grade D, Level 3)</p> <p>No recommendations for zolpidem in patients undergoing ECT.</p>
<p><i>AED=Anti-epileptic Drug; ECG=electrocardiogram; ECT=electroconvulsive therapy; MAOI=monoamine oxidase inhibitor; SSRI=selective serotonin reuptake inhibitor; SNRI=serotonin norepinephrine reuptake inhibitor; TCA=tricyclic antidepressant</i></p>		

ECT outside of Operating Room

Location

The treatment site should include separate areas for waiting, treatment, and recovery. If outpatient ECT treatment is provided, there should also be space identified for patients and those accompanying the patient during the post recovery period. Policies should identify where ECT related equipment and supplies are stored within the treatment site

Equipment

Equipment should be available in both the ECT treatment area and the recovery area to provide suction; deliver intermittent positive-pressure oxygen; monitor vital signs, including cardiac rhythm and hemoglobin oxygen saturation. The treatment area should also contain equipment for intubation, seizure induction (brief pulse waveform ECT device), physiologic monitoring including EEG, and resuscitation. The recovery area should also contain ECG monitoring and pulse oximetry devices.

More specifically, standard equipment in the treatment area includes: 1) stretcher or bed with side rails and the capacity to raise both the head and feet, 2) automatic or manual blood pressure monitoring device, 3) stethoscope, 4) ECT device with built-in EEG monitoring, 5) ECG monitoring equipment, 6) sphygmomanometer cuff to permit detection of ictal motor duration, 7) pulse oximeter, 8) oxygen delivery system, 8) suction apparatus, 9) intubation set for managing airways, and 10) reflex hammer.

When treating patients who are at significantly increased risk of musculoskeletal injury (e.g. severe osteoporosis) or when using nondepolarizing muscle relaxant agents (e.g. curare, atracurium, mivacurium, rocuronium), it is recommended that a peripheral nerve stimulator be available to ensure the adequacy of muscle blockade before delivering the electrical stimulus. A defibrillator should be readily available. Access to a backup ECT device and additional cables is suggested; however, because of cost, this may not be reasonable in smaller hospitals/facilities. Staff responsibilities relating to equipment should be delineated including its availability in the treatment area, safety checks and general care and maintenance.

Medications

Pharmacologic agents that may be required during ECT treatment should be identified. Such medications include: 1) primary anesthetic agent, 2) primary muscle relaxant, 3) an anticholinergic agent, 4) medications for first-line management of arrhythmias, hyper- or hypotension, and cardiac arrest, 5) medications for the initial management of severe bronchospasm or anaphylactic shock, other agents for managing status epilepticus, 6) anti-nausea medications, and 7) non-narcotic analgesics. Practices should cover storage and staff access to medications within the ECT treatment area, including maintaining a current inventory of controlled drugs.

Recommended Rating Scales for ECT assessment

1. Symptom ratings

- a. Montgomery Asberg Depression Rating Scale (MADRS)
- b. Hamilton Depression Rating Scale (HAMD)
- c. Brief Psychiatric Rating Scale (BRPS)
- d. Young Mania Rating Scale (YMRS)

2. Cognitive ratings

- a. Montreal Cognitive Assessment (MoCA)
- b. Brief ECT Cognitive Screen (BECS)

3. Quality of life ratings

- a. EQ-5D-3L
- b. Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-QS)

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