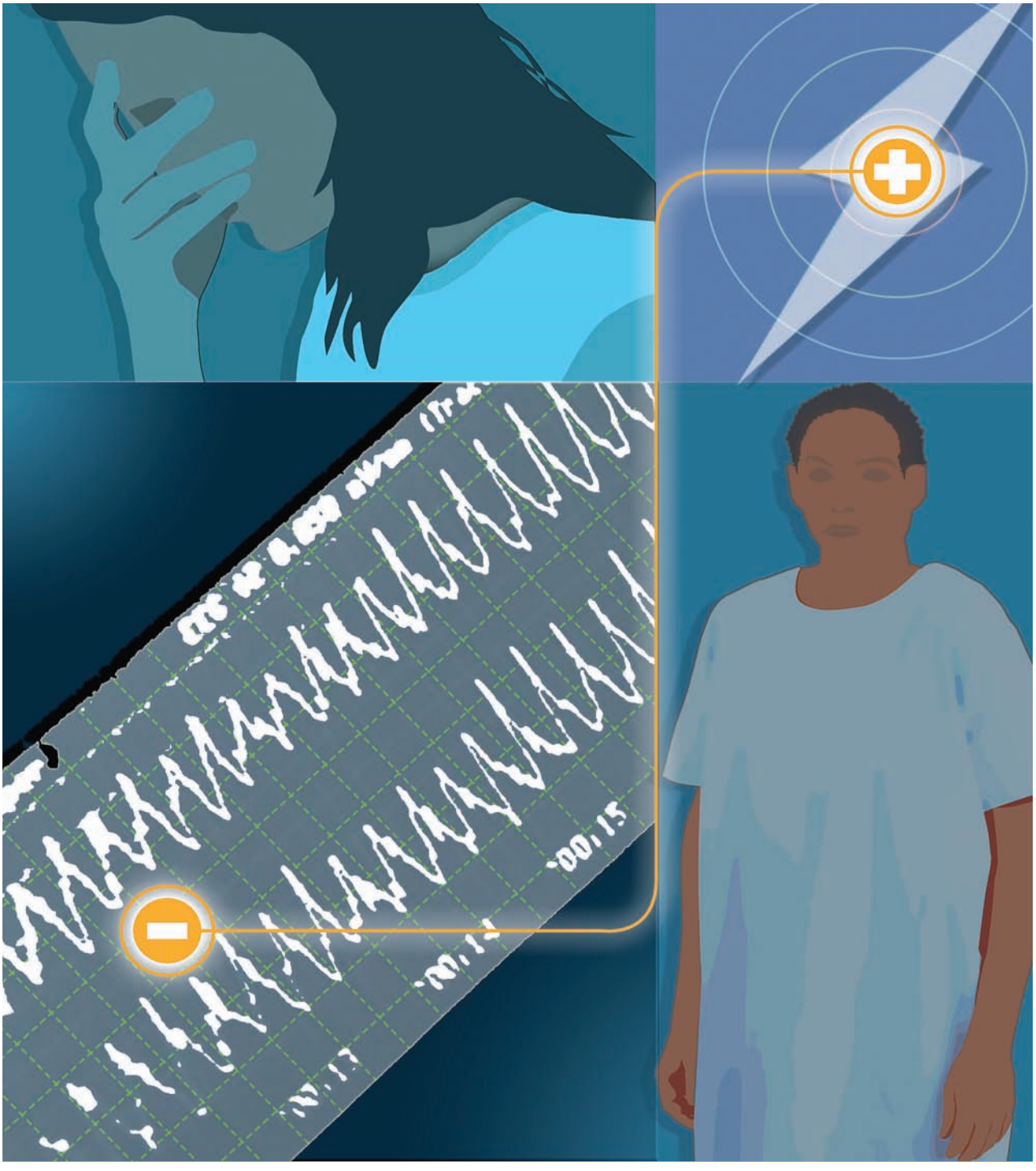

# Is ECT an option for your patient with severe depression?

**Electroconvulsive therapy (ECT) is a valuable treatment modality for severe psychiatric disorders that don't respond to other forms of treatment. This complex, specialized procedure has changed significantly from its beginnings. We give you information on the physical and mental assessments necessary for safe and effective patient outcomes.**

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In the early 1900s, treatment for mental illness was limited, with psychotherapy or inpatient confinement being the principal modalities. Somatic treatments, such as insulin coma, hydrotherapy with cold baths, and scotch douches, were tried in an attempt to "shock" the system into sanity. In 1934, the Hungarian neuropathologist L.J. von Meduna started using an I.M. injection of camphor to treat catatonic schizophrenia. Psychiatrist Lucio Bini and neurologist Ugo Cerletti performed the first electrical induction of a seizure to treat catatonia on a homeless man that was found wandering and mumbling incoherently in a railroad station in 1938. In 1939, ECT was introduced in the United States.

In the beginning, ECT was crude and harsh. There were no effective muscle relaxants available, and frequently the violent convulsions caused bone fractures and dislocations. Also, limited knowledge about the amount of voltage or dose parameters resulted in severe cognitive problems. This caused the public to be opposed to the procedure.

In 1940, the drug curare was developed to use as a muscle relaxant during ECT, which greatly decreased adverse reactions. ECT was the only effective treatment for some mental illness until the antipsychotic drug chlorpromazine was discovered in the 1950s. During the same time period, the American psychiatrist Max Fink started to research ECT

as a viable treatment modality. This was followed by controlled studies of ECT methods.

The American Psychiatric Association (APA) published the first taskforce report on ECT in 1978 that established standards for informed consent, technical procedures, and clinical aspects of ECT. Today, ECT has been demonstrated to be safe and effective for many psychiatric disorders.

You may encounter a patient undergoing ECT in different practice areas, so it's important for you to learn about ECT and how it can positively impact the prognosis for a patient with a psychiatric disorder that hasn't responded to other forms of treatment.

## Why ECT?

ECT is used in the treatment of major depression, bipolar disorder, and schizophrenia after other treatment alternatives, such as counseling and medications, have been unsuccessful. In fact, it's considered to be a primary treatment for people experiencing severe depression, acute mania, or mood disorder with psychosis.

For a person who's experiencing symptoms of severe depression, such as repetitive suicidal attempts or catatonia (refusing to eat, sleep, or interact), ECT can provide relief. In addition, older people with severe depression often respond better to ECT than medications. For pregnant women with severe depression, ECT doesn't harm the fetus, unlike current antidepressant medications that have the potential to do so.

ECT can induce a rapid resolution of the symptoms of severe depression, including loss of appetite, insomnia, lack of interest, feelings of hopelessness and helplessness, low self-esteem, and thoughts of suicide. Current studies also suggest that the combination of ECT and antidepressants may be more successful at reducing the symptoms of severe depression than medication alone.

## How it works

ECT delivers a small electric current that causes a disruption of nerve impulses within the brain, producing a generalized cerebral seizure via electrodes positioned on the patient's temples. It can be delivered unilaterally (an electrode

### Medications used in ECT

| Drug | Action | Adverse reactions |
|---|---|---|
| Glycopyrrolate (doesn't cross the brain barrier); atropine | • Cholinergic-blocking effects reduce secretions in the respiratory system and prevent bradycardia from vagal nerve stimulation | • Dilated pupils<br>• Tachycardia<br>• Urinary retention<br>• Confusion<br>• Dry mouth |
| Thiopental | • Rapid, ultra short-acting barbiturate anesthetic agent | • Cardiac arrhythmias<br>• Hypotension necrosis at the injection site |
| Methohexital | • Rapid, ultra short-acting barbiturate anesthetic agent with low cardiac toxicity | • Hypotension<br>• Tachycardia<br>• Respiratory arrest<br>• Bronchospasm<br>• Anxiety<br>• Delirium |
| Propofol (anesthesia) | • Rapid-acting, potent antiepileptic drug | • Pain on injection<br>• Hypotension<br>• Apnea<br>• Bradycardia |
| Succinylcholine (given I.V. because it causes rapid flaccid paralysis) | • Ultra short-acting depolarizing skeletal muscle relaxant | • Bradycardia<br>• Arrhythmias<br>• Cardiac arrest<br>• Prolonged respiratory depression<br>• Hyperthermia |
| Dantrolene | • Skeletal muscle relaxant effective against hyperthermia | • Seizures<br>• Muscle weakness<br>• Drowsiness<br>• Fatigue<br>• Headache<br>• Insomnia |

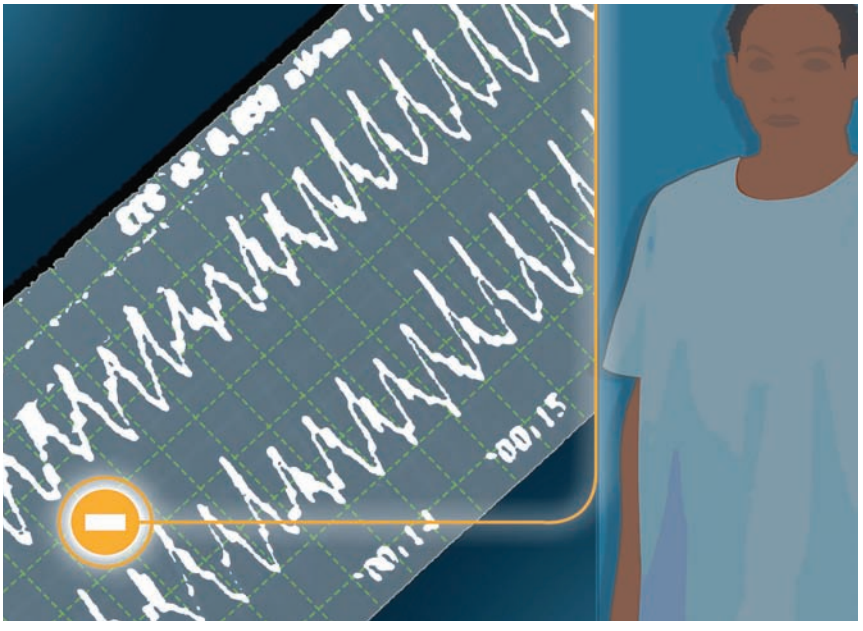
on one side of the brain) or bilaterally (two electrodes placed on opposite sides of the brain).

There are several different electrode positions used in ECT, including bilateral, right unilateral, and bifrontal. In the bilateral position, electrodes are placed bifrontotemporal, with the middle of the electrode about 1 in (2.5 cm) above the midpoint of an imaginary line drawn from the tragus to the external canthus. With the right unilateral position, only one electrode is placed over the nondominant frontotemporal area; the other electrode is placed on the nondominant centroparietal scalp, just lateral to the middling vertex. Unilateral electrode placement is usually over the right hemisphere because most people are left dominant (right-handed).

ECT is thought to work by producing changes in various brain chemicals, such as hormones, neuropeptides, and neurotransmitters. These chemicals, including dopamine, norepinephrine, serotonin, and gamma-aminobutyric acid, are involved in the regulation of mood and emotion.

Although the length of the seizure has little effect on the overall effectiveness of treatment, a seizure less than 15 seconds may be too weak and not alter the chemicals in the brain. Stimulus dose strength can be selected based on formula-based methods that adjust electrical intensity for gender, age, electrode placement, and concomitant medications. The usual dose of electricity is 70 to 150 V. If the initial dosage doesn't elicit a seizure, the dosage can be increased.

The number of ECT treatments needed depends on the patient's diagnosis, age, history of illness, family support, and response. The treatment is given every other day, at a frequency of two to three per week. The APA recommends three treatments per week, although there may be less memory impairment with a twice-weekly regimen. Usually 6 to 12 treatments are needed to see a full, positive clinical response. However, improvement may take as long as 6 months.



## Medications lend a hand

Patients undergoing ECT are given generalized anesthesia, muscle relaxants, anticholinergic medications, and oxygen to decrease adverse reactions and ensure safety (see *Medications used in ECT*). In the delivery of ECT, the goal is to elicit light anesthesia; heavy anesthesia can prolong unconsciousness or result in cardiovascular complications. The degree of cognitive changes after ECT often relates to the medication used for the anesthesia.

Sedatives or anesthetic medications prevent any fears or anxiety that could compromise response to ECT and ensure unconsciousness during the procedure. Methohexital, thiopental, ketamine, and propofol are some of the agents utilized. Methohexital offers a rapid action, short duration choice with low cardiac toxicity. It's the most commonly used anesthetic because of its known safety record, effectiveness, and cost.

Immediately after ECT elicits a seizure, a vagal reflex occurs. Anticholinergic

**Older patients with severe depression often respond better to ECT than medications.**

medications, such as atropine, are given to reduce the risk of vagal-induced asystole or bradycardia. Atropine and glycopyrrolate are the commonly used anticholinergic agents, but atropine has a more potent effect on heart rate.

A neuromuscular blocker, such as succinylcholine, is given to prevent bone fractures and other physical injury due to the motor activity that occurs with the seizure during ECT. Dantrolene is a direct-acting skeletal muscle relaxant that's effective against malignant hyperthermia—an uncommon, but life-threatening, complication that can occur following the administration of an anesthetic agent or depolarizing muscle relaxant such as succinylcholine (see *What's malignant hyperthermia?*).

## The ECT team

The ECT team usually includes the psychiatrist, an anesthesia provider, a recovery nurse, and an ECT nurse.

The ECT psychiatrist is responsible for the administration of the treatment. This provider determines the need for ECT, assesses the patient before the procedure, and confirms that all the preliminary evaluations have been completed. The psychiatrist also ensures that ECT is delivered in a safe, effective manner and then documents the event. Some of the responsibilities of the psychiatrist include verification of electrode placement, administration of the electrical impulse, and evaluation of seizure response and completion. An electroencephalograph (EEG) monitors brain tracings that tell the ECT psychiatrist how long the seizure lasts.

The anesthesia provider can be a physician or a nurse anesthetist. This team member is responsible for managing the patient's airway and oxygenation, and maintaining cardiopulmonary stability. The anesthetist is also responsible for administering the brief anesthetic and relaxing medications, and treating any acute adverse reactions. After the patient is unconscious, a breathing tube and mouthpiece are inserted. Intubation is usually not necessary because the patient is sedated for less than 5 minutes, but the equipment needed to intubate and support the airway should be readily available.

Just as after a surgical procedure, the recovery nurse monitors the patient's vital signs, pulse oximetry, and ECG rhythm, and alerts the team if an abnormality occurs. The recovery nurse can provide suctioning of the airway if needed and is also responsible for intervening if the patient experiences disorientation or agitation.

The ECT nurse should have additional training in the procedure and prove clinical competence in this area. This nurse assists the ECT psychiatrist and anesthesia provider by coordinating the procedure. The ECT nurse checks the proper functioning of the equipment, such as the suction machine, defibrillator, oxygen delivery system, and monitoring equipment. The ECT nurse may also assist the patient to and from the procedure area. A tourniquet is lightly applied to one of the patient's hands or feet before the muscle relaxant is given. This prevents any paralysis in the limb's muscle. The nurse monitors circulation by assessing the color and pulse of the extremity. The nurse can also use this hand or foot to monitor muscle movement from the seizure. The amount of muscle relaxation is determined by a decreased or loss of knee, ankle, or plantar withdrawal reflex or failure to respond to a nerve stimulator.

### What's malignant hyperthermia?

Malignant hyperthermia is a life-threatening clinical syndrome of hypermetabolism involving the skeletal muscle. It's an inherited disorder in which susceptible individuals can be triggered by inhalational anesthetic agents and the muscle relaxant succinylcholine. Symptoms of malignant hyperthermia include tachycardia, extreme temperature elevation, muscle breakdown, clotting problems, and organ failure. It can be treated with dantrolene, which lowers high temperatures. The patient will be moved to the ICU, where life-saving interventions can be initiated.

## Workup for safety

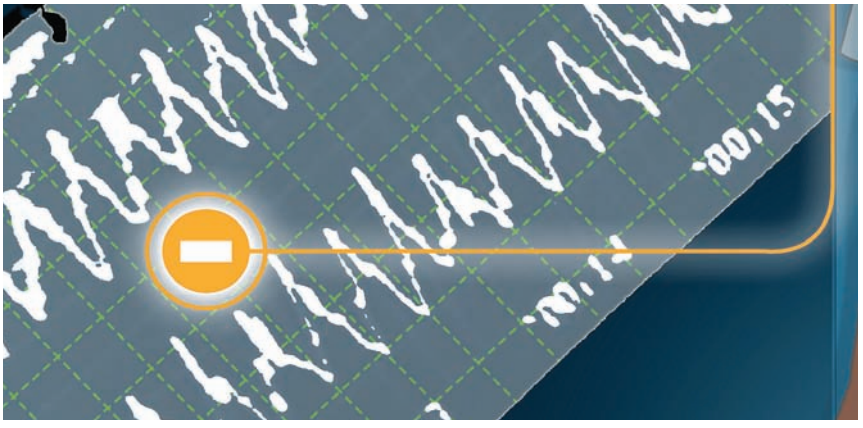
Before ECT, the patient receives a thorough evaluation comprising a psychiatric history, including past use and response to ECT, and a comprehensive medical exam, with particular attention to the cardiovascular, pulmonary, neurologic, and musculoskeletal systems. A cognitive assessment should be completed to provide a baseline of functioning before ECT. Lab tests include a complete blood cell count, urinalysis, complete metabolic profile, and ECG.

Unstable, severe cardiovascular conditions, such as myocardial infarction, congestive heart failure, and severe valvular cardiac disease, can substantially increase the risk of adverse reactions during ECT. Patients who have a brain aneurysm or a condition that increases intracranial pressure aren't good candidates for ECT because it can elevate BP. A computed tomography scan is sometimes ordered to rule out any brain abnormalities that can worsen with the convulsion caused by ECT. Complicated pulmonary conditions, such as severe chronic obstructive pulmonary disease, asthma, or pneumonia, need to be addressed. A chest X-ray may be performed to identify any lung conditions that could present a problem when receiving ECT. The anesthetist may then revise the choice of medications for the procedure.

ECT can be used during all three trimesters of pregnancy. It's important to ensure that an obstetric consultation is obtained before the procedure. If the gestational age is over 10 weeks, noninvasive monitoring of the fetal heart rate is needed before and after each ECT treatment. Also, if the pregnancy is high risk, the presence of an obstetrician may be valuable during the procedure.

## The importance of informed consent

Informed consent is an important part of ECT. No patient should be given ECT without informed consent. The consent should outline the reason for the treatment, expected benefits, description of the procedure, description of major adverse reactions, and reasonable alternatives available. It should also include permission for clinically necessary emergency treatment. The consent form should be signed by the patient before the procedure. If the patient isn't able to understand and appreciate the risks and consequences, a responsible medical officer can be assigned to assist with this legality. Individuals with mental illness are considered competent to give consent unless it has been determined by a court that they aren't legally competent.




Informed consent starts with the signing of the consent form, and continues through the procedure in a dynamic fashion.

Informed consent starts with the signing of the consent form, and continues through the procedure in a dynamic fashion. Any questions or concerns regarding ECT should be asked and answered at any time during the procedure. It's the psychiatrist's responsibility to obtain a signed consent; however, the nurse plays a vital role in ensuring that the patient receives a full explanation of the procedure and answers to questions along the way.

Remember that the psychiatric disorder that resulted in the need for ECT may also decrease the patient's ability to concentrate, so the nurse may need to repeat information several times. Also, the nurse can reinforce the patient's comprehension by asking what he or she understands about ECT. It's important to inform the patient to avoid activities such as driving a car due to the

anticipated cognitive effects after ECT. Also, the nurse can review with the patient which adverse reactions, such as nausea, vomiting, unsteady gait, vertigo, or headaches, to report to the healthcare provider.

## The nurse's role

The nursing care of a patient receiving ECT involves assessment of the patient's memory, behaviors, and functional ability before the procedure; preparing and monitoring the patient during the procedure; recovering the patient after the procedure; and providing educational and emotional support throughout ECT.

The ECT nurse is involved from the beginning with answering patient questions about the procedure. Assessing individual learning needs and styles is important so that education is tailored to each patient. Information is often given to the patient in the form of a booklet or video. The nurse can then address any questions that the patient may have about the procedure. Sometimes finding out what the patient fears about ECT is a good place to start. Also, if another family member or friend has received ECT, a discussion of the patient's feelings about that may be beneficial. The nurse can elicit how the patient feels about the ECT procedure and what expectations he or she may have for what happens during and after it. The nurse must be aware of any negative or biased feelings he or she may have about ECT and ensure that these opinions aren't communicated to the patient.

In the area where ECT will be done, specialized equipment is needed to ensure safe and effective delivery. Suction equipment, an automatic BP machine, a stethoscope, a reflex hammer (to test the effectiveness of muscle relaxation by assessing a reduction or loss of knee, ankle, or plantar reflexes), an ECG, and a pulse oximeter should all be in the area. In addition, intubation sets for managing the airway and a dual-channel EEG machine to monitor brain activity should be available. It's important to have a bed with side rails and the ability to raise the head and foot to allow safe positioning of the patient.

The nurse completes a pre-ECT assessment, including temperature, pulse, respirations, oxygenation, cognition, and pain score. The nurse should ensure that the patient's medical history and physical exam are current. He or she confirms that the patient has remained N.P.O. because of the general anesthesia used. Any medications that may interfere with the therapeutic properties of ECT or cause adverse reactions should be held, such as antiepileptic drugs, theophylline (increased risk of status epilepticus), and benzodiazepines.

The nurse will assist the patient to empty the bladder to avoid any incontinence or bladder distension during ECT. He or she completes the allergy and risk assessments and confirms that the informed-consent form is signed. The nurse starts an I.V. line with the ordered solution. The nurse also responds to any patient concerns, reinforcing any education about the procedure that the patient has received, and explaining the tasks of the procedure.

## On the web

- **American Psychiatric Association:** http://www.psychiatry.org/File%20Library/Mental%20Illness/Lets%20Talk%20Facts/APA-ECT.pdf
- **Duke Health:** http://www.dukehealth.org/health_library/health_articles/electroconvulsive-therapy-ect-q-a-with-sarah-hollingsworth-lisanby-md
- **Mayo Clinic:** http://www.mayoclinic.com/health/electroconvulsive-therapy/MY00129
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- **Mental Health America:** http://www.nmha.org/go/information/get-info/treatment/electroconvulsive-therapy-ect
- **National Alliance on Mental Illness:** http://www.nami.org/Template.cfm?Section=About_Treatments_and_Supports&Template=/ContentManagement/ContentDisplay.cfm&ContentID=142939

In the treatment room, the nurse can introduce the members of the team to the patient to decrease anxiety. During the procedure, the nurse may apply the ECG electrodes, BP cuff, and pulse oximetry sensors (not on the same extremity as the BP cuff). Seizure precautions per the facility's policies and procedures should be initiated. The nurse may also assist the psychiatrist in electrode placement by cleaning the patient's skin with alcohol and applying gel, which improves the contact of the electrodes with the head. A disposable bite block is inserted into the patient's mouth to prevent tooth, tongue, or gum damage during the seizure. The trained ECT nurse may press the treat button on the ECT machine as the psychiatrist holds the electrodes on the patient head.

## Recovery readiness

The patient remains in the recovery area until the vital signs are stable for at least 30 minutes, the ability to cough and swallow has returned, there's an absence of adverse reactions such as nausea or vomiting, and the ability to safely ambulate returns. Oxygen is routinely administered to the patient. Ensuring patency of the airway is important and use of suction may be necessary. Also, the nurse can optimize positioning to maintain a patent airway.

A comprehensive assessment of the major body systems, with priority to airway, cardiovascular status, and level of consciousness, is completed. The nurse should observe the patient for cyanosis, perfuse diuresis, nausea, vomiting, delirium, agitation, and more seizure activity. Complications of ECT include prolonged seizures, prolonged apnea, and cardiac arrhythmias. The nurse can use the ABCs (airway, breathing, circulation) to treat any of these complications. It's important for the nurse to alert the psychiatrist of any BP elevation or depression within 20% of baseline values, the presence of new dysrhythmias, changes in breathing patterns, or unexplained patient disorientation to person or place. Cardiovascular and pulmonary complications are the leading cause of mortality with ECT.

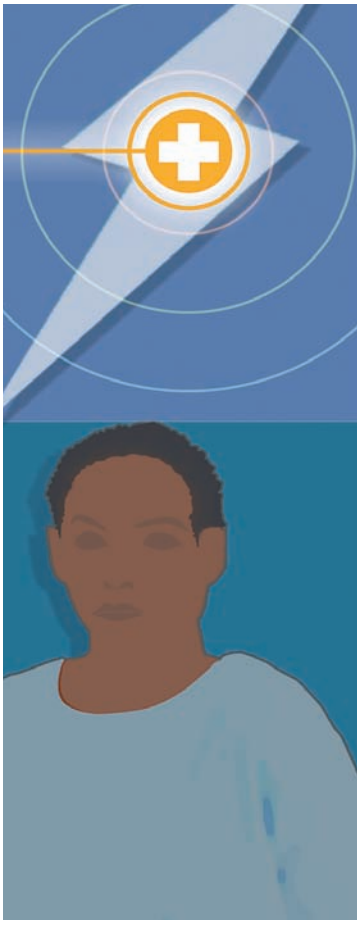
Immediately after the procedure, the nurse should assess the patient's level of consciousness and fall risk. Prolonged confusion can cause safety issues. The nurse will ensure that the patient has fluids within 2 hours of the procedure by offering them when the patient is alert and sitting up. Checking for ability to void is also an important part of post-ECT care.

## Warning! Adverse reactions

Concentration and attention problems can occur post-ECT. Most people report a return to normal concentration levels in a couple of weeks. Some patients may find it hard to read or perform other tasks requiring concentration. The nurse can educate about these adverse reactions and reassure the patient that they're short-lived.

Immediately after the procedure, the patient may also experience periods of confusion, not knowing where they are and what's happening. The confusion usually fades in a couple of hours, but can sometimes last for a couple of days. Lethargy is common for several hours post-ECT, so any physical activities should be planned accordingly. Older adults experience more postprocedure confusion, and planning for safety with family support is important.

Memory loss is the most common adverse reaction of ECT. The majority of patients experience retrograde amnesia, or not remembering the events leading up to and including the ECT procedure. In some patients, memory loss may be more profound; patients may have difficulty remembering events that occurred weeks before or after ECT. Rarely, a patient may have trouble remembering past experiences and events. It's important for the nurse to listen to concerns, answer questions, and realistically reassure about this memory loss. Memory loss usually improves a few weeks after ECT.



Memory loss is the most common adverse reaction to ECT and usually improves within a few weeks.

## Beneficial impact

The nurse is a valuable member of the ECT team, with the role of anesthetist, recovery nurse, or specially trained ECT nurse. Each role utilizes the nursing process, with assessments, interventions, and evaluations at all phases of the treatment. As a member of the ECT team, the nurse participates in a treatment that can positively impact a patient's life. ■

## Learn more about it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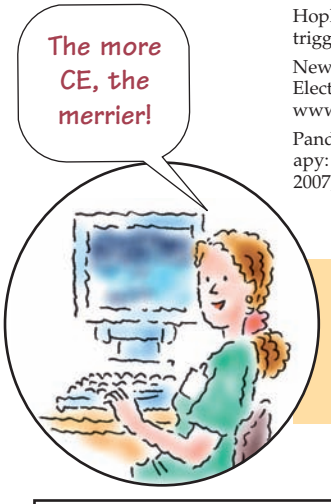


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