

## ANAESTHESIA FOR ELECTRO CONVULSIVE THERAPY

**Dr.T.Nirmala Devi, M.D., D.A., Asst Prof. of Anaesthesiology, Madurai Medical College, Govt. Rajaji Hospital, Madurai, India.**

### Introduction

Electro convulsive therapy (ECT) is the electrical induction of a grandmal seizure. It is an effective therapy used as part of the treatment of several psychiatric conditions including depression, mania, catatonic schizophrenia and other psychosis. A short general anaesthetic is usually given for the procedure.

### Anaesthetic Problems

*Patient Population.* Patients are often elderly with associated comorbidity of other chronic medical and psychiatric disease.

*Drug Interactions.* Patients are frequently taking psychotropic drugs. There are a number of important drug interactions which are listed below.

Monoamine oxidase inhibitors (MAOI) such as phenelzine and tranylcypromine. These may produce life threatening hypertensive crisis with precipitants such as ephedrine and pethidine.

Tricyclic antidepressants: increase catecholamine concentrations at central sites may lead to increased anaesthetic requirements and exaggerated response to catecholamines.

Lithium to be stopped at least 24hours before ECT as the drug is known to interact with suxamethonium and prolong apnoea.

Withhold anti convulsants

*Repeat General Anaesthetics.* ECT is usually given twice or three times a week over several weeks.

*Location.* In many hospitals ECT is administered at relatively isolated sites away from operating theatres. This may mean that help and backup to deal with unexpected problems or difficulties can be delayed or unavailable.

*Of Any Anaesthetic.* Nausea due to side effects of anaesthesia. Myalgia secondary to the use of suxamethonium.

### Effects of ECT

*Central Nervous System:* The exact mode of action in the treatment of psychiatric illness is poorly understood. The ECT device delivers a brief pulse of current (0.5-0.8amps) through electrodes placed at specific locations on the head to induce a seizure or grand mal convulsion. There is an associated increase in cerebral blood flow, oxygen consumption, intracranial pressure and intraocular pressure.

There may be a post-ictal phase with confusion, agitation or amnesia. The patient may complain of headache after the procedure.

*Musculoskeletal:* Uncontrolled myoclonic-tonic contractions may cause bony or musculoskeletal injury to the patient (or their carers). The passage of current directly stimulates the jaw muscles

and causes the teeth to clench which may lead to dental or oral injury. Because of increased muscular activity oxygen extraction is greatly increased and the patient may desaturate or become cyanosed.

*Cardiovascular System:* There may be initial parasympathetic stimulation with risk of bradycardia and hypotension followed by sympathetic stimulation with possible tachycardia, hypertension and dysrhythmias.

*Gastrointestinal System:* there is an increase in intra gastric pressure and there may be increased salivation and nausea and vomiting.

### Anaesthetic Management

#### Aims

- Safety.
- Pleasant and stress free environment for the patient who may be returning for multiple treatments.
- Rapid loss of consciousness and attenuation of the hyperdynamic response.
- Reduction of seizure movements (with appropriately judged paralysis) to avoid gross movements and injury but at the same time allowing a visual assessment of the motor element of the fit.
- Minimal interference with seizure activity.
- Prompt recovery of spontaneous ventilation and consciousness

#### Preoperatively

Assess the history, physical examination, and investigations as appropriate.

Identify and optimise co-existing disease if time allows before ECT.

It is important to explain the procedure and gain informed consent from the patient to proceed. However the nature of the underlying condition may lead to patients refusing treatment. It is important when imposing treatment against a patient's will to do this within the appropriate psychiatric framework and regulations of the country or region in which you are practising.

The patient may be an unreliable historian. Take extra care to ensure that the patient is appropriately fasted.

#### Premedication

Rapid return of consciousness and recovery is ideal so avoid premedication unless specifically required. Benzodiazepines will increase the seizure threshold so should be avoided if possible. Anticholinergic (atropine 0.6mg im or iv or glycopyrrolate 0.2mg

im or iv) may be given to attenuate bradycardia and salivation but are not absolutely necessary.

### **Monitoring**

Attach patient monitoring if available. Pulse oximeter is particularly useful to monitor cardiac rate and any desaturation that may occur during the fit. ECG and non invasive blood pressure recording are also useful if available. The psychiatric team may monitor the electroencephalogram (EEG) to track the progress of the fit.

### **Induction**

Preoxygenate the patient if tolerated.

Use a sleep dose of one of the following intravenous induction agents: methohexitone, propofol, thiopentone, or etomidate. Maintain the airway with an anaesthetic facemask, hand ventilating with 100% oxygen.

### **Muscle Relaxation**

In order to modify the fit give a low dose of suxamethonium calculated to cause incomplete muscular paralysis. Complete muscle paralysis obscures the muscular element of the fit and makes assessment of fit duration difficult. Start with a dose of 20-50mg ie 0.3 to 0.5mg/kg. Maintain the airway and ventilate with 100% oxygen throughout the procedure until the patient has resumed spontaneous and regular respiration. Check that the airway is clear and dentures are removed (if not already done so). Insert an oropharyngeal airway or bite block before allowing the psychiatrist to administer the stimulus when suxamethonium fasciculations has finished.

Carefully observe the patient for signs of a modified fit. Appropriate level of paralysis would be slight twitching of face and limbs but little more. If no movements are seen the dose of

suxamethonium was probably too high. Signs to suggest evidence of successful passage of current include dorsi flexion of great toes, dilatation of pupils and goose-pimples.

Record the doses of induction agent and suxamethonium and the patient's response to them.

This allows appropriate dose adjustments to be undertaken on subsequent occasions if necessary. (for example increasing the dose of suxamethonium to increase the fit modification)

The adequacy of ECT is judged by duration of seizure. Seizure activity is monitored direct observation of the modified fit, isolated arm technique or EEG if available. An adequate seizure duration is defined as 25-30 sec of EEG activity or 15 sec of motor seizure duration. Motor seizure duration is 30% shorter than EEG seizure.

A prolonged seizure of 120seconds (on EEG) or 90 seconds of motor activity may be detrimental and should be terminated actively with drugs. Use one of the following intravenously: thiopentone, methohexitone, lorazepam, diazepam or midazolam.

### **Post ECT Care**

Treat headache with simple analgesics or intra nasal sumatriptan.

Monitor the patient in recovery area until the patient is fully alert and able to ambulate.

Post ECT agitation, confusion and aggressive behaviour can be attenuated by

avoiding excessive stimulation during the recovery period. A small dose of benzodiazepine (eg midazolam) or haloperidol may be given if all else fails.

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