Electro convulsive therapy: A review
Alam MS, Kamal MZ

Introduction
Electro convulsive therapy (ECT) is a procedure in which generalized seizures lasting 25-150 seconds, induced by the passage of an electrical current through the brain under general anesthesia and muscle relaxant are used for therapeutic purpose.

Phillipus paraceessus used seizures produced by camphor to treat psychosis and mania in the 16th century and Leopold Von Auenbrugger, W.Oliver and Carl Weickhardt in the late 19th century. The first modern application of convulsive therapy occurred in January 1934 by Ladislas J Von Meduna, using Camphor. Psychiatrist A.E Bennett first introduced curare, a muscle relaxant to the procedure to make it safer. The use of electricity to induce seizure was introduce in April 1938 by Ugo Cerlette and Lucio Bini and was imported to United States by Lother Kalinowsky and others in 1939. Since its invention ECT has been criticized by different people. Thomas Szasz wrote that electricity as a form of treatment is "based on force and fraud and justified by medical necessity". "The cost of this fictionalization runs high," he continued. "It requires the sacrifice of the patient as a person, of the psychiatrist as a clinical thinker and moral agent." On the other hand many psychiatrist advocate ECT as a form of treatment writing "there is evidence that treatment with ECT can be beneficial in patients whom antidepressant medication has been unsuccessful."

Indication
Convulsive therapy was introduced in the late 1930s on basis of mistaken idea that epilepsy and schizophrenia do not occur together. However, when the treatment was tried it became apparent that the most striking changes occurred not in schizophrenia but in severe depressive disorder. Trial by clinical psychiatry committee, 1965 showed that it acted faster than imipramine or phenelzine and was more effective than imipramine in women and more effective than phenelzine in both sexes.

ECT should be used mainly when it is essential to bring about improvement quickly. Therefore, the strong indications are immediate high risk of suicide, depressive stupor or danger of physical health due to food and drink refusal.

ECT is particularly effective for patients with depressive psychosis or definite psychomotor disturbance.

ECT can be beneficial in depressed patients for whom antidepressant medication has been unsuccessful.

ECT is also effective in treatment of affective psychosis that follows childbirth. ECT is effective in treatment of Mania but reserved mainly for drug resistant cases. ECT is useful in treatment of acute catatonic states and schizoaffective disorders and in patients with acute schizophrenia with predominately positive symptoms. ECT should be reserved to use only when highest dose of medication has been used for adequate duration but no marked improvement is achieved.

Procedure
Patient is first selected for ECT. Patient's fitness for general anesthesia is assessed. Informed consent is obtained. The patient is placed in the reversed Trendelenburg position with shoulders elevated. The electroconvulsive shock is administered through the vertex of the head and the shock is delivered through the lower jaw. The shock is then repeated as necessary.

1. Dr. Md. Shah Alam, MBBS, FCPS
   Associate professor and Head,
   Department of psychiatry, DMCH.
2. Dr. Md. Zillur Kamal, MBBS, DPM
   Medical officer, Department of psychiatry
   DMCH.

The ORION Medical Journal 2003 Jan;14:61-62
consent is taken from patient's legal guardian to give ECT under general anesthesia.

On the day of ECT patient is kept nothing by mouth at least for 5 hours. Patient is anesthetized accordingly. The skin is cleaned in appropriate areas and moistened electrodes are applied. After muscle relaxation is achieved the treatment is given.

Mode of action
"Psychiatrist of that era (late 19s) used this form of shock therapy believed that the fear and terror produced were therapeutic because the "feeling of horror" before the onset of convulsion following injection of camphor, pentetrazol, triazol, picrotoxin, or ammonium chloride render the patients different after the experience. But the day has changed. No evidence exists for the hypothesis that ECT is effective because it is perceived as a punishment or that it enhances repression by causing confusion. As it is performed today, the procedure is not painful or threatening, and confusion and forgetting is not necessary for a therapeutic response. However, confusion may be a mark of an effect, such as sufficient stimulus dosage, but is relevant to the action of ECT in some psychotic disorders. With the advancement of science changes in the brain produced by ECT has been established. Some of the biological actions of ECT are similar to those of antidepressant medications both causes down regulation of β-receptors. But in doing this action antidepressants needs intact serotonin system which ECT does not need. So, ECT and antidepressants have important clinical and physiological differences that make it difficult to infer a common mechanism of action in depression.

ECT is also effective in treatment of mania, schizophrenia and in delirium. Mechanism of actions of ECT in these conditions are still to be established.

ECT causes some physiological changes in the brain- Cerebral blood flow increases up to 200%. There is an increased output of prolactin and neurophysin during and soon after the seizures. Blood flow and glucose metabolism, mostly in frontal lobe decreased. The degree of cerebral metabolism is correlated with therapeutic response.

Which procedure is most effective?
One of the central questions about the mode of action of ECT is whether the therapeutic effect depends on the seizure. Clinicians have generally been convinced that the patient does not improve unless a convulsion is produced during ECT procedure. This impression has been confirmed by several double blind trials which, taken together shows that ECT is strikingly more effective a full placebo procedure that includes anesthetic and muscle relaxant.

Modern ECT machines deliver brief pulses electrical energy, with this mode of administration; both electrode placement and electrical dosage can have profound effect on therapeutic efficacy of ECT. A recent study by Sackheim et al (1993) examined the effect of four ECT treatment regimes-low and high electrical doses with right unilateral and bilateral electrode placement in severely depressed patients. The result showed that low dose right unilateral treatment was significantly less effective than high dose right unilateral treatment. Both the bilateral electrode placements were more therapeutically effective than the unilateral placement and bilateral high dose treatment was marginally more effective than low dose bilateral treatment in speed of effect. From the theoretical view point it can be concluded that an important determinant of ECT efficacy is how far the applied electrical energy exceeds the seizure threshold of individual patient.

Unwanted effects
Anxiety, headache, brief amnesia, disorientation, confusion, nausea, vertigo muscle pain in jaw may occur after ECT especially if old type machine is used.
Occasional damage to teeth, tongue, lips, small electrical burn at place of electrodes can occur due to technical fault. Crouching fracture of vertebra, muscle torn may occur if adequate dose of muscle relaxant is not used.

Some rare complications like arrhythmia, pulmonary embolism, aspiration pneumonia and cerebrovascular accident may occur in patients suffering from physical illness.

Structural imaging studies in patients have shown that no damage to brain occurs by ECT. 14

The most discussed side effect of ECT is memory disorder after ECT. After reviewing several studies-ackheim’93, ronholm’64,Johnsone’1980, eeks’80, reeman’8015,16,17,18 it seems reasonable to consider that, when used in usual way, ECT is not followed by persisting memory disorder, except perhaps in small minority and that event in this group it is still uncertain whether the impairment is due to the effect of ECT is to a continuation of the original depressive disorder.

Death rate attributable to ECT is 3-4 to 4-5 per 100,00019,20 The risks are related to the anesthetic procedure and are greatest in-patient with cardiovascular disease and death is usually due to ventricular fibrillation or myocardial infarction.

**Contraindications**

Any medical illness like respiratory infection, serious heart disease and serious pyrexial illness that increase the risk of anesthetic procedure is contraindication to ECT. Disease-Like serious heart disease, recent coronary thrombosis, cerebral so aortic aneurysm and raised intracranial pressure that are likely to be worsen by change in blood pressure and cardiac rhythm is contraindication to ECT. ECT may cause increased cognitive impairment in patients taking lithium and prolonged seizure in patients taking SSRI. Pregnancy is not a contraindication for ECT

**Conclusion**

ECT is the most debatable issue in psychiatry throughout the world. In many countries ECT use is not practiced on the hand of protest by the humanitarians. Despite these issues ECT is still one of the emergency treatment method surviving even in America where 50000 patients get ECT every year. In our clinical practice we also see ECT as one of the life saving, emergency and safe method of treatment in our field. Suicidal, dangerously violent and aggressive patient with drug refusal and catatonic and depressive stupors as well as puerperal psychotics are the most beneficial patients improved by ECT. If patients are chosen academically, anesthetic and other procedures are maintained properly, ECT is a safe and smart form of treatment. Most propaganda against ECT are due to unethical practice of ECT by psychiatrists.

**Reference**

Review Article