

Practice of ECT guidelines in the UK v. the USA

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Electro-convulsive therapy (ECT) is a safe and effective treatment for some psychiatric disorders, but its mechanisms of action remain unclear. In the last decade ECT seems to have enjoyed a resurgence of research interest and some recent findings have raised exciting possibilities of making it a more rational and targeted treatment.

In December 1992, I visited centres in the USA and I had the opportunity of comparing guidelines for practice of ECT across the Atlantic. The American guidelines, published in 1990 in the form of the American Psychiatric Association Task Force on ECT, give detailed recommendations for various aspects of practice of ECT and training requirements. The guidelines for the practice of ECT in the UK were last published by the Royal College of Psychiatrists in a booklet, *The Practical Administration of Electro-convulsive Therapy* in 1989. The American guidelines are more explicit and detailed and their requirements more stringent. In this paper, it is my aim to highlight differences between the American and the British approach in the practical administration of ECT, along with relevant theoretical issues. It is not intended to be an exhaustive comparison of the two guidelines.

Monitoring ECT induced seizure

Monitoring the seizure with an electroencephalogram (EEG) is the best available method and recommended practice in the USA. The College guidelines do not recommend EEG for routine clinical practice. This is reflected in the type of ECT apparatus used across the Atlantic; i.e. British ECT equipment does not have the facility for EEG monitoring and virtually all ECT machines in the USA have the EEG facility built in.

For the majority of patients undergoing ECT, visual estimation for the motor seizure without additional EEG monitoring may suffice. However, there are clear theoretical advantages of EEG monitoring and a small proportion of patients would benefit from monitoring.

The ECT induced paroxysmal seizure activity typically persists beyond cessation of the motor component, the difference being 10–25 seconds and the motor seizures are about 76% as long as the EEG seizures (Abrams, 1992). However, cerebral seizure

activity may sometimes continue for several minutes after the motor component ends, sometimes requiring its termination by pharmacological means to prevent neuronal damage.

It is not surprising that assessment of the ECT induced seizure by clinical methods and EEG monitoring may yield discrepant findings. The issue is, how relevant this is for clinical management. McCreadie *et al* (1989) showed that in routine practice within the National Health Service in 2.5% of bilateral and 8% of unilateral applications, there was disagreement between clinical and EEG assessment as to whether a fit had occurred. When the requirement was to state whether a seizure greater than 25 seconds had occurred, the disagreement rose to 7% and 28% respectively. Scott *et al* (1989) found that EEG monitoring revealed short seizures in about one third of ECTs monitored but was usually detected by the treating doctor. Thus EEG monitoring may be worthwhile for patients whose visible seizure is short but where cerebral seizure length is satisfactory. It is more likely to be a practical aid for unilateral than for bilateral ECTs and this would be essential for detection of the occasional ECT induced status epilepticus.

Estimation of the seizure duration is linked to the question, "How crucial is it for the seizure duration to be at least 25 seconds for the ECT to be therapeutic?" Although there is evidence to support the cut-off point of 25 seconds, there is no direct proof of this being critical for a "therapeutic ECT". Both American and British guidelines acknowledge that 25 seconds is an arbitrary cut-off point and so the American guidelines suggest re-stimulation only if the seizure is less than 20 seconds whereas the College guidelines recommend re-stimulation for seizures of less than 15 seconds.

Seizure duration depends on the seizure threshold which in turn rises with successive ECTs and depends upon age, gender and electrode placement. The other important variables influencing the seizure duration are electrical energy, dose of anaesthetic agent, muscle relaxant and any other concomitant drug therapy. Hence it is impossible to lay down a minimum seizure duration for an effective ECT, independent of the other factors mentioned above. Sackeim *et al* (1991) stated that in their experience excessive anaesthetic dose is perhaps the most common cause

of short or abortive seizures. McCreadie *et al* (1989) commented that the case for routine EEG monitoring of the ECT induced seizure would be strengthened if the seizure duration was shown to be of fundamental importance. With current knowledge, laying down the minimum seizure duration is far from scientific, but this practice is likely to continue for lack of more rational criteria.

A dosage of electrical energy

A constant current brief pulse stimulus is recommended for routine use on the basis that brief pulse stimuli produce epileptic seizures at lower levels of electrical energy and markedly reduced cognitive impairment related to ECT.

As regards the optimum dose of electrical energy, there is considerable debate. Sackeim *et al* (1991) suggested that a seizure may be necessary but not sufficient for a therapeutically effective ECT and that the degree to which stimulus intensity exceeds seizure threshold, and not the absolute dose of electricity administered, determines therapeutic efficacy, speed of response and magnitude of cognitive deficits. Because of a wide variability in the seizure threshold among patients, they advise estimating the seizure threshold during the first ECT session to be able to administer a moderately supra-threshold stimulus. They recommend a method of empiric titration in the first session and estimation of the seizure threshold by starting with a clearly subthreshold dose (e.g. 50 millicolumbs) and repeatedly restimulating with progressively higher doses of electricity until a seizure is elicited.

But Abrams (1992) has argued that the widely used "seizure threshold" is an imprecise approximation of the biological propensity to develop seizures in response to electrical stimulation and that the specific numerical value obtained is dependent on the method used to elicit it. He has also cautioned against the potential harmful effect of repeated subconvulsive stimulations on the heart although Sackeim *et al* assert that recent evidence prove this fear to be unfounded.

This debate is reflected in the American Task Force recommendations on ECT (p. 94, 95), which states "there are in general two approaches to determining stimulus intensity for individual patients". One method is to select a dose that is empirically supra threshold for a sizeable majority, for example 80% of patients, the second to estimate the seizure threshold in the first treatment and deliver a moderately suprathreshold stimulus.

Unilateral v. bilateral ECT

The College guidelines treat the choice between unilateral and bilateral ECTs as controversial. How-

ever, bilateral ECT is favoured because of quicker action and effectiveness, provided brief pulse stimulation is available. The American guidelines are broadly similar, stating "Unilateral ECT is most strongly indicated where it is important to minimise the ECT induced cognitive impairment and bilateral ECT is preferred where a high degree of urgency is present." However, the matter is far from settled. Abrams (1992) listed diagnosis, age, sex of patients, electric dosage and interelectrode distance for unilateral ECT which could explain the discrepant findings from several studies comparing efficacy of unilateral and bilateral ECTs.

Sackeim *et al* (1991) suggested that poor efficacy of unilateral ECT is related to the use of low stimulus intensity. They showed that increasing the stimulus intensity augments the efficacy of unilateral ECTs, but not bilateral ECTs (Sackeim *et al*, in press). They showed that the extent to which the dose of electricity exceeds the seizure threshold and not the absolute dose of electricity is the critical parameter determining the efficacy of unilateral ECTs. They predict that in order to match the efficacy of bilateral ECTs, the stimulus intensity in unilateral ECTs needs to be markedly suprathreshold to the order of 5.5 times the initial seizure threshold.

However, Abrams (1986) suggested that the seizure and the electrical stimulus both contribute to the antidepressant effect of ECT. At substantially suprathreshold level of stimulation, the therapeutic effect attributable to the electrical stimulus is dwarfed by the effects of the generalised seizure. With reduced electrical dosage or elevated seizure threshold, the therapeutic effects of the stimulus emerge.

Both views allow the possibility of increased therapeutic effect by increasing the stimulus charge with unilateral ECT. A related issue is the ECT induced cognitive impairment, which is most benign with right unilateral ECT administered with brief pulse stimulation. It remains to be seen if unilateral ECT still retains cognitive advantages over bilateral ECT at the markedly suprathreshold level of stimulation suggested by Sackeim. Abrams *et al* (1991) using a fixed brief pulse stimulus (378 mc) found no significant difference in improvement of depression between unilateral and bilateral ECTs, although they found a trend for faster improvement with bilateral ECT. Abrams recommended (1992) an initial trial of four to six unilateral ECTs administered with markedly suprathreshold (e.g. 75% to 100% of maximum device output) brief pulse square wave stimulus for every patient for whom ECT is prescribed. According to him, bilateral ECT should be considered only if this fails to produce substantial improvement or if the patient's clinical condition deteriorates. So it appears that the practice of unilateral ECT might have been discredited prematurely and ongoing research will hopefully redefine its role.

ECT apparatus

The American machines are more elaborate with facilities for EEG, ECG and sometimes EMG and are correspondingly more expensive than their British counterparts. Currently, most machines in use in the UK are manufactured by Ectron Ltd. Their latest model, ECTONUS series 5, provides a digital read-out of the amount of electrical charge delivered to the patient. It has a single switch to control the range of electrical charge, which is achieved by changing the frequency of the uniphasic pulse waves while keeping the duration constant. In contrast, the American machines provide the facility for altering most or all of the stimulus parameters, e.g. pulse width, pulse frequency as well as stimulus duration. One model (El Cot MF 1000) allows choice of the pulse, such as biphasic, uniphasic positive, uniphasic negative or sine wave form. Another American model (Thymatron) features an audible EEG monitoring system, which converts EEG activity into an auditory signal that varies with the spiking activity of the cerebral seizure.

It is debatable whether the ability to alter different stimulus parameters confers practical advantages in clinical situations. Available evidence favours the brief pulse square wave current and the sine wave stimulus seems to have no therapeutic advantages over the square wave current. The effect of pulse frequency, pulse width and current durations on the therapeutic efficacy of the ECT is not clear. However, there is some indication that they may have a bearing on the outcome of treatment with ECTs. Abrams believes that even relatively high dose of electricity may be ineffective if the stimulus charge is delivered over too short a time. It is obvious that with advancing knowledge, the ECT machines used in Britain may need to be modified, perhaps in line with the American machines.

Other issues

Elevated seizure threshold/short seizures

In some patients, particularly older men during the latter part of their treatment course, seizures may be increasingly difficult or impossible to obtain or the seizure duration may remain inadequate even at the maximum electrical dose. It may then be necessary to consider chemical means of reducing the seizure threshold. The American guidelines recommend par-enteral caffeine, 125 to 2000 mg, to enhance seizure duration. The College guidelines mention the use of caffeine but suggest a small dose of phenothiazine to be given several hours before the ECT.

Use of caffeine to augment the seizure in ECT is not without risk. Jaffe *et al* (1990) have reported on three elderly patients who developed severe cardiac

dysrhythmias after caffeine use. The related compound theophylline also lowers seizure threshold, but status epilepticus has been reported in asthmatic patients who receive ECT while taking theophylline.

Two v. three ECTs per week

There is no explicit guideline on this matter in the College guidelines or the American Task Force report. In the USA, ECT is given three times per week, whereas in the UK two ECTs per week are the rule. The optimal rate of administration of ECT is not known. McAllister *et al* (1987) showed that fewer treatments were required with twice weekly than thrice weekly unilateral ECTs to achieve the same antidepressant effect, but visual memory impairment was lower in the twice weekly group. Abrams (1992) argued that this probably reflects national character: Americans are impatient for results which expose their patients to the risk of greater cognitive impairment secondary to ECT.

Training

The contrast in recommendations for training in ECT in the UK v. the USA is adequately dealt with elsewhere (Pippard, 1992). The American requirements, which are far more stringent and explicit than the British recommendations, partly reflect the American healthcare culture. However, the recommendations of Pippard will certainly improve standards of ECT administration in the NHS. The initiative of the College in embarking on a series of ECT training workshops in November 1992 was a welcome move.

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A full list of references is available on request to Dr Upadhyaya.

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ECT: a patient-friendly procedure?

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Electroconvulsive therapy is widely seen by the public as a barbaric and outmoded form of treatment. Even within groups of health care professionals, ECT does not have a 'good press'. Most research into the area of patient attitudes to ECT has been retrospective and often considerably so, and is therefore unlikely to illustrate patients' feelings about a course of treatment at the time it took place (Freeman & Kendell, 1980; Kerr *et al.*, 1982). The only prospective study is that by Malcolm (1989). This showed a low level of understanding of treatment and a high level of anxiety both before treatment and afterwards, but, despite this, a high level of compliance with ECT therapy.

Our aim was to re-examine these findings in order to find a way of improving the experience of ECT.

The study

Our study took place between August 1990 and June 1991. Consecutive patients prescribed ECT in three hospitals in the Northern Region were identified

before treatment and approached for the study. Consenting patients were interviewed using a semi-structured questionnaire before treatment and approximately two months after it had been completed.

The interviewers were psychiatric registrars not involved in the patient's clinical care. An agreed interview script was used to improve inter-rater reliability. Patients were interviewed after consenting but before commencing treatment. The questionnaire included open and closed questions, and Likert attitude scales, on various aspects of the ECT 'process' such as anxieties about treatment, anticipated benefit, understanding of procedure, knowledge of side-effects and opinion of relatives' attitudes to ECT.

After treatment patients were interviewed at home or on the ward. We assessed change in attitude to treatment, perceived benefits, standard of care received, experience of side-effects, satisfaction with the consent procedure, and opinion as to who should be involved recommending ECT.