
Running an ECT department

Eve Russell

An editorial in *The Lancet* two decades ago (*Lancet*, 1981) described the contemporary practice of electroconvulsive therapy (ECT) in Britain as “a shameful state of affairs”. It concluded that, “if ECT is ever legislated against or falls into disuse it will not be because it is an ineffective or dangerous treatment; it will be because psychiatrists have failed to supervise and monitor its use adequately”.

This conclusion followed an audit conducted by the Royal College of Psychiatrists, which covered aspects of the administration of ECT (Pippard & Ellam, 1981). Fewer than half of the units met the minimum standards set by the College at the time (Royal College of Psychiatrists, 1977). Many treatments failed to induce seizures and more than a quarter of units had obsolete ECT machines. Consultant psychiatrists were rarely involved in the work of the clinics, with half the junior staff receiving no or only minimal training.

Following publication of these findings, both the Department of Health and the College established working groups and committees with a remit to advise on updating equipment and to initiate improvements in practice and training. Guidance on the practical administration of ECT was produced and hospitals were advised to nominate a consultant psychiatrist with responsibility for ECT.

A subsequent audit (Pippard, 1992) revealed much improvement in the physical conditions in which ECT was given and in anaesthetic and nursing practice. However, half the clinics surveyed had not updated their ECT machines and training and supervision remained unsatisfactory in many units.

Despite the publication of detailed College standards for the provision of ECT (Royal College of Psychiatrists, 1995), a third audit (Duffett & Lelliott, 1998) highlighted continuing deficiencies in the equipment used and training and supervision of junior psychiatrists.

In the public eye, ECT remains an emotive and controversial subject, and some groups campaign for it to be banned. There is also public concern that ECT should be given only to appropriate patients, with minimal side-effects and distress, and should be administered by competent doctors. At present, standards within ECT services remain patchy. Ways of inspecting all aspects of the provision of ECT are being considered by the College, and the Mental Health Act Commission also takes an interest in the subject.

In this context, it is surprising that few ECT consultants are given sessional time to carry out the task effectively. The purpose of this article is to give some guidance to colleagues either taking on the role or reassessing clinical standards in their unit.

Existing clinical guidelines

Clinical guidelines have been set out in a number of documents. Useful starting points are the *Guidelines for Health Care Commissioners for an ECT Service* produced by the Royal College of Psychiatrists' Special Committee on ECT (Royal College of Psychiatrists, 1999) and the *Checklists for Good Practice in ECT* contained within the College's *ECT Handbook* (Royal College of Psychiatrists, 1995). The latter outlines detailed standards for resources and equipment, preparation of patients for ECT and its prescription and administration. Guidelines produced by the American Psychiatric Association (Weiner, 1990) and the Canadian Psychiatric Association (Enns & Reiss, 1998) are also available.

Detailed examination of these standards, identifying any deficits in the existing service, should be undertaken by the consultant psychiatrist,

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consultant anaesthetist and senior nurse responsible for ECT. The necessity and resource implications of raising standards must be supported by management. Provision of high-quality ECT is not cheap (Box 1).

If deficits in the service are recognised, improvement in standards must be made rapidly and jointly by the consultant psychiatrist responsible for ECT, consultant anaesthetist and nurse manager for ECT. It is useful at this stage to look at other ECT services, aiming to utilise specialist interest and experience in the subject. If trainees rotate through several hospital sites, minimising differences in models of ECT machines and written protocols will help trainees. Developing better practice can be facilitated by sharing experience at informal meetings.

If there are serious deficits and resources are scarce, alternative approaches should be considered. Within a locality, patients requiring ECT might be admitted to a single site, or a team (e.g. a consultant psychiatrist, consultant anaesthetist, ECT nurse and recovery nurse) could travel to different sites providing training and supervision in the safe administration of ECT. The latter arrangement would be less disruptive for patients.

Environment and facilities

The minimum requirement is three rooms: a quiet waiting-room, separate from other waiting areas and clinic activities; a treatment room with direct communication to an adjacent recovery room; and a recovery room of sufficient size to accommodate the rate and number of patients treated per session.

In addition, it can be useful to have a further two areas: one between the waiting-room and treatment room where patients can prepare for treatment, for example, removing dentures and speaking in privacy

Box 1 Raising standards – first steps

Audit existing service against College standards

Ensure joint working with consultant anaesthetist and nurse in charge of ECT

Look locally to share best practice and standardise equipment and written protocols

Meet early with management to consider resource implications (both equipment and staffing, including consultant sessional time)

to the anaesthetist and nurse, without the presence of the equipment in the treatment room; and a second area beyond the recovery room where patients can sit and have a cup of tea while awaiting transfer back to the ward. If the premises do not meet minimum College requirements, then the managers need to be informed and resources made available to effect the necessary alterations.

Equipment other than ECT apparatus

The monitoring and resuscitation equipment provided should be compared with the standards set within the *ECT Handbook*. The guidelines of the Royal College of Anaesthetists are more detailed: for example, for the recovery room, the *ECT Handbook* does not mention pulse oximetry, which the Royal College of Anaesthetists would regard as essential. Written protocols for checking anaesthetic equipment and drugs must define the frequency and responsibility for and mechanisms of recording checks. Funding to replace and update equipment should be identified in future budgets.

Anaesthetic cover

Close cooperation between anaesthetist and psychiatrist is essential for optimum treatment. The College recommends that one consultant anaesthetist should be responsible for ECT and that all anaesthetists on the ECT rota should have had training in anaesthesia for ECT. A consultant anaesthetist, interested in anaesthesia in ECT and regularly attending the suite, is a great asset, not only in optimising the treatment of individual patients, but also in advising on relevant developments in anaesthesia, such as alternatives to methohexitone as an anaesthetic agent following its withdrawal by the manufacturer (Freeman, 1999), and contributing to the training of junior psychiatrists.

The anaesthetist will also need skilled nursing assistance. If this is regarded as the responsibility of one nurse, continuity of care is maintained for patients and this nurse can also contribute to the management of the suite and to the development of protocols for patient care.

Nursing expertise

It is imperative that a senior nurse takes overall responsibility for the administration of the clinic and

liaison with medical staff and wards. He or she is responsible for record-keeping and plays a key role in monitoring standards and auditing protocols.

The senior nurse needs to develop and maintain a high level of expertise in recovery and resuscitation and work to train and raise standards. There also needs to be a team of nurses trained in recovery. Although their initial training is relatively straightforward, it is more difficult for them to maintain recovery skills, particularly if only small numbers of patients are receiving ECT. The consultant anaesthetist may be able to offer help with ongoing training.

Role of the psychiatrist

The problems highlighted in the first ECT audit, of outdated ECT machines, inadequately trained junior doctors and lack of written policies, are likely to remain the major problems that the consultant taking responsibility for ECT will need to address.

ECT machines

Four machines currently available are recommended by the College: the Ectron Series 5A, Ectonus (Electron Ltd, Letchworth), Mecta SR2 and JR2 (Mecta Corp., Lake Oswego, OR) and the Thymatron-DGx (Somatics Inc., Lake Bluff, IL) (Royal College of Psychiatrists, 1995).

Modern ECT machines deliver brief square-wave pulses of 1–2 milliseconds and hence only a fraction of the electrical energy of traditional ECT machines producing sine-wave signals. The machine should have a wide range of stimulus settings, allowing adequate treatment of patients regardless of their seizure thresholds. Some older machines were unable to deliver charges of less than 150 millicoulombs, which is above the seizure threshold in many young patients, or the higher amounts of electrical energy needed for patients with higher thresholds, for example, older bald men. A test facility allowing the static impedance to be ascertained before delivering the treatment is useful, giving feedback to trainees of faults and assurance that the electrodes are applied properly. Although the College does not recommend mandatory routine electroencephalogram (EEG) monitoring, we have found this a useful way of monitoring seizure adequacy, as discussed below.

As with the anaesthetic equipment, responsibility for checking the machine and recording that checks have been made must be clearly defined. Back-up

machines should also meet College standards but, rather than purchase expensive machines that will become obsolete in cupboards, the purchase of a reliable and fast maintenance contract, or arrangements made with local colleagues to help out as needed, may be preferable.

Psychiatric cover

It is difficult to maintain high standards within the ECT suite without an interested and experienced consultant attending regularly, and this needs to be recognised in job plans.

Training of junior doctors remained a problem in the 1995–1996 audit, and although 79% of trainees reported receiving training in ECT, 40% were not supervised by a member of the College when they first administered ECT, and 45% lacked quite basic knowledge about its administration, such as being unaware that a fit was needed for the treatment to be effective or that the threshold was likely to be higher in older men and to increase during the course of treatment. When knowledge of the mechanism of action of ECT was compared between different groups of doctors, knowledge was seen to increase as trainees went on to higher training, but their knowledge about its administration remained static. It therefore cannot be assumed that specialist registrars are necessarily more able to administer ECT effectively than are basic trainees.

The training of basic trainees needs to address both knowledge and practical aspects. Trainees need formal teaching, written information and personal supervision from the ECT consultant within the ECT suite. We have found it helpful to put aside a half-day at the start of each intake of basic trainees for training in ECT. During this session, the consultant anaesthetist will discuss the importance of adequate preparation of the patient and the potential medical problems associated with ECT both during and after the treatment. Trainees will also see edited parts of the College's training video (Royal College of Psychiatrists, 1994) and learn about the principles of patient selection, consent to treatment and the administration of ECT, including stimulus dosing. This teaching session should be followed-up by personal supervision by the consultant within the ECT suite, illustrating the theoretical points learnt with reference to treatment of individual patients.

From the point of view of ECT training and continuity of care for patients, the ECT rota needs to be arranged such that the trainees carry out a series of consecutive treatments. At times, this may not be popular with trainees or their consultants, as the timing of sessions may conflict with other training

opportunities or attendance at ward rounds. Allowing trainees adequate notice and to choose their block of time for training in ECT can overcome many of these difficulties. If the lists are long, a compromise may be for trainees to attend weekly, although this reduces the continuity of care for patients and often reduces trainees' understanding of stimulus dosing.

The ECT consultant can play an important role in academic teaching about ECT. A seminar on ECT can be incorporated into medical student teaching, including videos and an open discussion of the topic.

Presentations to colleagues in other medical specialities, for example, anaesthetists and general practitioners, can also be helpful in dispelling myths about ECT.

Preparation for ECT

Consent to treatment

Obtaining consent is the responsibility of the responsible medical officer, not of the ECT staff. The patient needs to have a broad understanding of the purpose, nature, likely effects and risks of treatment. It is often delegated to the basic trainee in the team, who may lack sufficient expertise to do this. Often, discussion about the treatment will be ongoing and, respecting issues of medical confidentiality, involve family members. Written information about ECT should be available to patients and their families. It should be made clear that consent can be withdrawn at any time.

If there is any doubt about the patient's capacity to consent, either permanently as a result of cognitive impairment or temporarily owing, for example, to delusional ideas, then it is common and in my view good practice to seek the advice of a second opinion doctor under Section 3 of the Mental Health Act 1983, although this practice has been questioned (Chubb & Alldrick, 2000).

Usually, the nurse in charge will check that patients are consenting to treatment and that the necessary provisions, including Mental Health Act documentation, are in place. Mechanisms also need to be in place to verify the identity of students attending the suite and to obtain patients' consent for them to be present during treatment.

Physical assessment of patients before ECT

Electroconvulsive therapy is a deceptively simple procedure, but it results in increased sympathetic

drive and profound haemodynamic changes, with the risk of heart failure or arrhythmias. Such cardiac changes are not confined to the first treatment, and it is important that monitoring of the patient's fitness for ECT continues throughout the course of treatment and that changes in the patient's physical health are relayed to the ECT treatment team.

The patient assessment for ECT should include as a minimum:

- (a) a recent complete medical history and full examination
- (b) details of any previous anaesthetics or operations
- (c) a full list of the patient's drugs and allergies
- (d) a clinical assessment of the patient's cardiovascular state including exercise tolerance.

In a patient with a learning disability, depression may be difficult to assess, but this should be attempted with the help of nursing observations. Investigations carried out will depend on the age and associated medical comorbidity and may often include full blood count, urea and electrolytes, chest X-ray and electrocardiogram; it may also involve more detailed investigation, for example, blood glucose in diabetes, sickle cell test or lithium levels. It is important that protocols produced for assessment of patients before ECT are agreed with the consultant anaesthetist and do not conflict with those produced elsewhere, for example, a potential conflict would arise if a chest X-ray were made routine in fit young people.

There must also be infection-control procedures in place, with good liaison between the wards and ECT suite, both for protecting patients thought to be at high risk of infections such as hepatitis and HIV and, increasingly, for preventing hospital-acquired infection such as MRSA (methicillin-resistant *Staphylococcus aureus*).

Awareness needs to be raised about the effect of drugs, both on seizure thresholds (and hence efficacy of treatment) and in increasing the risk of prolonged seizures. Nursing staff must be aware of the effect of benzodiazepines, commonly prescribed on an 'as required' basis, on seizure threshold. Anticonvulsants such as carbamazepine, used in epilepsy and as mood stabilisers, increase seizure threshold and decrease seizure duration. There needs to be discussion with the patient's consultant about continuing prescription. It may be appropriate to defer prescription of carbamazepine as a mood stabiliser or reduce the dose of an existing prescription if there are difficulties in producing effective seizures. There are case reports of young patients on selective serotonin reuptake inhibitors having very prolonged seizures, and this possibility needs to be drawn to the attention of the anaesthetist prior to treatment. Caffeine can be used to decrease

seizure threshold and increase seizure duration therapeutically.

Other drugs may increase the risk of complications during treatment, and written protocols, for example, for the discontinuation of clozapine during ECT, need to be agreed and available. The necessity of continuing other drugs, such as tricyclic antidepressants, which may increase the risk of cardiovascular complications in patients with previous cardiac disease, also needs to be considered.

The consultant anaesthetist responsible for ECT can play an invaluable role in developing these protocols, disseminating information from the literature and giving advice on individual patients.

Prescription of ECT

Electrode placement

The choice of electrode placement should be made on a risk/benefit basis. Bilateral ECT is recommended by the College (Royal College of Psychiatrists, 1995) and is most commonly used in the UK. It is the treatment of choice where rapid response is needed and patients have had previous benefit and minimal cognitive problems from bilateral ECT. Bilateral ECT should also be used where unilateral ECT has failed. Unilateral ECT with moderately supra-threshold stimulation is preferable when it is important to minimise adverse cognitive effects, when previous bilateral ECT has produced troublesome cognitive side-effects and when there is a past history of effective treatment with unilateral ECT.

Frequency of treatment

A fixed number of treatments should not be prescribed at the start of a course of ECT. The treatments should be prescribed singly or at a maximum of two at a time, with patient review before further prescription. Some patients benefit from a small number of treatments and others may require longer courses. Treatment should be stopped when the patient is euthymic. There is no evidence that prolonging the course after this point has any benefit.

It is the practice in National Health Service hospitals within the UK to give treatments twice weekly, but in the USA treatments are given three times per week. Studies using the older machines producing sine-wave stimulation showed that twice-weekly ECT worked as quickly as three times per week (Gangadhar *et al*, 1993). Although it has been suggested that more frequent ECT should be given to manage patients with life-threatening

disorders, there is no good evidence base for this, nor for the induction of two seizures during each anaesthetic. Both treatment strategies would increase the acute cognitive impairment after ECT and there is no evidence that they are more efficacious than the standard treatment.

Dose titration

One way in which the administration of ECT has improved is the move away from fixed dosing, whereby all patients received the same dose of electricity, to stimulus dosing, where the magnitude of the electrical stimulus is altered depending on the individual patient. This can be done either by using age and gender to predict the likely dose or by using a protocol of increasing dose to determine an approximation of seizure threshold at the start of treatment.

Double-blind studies (Sackeim *et al*, 1993) have demonstrated that the antidepressant effect of ECT is dependent not on the absolute electrical dose administered, but on whether or not the dosage substantially exceeds the seizure threshold. Although there is a significant correlation between age and seizure threshold, thresholds have been shown to vary at least three-fold in patients aged 30–60 years (Dykes & Scott, 1998), supporting the practice whereby the stimulus threshold is determined for individual patients.

Seizure thresholds vary between individuals according to the factors given in Box 2, and protocols need to reflect these factors. Thresholds also rise during a course of ECT.

The treatment dose will exceed the threshold. A moderately supra-threshold stimulus has been shown to have greater efficacy than a dose just above threshold. The evidence suggests that when unilateral ECT is used, the treatment dose needs to exceed the seizure threshold by a larger amount (up to 3- to 6-fold) than with bilateral ECT (50–100%) (Sackeim *et al*, 1993).

A recent study has shown right unilateral ECT at high dosage (5 x threshold) to be as effective as bilateral ECT at 1.5 x threshold (Sackheim *et al*, 2000), while producing less severe and persistent cognitive effects.

Although fixed dosing remains common in the UK, it is associated with a higher risk of missed or partial seizures that have no therapeutic effect and with a significantly greater risk of adverse cognitive effects compared with dose titration techniques.

Monitoring the seizure adequacy

Many modern ECT machines now include EEG monitoring, which helps to prevent unwarranted

Box 2. Seizure threshold**Increases with age****Is higher in men than in women****Is increased by benzodiazepines and anti-convulsants****May increase during a course of ECT**

re-stimulation, as well as to detect prolonged seizures. Motor seizure monitoring without EEG can be unreliable, even if the Hamilton cuff technique is used (Mayur *et al*, 1999). Clear protocols should be in place to stop lengthy seizures.

When methohexitone was used, it was common practice, although without an evidence base, to aim for a generalised bilateral tonic-clonic seizure lasting over 15 seconds and/or 25 seconds on an EEG recording. Since methohexitone has been unavailable and other induction agents have been used, the evidence for any particular length of fit being effective is even weaker. Propofol anaesthesia results in shorter duration of fits, but there is debate as to whether it reduces therapeutic effectiveness (Fear *et al*, 1994).

Reductions in seizure duration during a course of ECT can give an indication of increasing seizure threshold and the need to increase the stimulus dose, but decisions to increase the dose during the course of ECT need to be based on information of clinical improvement and cognitive side-effects, not only on seizure duration.

Mechanisms should be in place to ensure that patients leave the suite having received a therapeutic treatment. Protocols should address finding threshold and treatment doses, re-stimulation in the case of missed seizures and adjustment of the dose during the course of treatment. The ECT consultant has an important role in auditing the use of these protocols and maintaining standards.

Records of treatment

Treatment cards should record the drugs administered, anaesthetic complications, the dose and the effect of treatment, on both muscle and EEG activity, and could usefully incorporate feedback from the patient's team on clinical improvement and side-effects. Self-report questionnaires completed by the patient can also be of benefit. Increasing confusion during a course of treatment may be secondary to ictal activity, but, in patients with existing cardiac problems, may indicate an increasingly compromised cardiovascular system or other physical problems such as intercurrent infection.

Post-treatment protocols

It can be helpful to produce protocols for the management of patients after ECT, particularly for high-risk patients, for example, the elderly and those with pre-existing cardiac problems, hypertension, arrhythmias, those on anticoagulants and those with pre-existing renal or gastrointestinal tract impairment. Such protocols can give the parameters to be measured, for example, heart rate and blood pressure, some indication of the frequency of measurements and guidance on when to ask for medical involvement. Such protocols would include availability of oxygen and access to a 12-lead electrocardiograph.

Other protocols

Use in children

The use of ECT in young people is uncommon within the NHS, but it is a sensitive issue and clear protocols need to be in place. The College recommends that in children under 16 a second opinion from a psychiatrist from another clinical unit be sought, even if the patient and their parents consent to treatment. The ECT machine used must be capable of administering doses as low as 25–50 mC, and fixed-dose machines should never be used.

Many ECT consultants will have no experience of giving ECT to children and should seek advice from colleagues before doing so.

Use in out-patients

There are circumstances in which ECT can safely be given on an out-patient basis, but protocols need to be in place to ensure that patients are adequately prepared prior to treatment and monitored after it. This may be particularly relevant in patients receiving maintenance ECT.

Written advice to patients and carers should be provided. It can be interesting to compare the detailed advice given to patients attending, for example, for endoscopy with the situation that in the past has occurred in psychiatry when patients have had to find their own way home within an hour or so of receiving ECT. From an anaesthetic point of view, all guidelines suggest that patients who receive anaesthesia on a day-case basis should be accompanied home by a responsible adult and that there is a responsible adult with them

continually over the next 24 hours. A mechanism needs to be in place whereby patients' physical and mental state are checked, for example, by the nurse in charge of the ECT suite, before they leave the clinic or by staff in the community mental health team or day hospitals. Lines of responsibility need to be clear.

Conclusion

Running an ECT department, although initially daunting, can be a most rewarding experience. Published audits from colleagues have shown that the introduction of more complex ECT techniques is not easy (Yousaf *et al*, 1999) and have identified the need for continuing supervision of trainees (Shaikh *et al*, 1999).

However, the introduction of up-to-date machines (Trezise & Conlon, 1997) and increased consultant supervision (Trezise, 1998) have both been shown to be associated with a reduction in the number of treatments given. With appropriate resources, good liaison with colleagues and continuing audit, standards can be raised, thus ensuring that ECT is safely and effectively administered to the benefit of patients.

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Multiple choice questions

- Audits of standards in ECT practice have shown:
 - standards to vary between clinics
 - deterioration in anaesthetic standards
 - problems with supervision of trainees
 - obsolete equipment still in use
 - improvements in the physical conditions in which ECT is given.
- The College's clinical guidelines on ECT suggest:
 - a minimum requirement of three rooms
 - fixed-dose ECT machines
 - that all anaesthetists on the ECT rota should have had training in anaesthesia in ECT
 - that only one nurse needs to be trained in recovery
 - mandatory EEG monitoring for all patients.
- Physical assessment of patients before ECT:
 - normally includes a physical examination
 - usually includes full blood count and urea and electrolytes
 - must include a chest X-ray
 - should usefully include a measure of exercise tolerance
 - should include a past medical history.

4. Seizure threshold:
- can increase during a course of ECT
 - can increase with age
 - is usually higher in women than in men
 - is reduced by caffeine
 - is reduced by lorazepam.
5. In bilateral ECT:
- a fixed number of treatments should be prescribed
 - short courses are never effective
 - the treatment dose needs to be 50–100% higher than the seizure threshold
 - fixed dosing reduces the prevalence of cognitive problems
- e EEG monitoring can help to prevent prolonged seizures.

MCQ answers

1	2	3	4	5
a T	a T	a T	a T	a F
b F	b F	b T	b T	b F
c T	c T	c F	c F	c T
d T	d F	d T	d T	d F
e T	e F	e T	e F	e T

New from Gaskell

Liaison Psychiatry: Planning Services for Specialist Settings

Edited by Robert Peveler, Eleanor Feldman and Trevor Friedman

Liaison psychiatry services have the potential to improve patient care and streamline medical services but are underdeveloped in many European health systems. This book follows on from the 1994 publication *'Liaison Psychiatry: defining needs and planning services'* and is planned as a practical guide to the development of services for a range of specialist settings. These include services in obstetrics, A&E, intensive care, pain clinics and trauma services.

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Features

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