

# A retrospective audit of electroconvulsive therapy at King Khalid University Hospital, Saudi Arabia

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مراجعة استرجاعية للمعالجة بالاختلاجات الكهربائية في مستشفى جامعة الملك خالد بالمملكة العربية السعودية

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**خلاصة:** تم استعراض سجلات المرضى الذين عولجوا بالاختلاجات الكهربائية في مستشفى جامعة الملك خالد على مدى عشر سنوات، من حيث الجوانب المتعلقة بالمبادئ الأخلاقية والطرائق التقنية لإجراء الاختلاجات الكهربائية. وبمراجعة سجلات 127 مريضاً ظهرت بعض الثغرات في السنوات المبكرة: فلم يكن هناك رصاً للنوبات ولم يكن هناك تدريب أو تثقيف للعاملين (ولاسيما المختصين بالجوانب النفسية والتخدير)، فضلاً عن استعمال الأتروبين كدواء تحضيرى لجميع المرضى. ولقد بدئ مؤخراً تنظيم دورات تعليمية وتدريبية منتظمة للعاملين ورصد توقيت النوبات. ويوصى عند استعمال جهاز المعالجة بالاختلاجات الكهربائية، برصد مخطط كهربائية الدماغ والمراقبة المنهجية المتدرجة للمضاعفات. وتبين النتائج ضرورة إجراء مراجعات للمعالجة بالاختلاجات الكهربائية شاملة مراجعة ماثلة خارجية غير متحيزة للرصد الفعال للتطبيق العملي هذه المعالجة ويوصى بإجراء مراجعات في المؤسسات الأخرى للصحة النفسية في المملكة العربية السعودية.

**ABSTRACT** The case records of patients receiving ECT at King Khalid University Hospital over a 10-year period were reviewed for all aspects of ethical and technical administration of ECT. The audit of 127 patients showed some deficiencies in the early years: no seizure monitoring, no training or education for staff (particularly psychiatrists and anaesthetists), and the use of atropine as a premedication for all patients. Recently, regular education and staff training have been organized and seizure timing regularly monitored. Use of an ECT machine with EEG monitoring and the systematic and scaled monitoring of complications is recommended. Results show the necessity of ECT auditing, including an unbiased external audit for effective monitoring of the practical administration of ECT. Similar audits in other mental health institutions in Saudi Arabia are recommended.

## Audit rétrospectif des électrochocs à l'Hôpital Universitaire King Khalil (Arabie Saoudite)

**RESUME** On a procédé à un examen du dossier de patients ayant été traités par électrochocs à l'Hôpital Universitaire King Khaled sur une période de dix ans pour tous les aspects relatifs à l'administration d'électrochocs sur le plan éthique et technique. L'audit de 127 patients a révélé certains insuffisances au cours des premières années: pas de surveillance des crises, pas de formation ou d'enseignement pour le personnel (en particulier les psychiatres et les anesthésistes) et l'utilisation de l'atropine comme prémédication pour tous les patients. Récemment, une formation régulière a été organisée pour le personnel et la fréquence de survenue des crises a été surveillée régulièrement. L'utilisation d'un appareil à électrochocs équipé d'un système de monitoring ECG et la surveillance systématique et proportionnée des complications est recommandée. Les résultats ont montré la nécessité d'un audit des électrochocs, y compris un audit externe impartial pour la surveillance efficace de l'administration pratique des électrochocs. Il est recommandé de procéder à des audits similaires dans d'autres établissements de santé mentale en Arabie saoudite sont .

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## Introduction

Despite efforts over the past 50 years by antipsychiatry movements, electroconvulsive therapy (ECT) remains recognized as an effective psychiatric treatment [1]. Being a controversial treatment, ECT has been extensively investigated for its efficacy, clinical indications and contraindications, safety, side-effects (such as brain damage), mode of action and ethical aspects [1-6]. Therefore, the auditing of ECT administration by psychiatric services is as essential for psychiatrists as the treatment is beneficial for particular psychiatric conditions [7-11]. We discuss the results of a retrospective audit of ECT administration at King Khalid University Hospital (KKUH) in Riyadh, Saudi Arabia and compare the findings to recommendations for ECT administration by the Royal College of Psychiatrists, United Kingdom and the American Psychiatric Association, as well as audits of ECT administration in other countries.

## Subjects and methods

All ECT case records at KKUH over a 10-year period, commencing January 1985, were reviewed with regard to the ethical and technical administration of ECT. Aspects reviewed included: formal consent, quality of records, the premises and setting, treatment schedules, the ECT apparatus used and its maintenance, equipment other than ECT apparatus, pattern of stimulation, seizure monitoring, patient preparation, the anaesthetist and drugs used in anaesthesia, status of the person administering ECT, staff training and education, concurrent pharmacotherapy, premedication, patient care and monitoring of complications following ECT.

The hospital is in Riyadh and is a 637-bed teaching hospital treating mostly Saudi patients of varying backgrounds. The psychiatric wards are mainly for acute conditions with a short stay limit that rarely exceeds 8 weeks.

## Results

### General statistics

A total of 127 patients, 51 males (40.2%) and 76 females (59.8%) underwent ECT during the study period. The age range was 15-60 years with a mean age of  $27.9 \pm 9.23$  years. ECT was given to patients in courses. During their course, patients had sessions two or three times per week; each session consisted of one or more application depending on the patient's response and seizure duration. Twelve patients had more than one course and the total number of courses was 156. The total number of sessions was 1070. In 883 cases (82.5%), patients had only one application, 182 (17%) had two applications and 5 (0.5%) had three applications, a total of 1262 applications. The average number of applications per patient was 9.9 and the average number of applications per course was 8.1.

### Technical and procedural data

The technical administration procedures for ECT at KKUH are described below, including any changes made during the study period.

#### Equipment

ECT was introduced to KKUH in 1983 and the apparatus used was a Konvulsator 2077S (Seimens, Germany) which produces a brief-pulse current. It was routinely serviced by the maintenance department and had a current intensity selection range from 1-9 and timing ranging from 0.6 sec-

onds to 10 seconds with an automatic timer. In the ECT room there was a monitor for vital signs with an electrocardiogram (ECG), a defibrillator, the anaesthesia apparatus (including a pulse oximeter), oxygen equipment, suction apparatus and a movable bed. Emergency drugs were also available in standard, sealed, pharmacy-checked boxes.

#### *Setting*

The ECT room and a recovery room with two beds were situated in the area between the two male and female inpatient wards.

#### *Treatment schedule*

The frequency of sessions per week and the number of sessions per course, i.e. the treatment schedule, was determined for each individual patient by the consultant in charge. In 56.9% of courses, the session frequency was twice a week and in 43.1% it was three times a week. The average number of sessions per course was 6.9 with a range of 1–19.

#### *Pattern of stimulation*

All patients were given bilateral ECT with standard placement of electrodes. The time of stimulation, in seconds, ranged in most cases (75.3%) from 2 seconds to 2.5 seconds and the current intensity did not exceed 6 in 82% of cases. The maximum time of stimulation and the current intensity used were 5 seconds and 8 seconds respectively. The combination of time and intensity recommended by the consultant psychiatrist depended on the severity of the case, previous fit response, concurrent anticonvulsant medication and other factors relating to the individual patient.

#### *Consent*

Every patient was required to sign a formal consent for ECT, counter-signed by a near

relative. In severe psychotic cases, where the patient was not able to give consent, the signature of a relative and the approval of the consultant in charge was considered sufficient. This consent was valid for one course of ECT only.

#### *Seizure monitoring*

There was no timing of seizures until 1987 when it became routine to time the seizure from the beginning of the clonic movements, using a wristwatch or the wall clock. Seizure information was missing for 107 (8.5%) applications. There was no fit reported in 66 (5.2%) applications and a positive fit reported in 1089 (86.3%) applications. The duration of fit was reported to be 25 seconds or more in 950 (87.2%) applications and less than 25 seconds in 139 (12.8%). The average length of seizure was 26.1 seconds.

#### *Anaesthesia*

The department of anaesthesia used a specific regimen for all patients, even though the individual anaesthetists who attended ECT applications came on a rota from different specialities. Until 1986, premedication with atropine was the policy and was used on 38.9% of courses, but after 1986, for 61.2% of courses, no premedication was used. The anaesthetic used was thio-pentone and the muscle relaxant was sux-amthonium. The anaesthetist was responsible for thoroughly checking the ECT records, for personally examining the patient and, when necessary, for involving the consultant anaesthetist. The anaesthetist always gave oxygen before and after ECT and before reapplication of ECT.

#### *The psychiatrist*

Although ECT was given by junior psychiatrists, the decision to give ECT was only taken by the consultant in charge. In 1987,

a change was implemented requiring that the consultant in charge be on the hospital premises. Up to 1990, ECT was given by junior psychiatrists under the supervision of the senior registrar but in 1994 a policy of supervision by an ECT consultant was implemented on a 1-year rotation basis.

#### *Nurses and patient care*

Nurses played an important role in ECT at KKUH. They carried out the preparation procedure, ensuring that the patient fasted (NPO) and making sure that the consent form, the ECT order sheet and the anaesthesia form were all signed. A nurse, or sometimes two nurses, from the ward would accompany the patient and stay with them until they were back on the ward.

#### *Records*

There was an order sheet for ECT which had to be signed by the consultant. This included demographic data, information on diagnosis, medication, associated physical diseases and all other items that were relevant for each session: the time of stimulation, intensity, anaesthetic and muscle relaxant with doses, and the fit report and its duration. Nurses also recorded this information in a log book together with their observations. The anaesthetist completed a form which was sent to the operating room and these records documented each session and reapplications. In 1994, the ECT order sheet was reviewed according to the form suggested by the Royal College of Psychiatrists.

#### *Education and training*

Since the start of the Diploma Programme at KKUH in 1985, a two-lecture course on ECT has been scheduled for all junior residents every year. Also, a practical demonstration and training under supervision is given to junior doctors before they are al-

lowed to give ECT by themselves. This was reinforced by the obligatory presence of the senior registrar during ECT applications and more recently the assignment of an ECT consultant to supervise the administration policy of ECT.

#### **Concurrent medications**

It was found that in only 2.9% of sessions were patients on no medications during ECT and in 12.4%, patients were on drugs with an anticonvulsant property, including carbamazepine, sodium valproate acid and sedative hypnotics. In the remaining sessions (84.7%), patients were on either antipsychotics, antidepressants or both. In 24.8% of sessions, patients were on other non-psychotropic medications, such as antihypertensives, drugs for diabetes and non-steroidal anti-inflammatory drugs.

#### **Complications**

Complications were documented by the anaesthetist, the psychiatrist and the nurses, either in the recovery room or afterwards on the ward. About 84% of sessions were not followed by any complication. The remaining sessions were followed by a variety of complications, which are described in Table 1, but only 3.6% were followed by transient amnesia or disorientation.

#### **Discussion**

The results of this audit generally fit within the frame of recommendations set by the Royal College of Psychiatrists and the American Psychiatric Association [3,4]. The average number of applications per course was 8.1, close to the 9.0 reported in the USA, but more than that of the UK (6.5) and Bahrain (6.35). Although these differences have no empirical basis, they may reflect either low electrical stimulation,

Table 1 Complications after each ECT session

Complication	No. of sessions	%
No complications	899	84.0
Transient amnesia	31	2.9
Headache and bradycardia	31	2.9
Drowsiness	24	2.2
Bradycardia	16	1.5
Mania	16	1.5
Prolonged recovery	9	0.8
Headache and vomiting	8	0.7
Apnoea	8	0.7
Agitation	7	0.7
Dizziness	7	0.7
Disorientation	7	0.7
Transient euphoria	7	0.7
Total	1070	100

hence the higher number of applications, or that ECT was being used in severe cases which needed more applications [7,9,12]. The machine used at KKUH was the modern, brief-pulse, wave-form producing type, recommended by the Royal College of Psychiatrists and other psychiatric associations, as it produces seizures at lower levels of electrical energy and results in less cognitive impairment compared to the older sinewave stimulus machines [3,11].

The finding that only bilateral ECT was used fits with the more convincing evidence that bilateral ECT is more effective than unilateral [2-4,10,11]. It is interesting that although the treatment schedule was decided by the individual consultant, it was still within recommended guidelines, being not more than three times per week. In fact, the majority of courses (56.9%) were two sessions per week and the average

number of sessions per course of 6.9 is similar to others reports [7-9,11]. Although a schedule of three ECT sessions per week has a more rapid antidepressant effect, it causes more memory impairment [8,13].

The selection of electrical stimulation needs to be reconsidered at KKUH as recent research has found that the occurrence of seizures exceeding a specified minimum motor duration does not, of itself, assure good efficacy [10]. In fact, a seizure-related event that produces greater postictal suppression the so-called "suppression threshold" and monitored by electroencephalogram (EEG), is associated with greater clinical improvement [14]. This has led to the development of new machines (e.g. Thymatron) that enable the physician to determine physiologic and therapeutic thresholds, such as the postictal suppression threshold, with EEG monitoring for stimulus selection, without any subconvulsive stimulations. Therefore, this hospital should consider such equipment in order to provide proper selection of electrical stimulation.

Although failure to time the seizure until 1987 was a major drawback, this was also found to be the case in a few hospitals in the UK [7]. In addition, the average length of seizure of 26.1 seconds can be considered on the low side (higher ranges are associated with greater efficacy). However, only 5.2% of applications produced no fits and 87.2% of applications produced fits of more than 25 seconds, which is comparable to other results [9].

The training of those involved in ECT administration at KKUH, especially psychiatrists and anaesthetists, needs to be reviewed and promoted according to the recommendations of the American Psychiatric Association. These should include basic lectures, practical sessions, regular teaching and training update sessions; in

addition, the rota system for psychiatrists and anaesthetists may not be efficient [4,7].

The change of policy away from using atropine as a premedication is consistent with recommendations on avoiding adverse effects on cardiac rhythm and cognitive deficit [3,4,11]. Even though drugs with anticonvulsant properties were used during ECT in 12.4% of patients, this is not an unusual practice as long as precautions are taken to produce an effective seizure [4,11]. Using other drugs during ECT, such as antidepressants and antipsychotics is also common practice. However, it may be advisable to stop these drugs during ECT according to recommendations of the American Psychiatric Association [4,11].

The unusually low rate of complications in this study (16%) may be explained by subjectivity in recording complications and the lack of rating scales which precisely document each expected complication. On the other hand, it may be due to the conservative (low) use of electrical stimulation, as shown by the average seizure duration of 26.1 seconds.

## Conclusion

This study has shown that an ECT audit is essential to improve and update the administration of ECT. In fact, external auditing has been advocated by Pippard to ensure a continuous review and the implementation of the recommendations of scientific authorities [7].

In spite of the fact that the administration of ECT at KKHU generally complies with standard recommendations, some aspects need to be reviewed as for example, areas such as education and training (especially for psychiatrists and anaesthetists) and concurrent use of psychotropic medications. The development of a precise and scaled method of documentation for complications should be implemented and consideration given to the introduction of EEG monitoring equipment. As ECT is used in other health institutions in Saudi Arabia, similar audits should be conducted to ensure the safe and effective administration of ECT.

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The implementation of national mental health programmes with the strategy of integration of mental health into primary health care continued in many countries of the Region. In Bahrain and the Islamic Republic of Iran, the integrated system of mental health services in primary health care is functioning well. In Iraq, Jordan, Oman, Saudi Arabia, Sudan and the Syrian Arab Republic, training of general practitioners/primary health care physicians in mental health is continuing.

*Source: The Work of WHO in the Eastern Mediterranean Region. Annual Report of the Regional Director, 1 January-31 December, 1998. WHO Regional Office for the Eastern Mediterranean, Alexandria, 1998, page 74.*