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The State of Electroconvulsive Therapy in Texas. Part I: Reported Data on 41,660 ECT Treatments in 5971 Patients*

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ABSTRACT: The Texas Legislature in 1993 mandated a quarterly reporting requirement for hospitals and physicians performing electroconvulsive therapy (ECT) in the state (United States Government hospitals were excluded). The Texas Department of Mental Health and Mental Retardation (TDMHMR) was designated as the agency responsible for collecting and maintaining the data. This paper reviews the ECT data from 16 quarterly reports (09/01/93 through 08/31/97). The reports contained data on 41,660 ECT treatments in approximately 5971 patients. The results of this study support the proposition that ECT is an extremely safe and effective treatment for those individuals suffering from a serious mental illness. In Texas, ethnic groups other than non-Hispanic Anglo-Americans appear to be underserved in regards to ECT. Those patients without appropriate insurance or adequate personal funds are also underserved as a result of the few county and state hospitals performing ECT and the relatively small number of patients treated with ECT at those hospitals. Recommendations are suggested to improve the quality of the database and in informing the public as to the safety and efficacy of this valuable treatment modality.

What, at first, was seen as an unwarranted legislative foray into the practice of medicine, has, in the end, become a source of valuable data supporting the use of ECT as an important treatment modality.

KEYWORDS: forensic science, forensic psychiatry, electroconvulsive therapy, demographics, symptom severity, memory impairment, suicide, complications, Texas

Opposition to the use of electroconvulsive therapy (ECT) in Texas has been both diligent and persevering. For a number of years, legislative bills have been introduced at the biennial Texas legislative sessions to either ban or curtail the use of ECT. To date, those bills seeking to ban ECT have been defeated, but several bills curtailing the use of ECT have been passed. The opposition to ECT and psychiatry, in general, is well organized and vocal (1–3), while support for this valuable treatment has generated little public interest despite efforts by the Texas Society of Psychiatric Physicians, the Texas Alliance for the Mentally Ill, the Texas Depressive and Manic-Depressive Association, the Mental Health Association in Texas, and other similar organizations.

Brief Legislative History Regarding ECT

The 73rd Texas Legislature (1993) passed a comprehensive bill dealing with the use of ECT in Texas (4). The use of ECT in individuals younger than 16 years was banned (5), and the bill mandated a quarterly reporting requirement from "*. . . a mental hospital or facility administering electro-convulsive therapy . . . or a physician administering the therapy on an outpatient basis . . .* (6)." A much more extensive written consent form was created, which included the statement "there is a division of opinion as to the efficacy of the procedure . . . (7)."

The Texas State Legislature, through the passage of various restrictive laws, reflects the public's high level of concern about the use of ECT as a medical treatment. This is extraordinary since the value, efficacy, and safety of ECT (8–12) has been documented, not only in North America, but also around the world. The apparent over-regulation of ECT is clear when compared to more serious medical interventions such as termination of life issues, organ transplantation, and life-threatening surgery.

On the positive side, the citizens of Texas through their elected representatives have mandated a reporting requirement, which, though not perfect, has provided important data about the individuals receiving ECT and about ECT itself.

Patients and Methods

This paper reviews 16 quarters of data (from September 1, 1993 through August 31, 1997) reported to TDMHMR. These data include all ECT administered in Texas except for ECT treatments performed at four U.S. government hospitals (three veterans administration hospitals and one military hospital). No study to date has systematically attempted to obtain data on all ECT treatments within such a large population base as the state of Texas. A methodological limitation of the study is that it is retrospective and reviewed data that had been reported and collected by TDMHMR. The reported data did not include the use of rating instruments for symptom severity or memory impairment. All the data on symptom severity before and after ECT and memory impairment before and after ECT is based upon data provided by the physicians performing the ECT treatments.

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Each quarter, hospitals and physicians performing ECT completed the reporting form from TDMHMR. There were 41,660 ECT treatments reported. The number of patients reported did not take into account the possibility that a patient beginning a series of ECT treatments at the end of one quarter would complete his/her treatment series in the beginning of the next quarter. To allow for this, patients who from one quarter to the next were the same sex, age, ethnic group, with the same physician, and at the same hospital were counted as one patient. This reduced the total number from 7006 to 5971. The latter figure is a more realistic representation of the total number of patients receiving ECT during these 16 quarters.

The four U.S. government hospitals (three VA hospitals and one military hospital) were contacted and asked to provide data regarding the performance of ECT at their institution for at least a one-year period. The pooled data disclosed: 138 patients (115 males and 23 females) received 1160 ECT treatments. There were no recorded deaths.

Results

Demographics

Approximately 5971 patients received a total of 41,660 ECT treatments. Of these, 68.7% were female and 31.3% were male. Age distribution is presented in Fig. 1. Anglo-Americans accounted for 87.3% of patients receiving ECT, Latins 8.5%, African-Americans 3.3%, Asians 0.7%, and others 0.2%. The U.S. Census Bureau's Texas population statistics (13) for the years 1993 through 1996 are as follows: 58% White; 27% Hispanic; 12% Afro-American; 2.4% Asian; and 0.5% American Indian.

Consent for ECT and Method of Payment

Consent was voluntary in 98% of the ECT treatments performed, while in 2% consent was provided by a legal guardian. Methods of payment included 37% from private insurance, 60% public, 2.5% self/family, and 0.5% from some other source.

Diagnosis

Diagnoses were listed descriptively or by DSM-IV numbers.

ECT—Electrode Placement and Series

Electrode placement for ECT was bilateral in 75.6% of treatments, unilateral in 16.2%, and mixed in 8.2%. The planned series of ECT treatments were completed in 61%. An incomplete series accounted for 8%, and maintenance for 31%.

Symptom Severity Before and After ECT

Figure 2 provides a graphic representation of the severity of symptoms of the mental disorder for which the patient was treated with ECT and is based on the treating physician's estimate of the degree of symptom severity.

Memory Impairment Before and After ECT

Figure 3 provides a graphic representation of memory impairment severity before ECT and two to four weeks after ECT. These data are based on the treating physician's estimate of the degree of memory loss.

Complications

At the time ECT was performed, there were no fractures, cardiac arrests, or deaths. There were four episodes of unexpected apnea, possibly due to the anesthetic. Complications that occurred within 14 days following ECT included 1 fracture, no cardiac arrests, 5 unexpected apneas, and 25 deaths.

Fractures

One fracture, not associated with ECT, was reported in a 74-year-old man. He suffered a fractured hip at a senior activity center, was hospitalized, underwent hip replacement, and recovered.

Patient Deaths Within Two Weeks of ECT

There were 25 deaths (17 men and 8 women) within a two-week period following ECT. No deaths occurred or were caused by ECT at the time treatment was provided. All but 2 of the 25 were white non-Hispanic. Twenty-two suffered with major depressive disorder, two with bipolar disorder, and one with schizoaffective disorder. Table 1 provides data regarding these deaths. Table 2 provides data regarding the 17 non-suicide deaths.

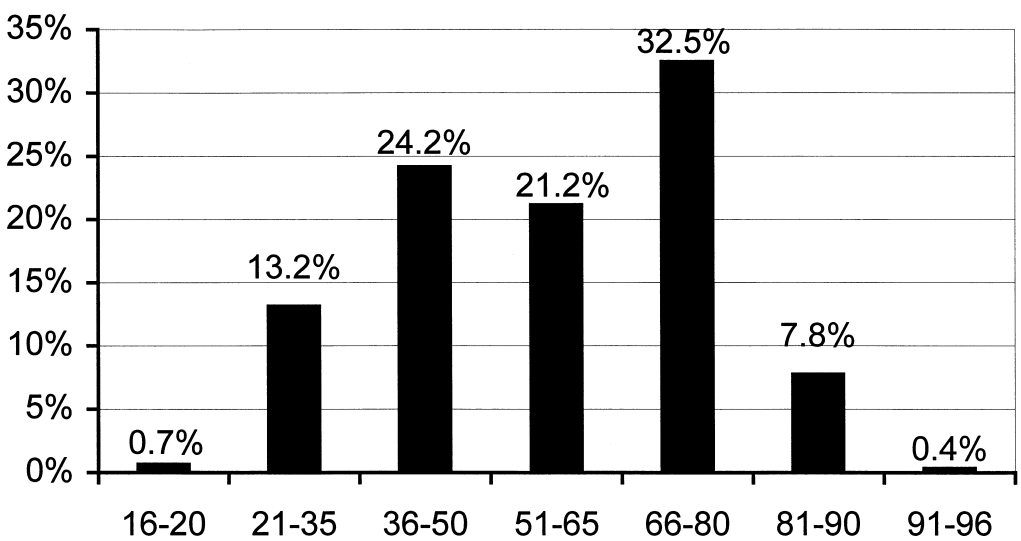

FIG. 1—*Age distribution.*

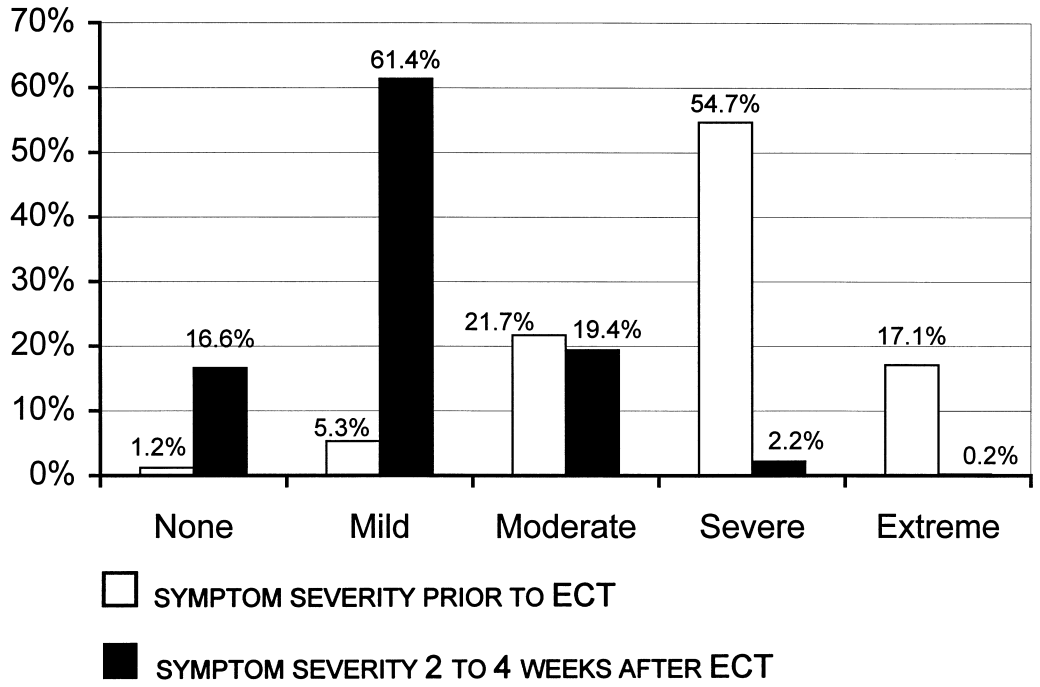

FIG. 2—*Symptom severity.*

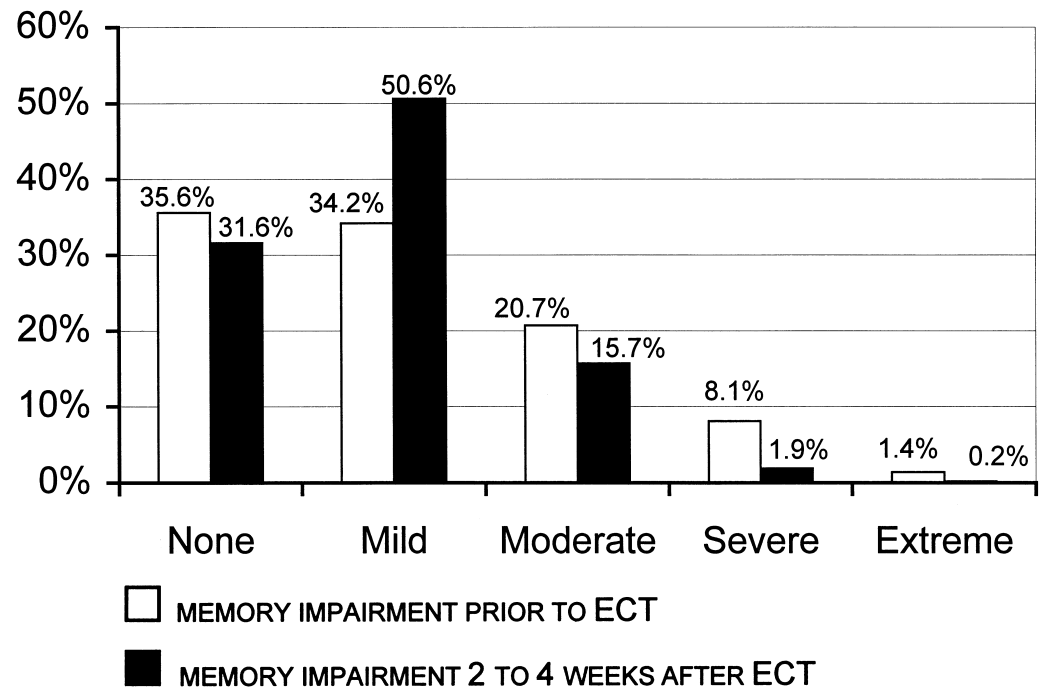

FIG. 3—*Memory impairment.*

Discussion

The psychiatric use of electroconvulsive therapy (ECT) was first published in the medical literature in 1938 by Cerletti and Bini (14). Two years later the first ECT was performed in the United States (15). ECT over the next 57 years (9) has, despite its poor image in the public's eye, become an extremely safe and useful treatment modality in certain psychiatric conditions (16–22).

A point of great interest is the ethnic background of patients receiving ECT. Although the U.S. Bureau of Census indicates that 58% of the population in Texas are White non-Hispanic, this group received 87.3% of the ECT treatments. Assuming that the remaining ethnic groups suffer from mental illness amenable to

TABLE 1—*Deaths at or during ECT or within two weeks of ECT.*

Deaths at or During ECT		Completed Suicides		Deaths 1 to 4 Days after ECT		Deaths 6 to 14 Days after ECT	
♂	♀	♂	♀	♂	♀	♂	♀
—	—	28	54	46	50	58	72
—	—	38	61	48	69	65	73
—	—	50	—	51	70	71	—
—	—	60	—	75	72	79	—
—	—	63	—	78	79	—	—
—	—	74	—	84	—	—	—
No deaths		7 of the 8 were <65		7 of the 11 were >65		5 of the 6 were ≥65	

TABLE 2—*Seventeen non-suicide deaths.*

Patient	Time of Last ECT	Comments
48 ♂	1 day	Myocardial Infarct
50 ♀	1 day	Cardiac arrhythmia 2° to interstitial fibrosis of the conducting system
51 ♂	1 day	Sepsis 2° to perforated colon 2° to diverticulosis
70 ♀	1 day	Pneumonitis 2° to inhalation of food or vomitus
79 ♀	1 day	Sepsis with multi-organ failure
46 ♂	2 days	Motor vehicle accident in which patient was a passenger
69 ♀	3 days	Died 2° to pre-existing cardiopulmonary problems
78 ♂	4 days	Cause of death unknown
72 ♀	4 days	Cardiac arrest—cause not noted in report
84 ♂	4 days	Old anterior myocardial infarct and cardiac arrest
75 ♂	4 days	Ruptured abdominal aortic aneurysm
58 ♂	6 days	Myocardial infarct and pulmonary embolism
65 ♂	6 days	Myocardial infarct
73 ♀	8 days	Died of an obstructed airway 2° to cancer
79 ♂	8 days	↓ food and fluid intake, pre-renal azotemia, cachexia, cardiac arrest
71♂	10 days	Died at home—family attributed death to cardiac arrest
72 ♀	13 days	Multiple severe medical conditions with arteriosclerosis and cardiac disease

ECT treatment, it appears that they were underserved in this regard.

Depression, in one form or another, accounted for 93.5% of mental illnesses for which ECT was employed (major depressive disorder 79.2%; depression with psychotic features 2.0%; depression with organic brain disease 0.8%; bipolar disorder, depressed 7.4%; schizoaffective disorder, depressed 5.9%). The remaining 6.5% included schizophrenia (1.8%); bipolar disorder, manic (1.4%); bipolar disorder, mixed (0.3%); schizophrenia, catatonic (0.2%); delusional disorder (0.3%); acute psychosis (0.2%); and other (0.5%).

Symptom severity and memory impairment prior to ECT are related (23) factors. Symptom severity was rated as severe (54.7%) or extreme (17.1%) in 71.8% of patients prior to ECT, and as severe (2.2%) or extreme (0.2%) in 2.4% of patients within two to four weeks following ECT. Memory impairment was reported as severe or extreme in 9.5% of patients prior to ECT, and in 2.1% of patients within two to four weeks following ECT. The reporting form did not employ the use of an accepted rating instrument for symptom severity or memory impairment. However, the results agree with a study by Coleman, et al. (23), in which rating instruments were used. Coleman found a strong relationship between symptom severity and memory impairment pre-ECT. Both symptom severity and memory impairment improved following a course of ECT, and, similar to the present review, improvement of symptom severity was more robust than improvement in memory. Memory, in this study, was evaluated two to four weeks following ECT with 66.3% patients having mild (50.6%) to moderate (15.7%) impairment. It is expected that this percentage would improve over time.

Complications suffered by patients undergoing ECT support its safety. During ECT, there were no reported incidents of fracture, cardiac arrest, or death. The four reported episodes of unexpected apnea are presumably related to the patient's recovery from anesthesia. Five additional cases of unexplained apnea were reported within the four-week interval following ECT. The timing of these episodes and the causes were not provided.

One fracture not associated with ECT was reported. With the advent of modified ECT, fractures at the time of ECT are extremely rare. A forearm fracture secondary to the use of a blood pressure cuff (used to monitor seizure occurrence and length) has been reported [Levy (24)] in an elderly patient with osteoporosis.

There were no deaths at the time of or immediately following ECT. Twenty-five deaths occurred within two weeks of ECT. Eight of the 25 deaths were due to completed suicides. Seven of the 8 individuals completing suicide had been diagnosed with major depressive disorder. One was diagnosed with bipolar disorder, depressed. Men accounted for 75% of the suicides. Of the 8 completed suicides, 50% were 50 years of age or younger. The psychiatric literature indicates that depression is the most common diagnosis in suicide victims in this age group (25–27). Studies suggest lower suicide mortality among patients treated with ECT (28–30) versus untreated severely depressed patients.

Of the 17 non-suicide patients, 11 died within 4 days of ECT, and 6 died between 6 and 13 days following ECT. Of the 11 deaths, 2 died a septic death one day following ECT, and 1 patient, a passenger in an automobile, died in a motor vehicle accident. There appears to be little, if any, relationship between ECT and the deaths of these 3 patients and the 6 who died 6 to 13 days following ECT. Of the remaining 8 patients who died within 4 days of ECT, 5 died of cardiovascular causes, 2 of pulmonary causes, and one died of an unknown cause. A review of the 7 known causes of death in this group of 8 patients does not provide us with clear evidence whether ECT was or was not related to the deaths. ECT treatment, itself, is associated with sympathetic arousal, an elevation of blood pressure and pulse, followed by enhanced parasympathetic activity that may produce bradycardia or asystole (22,31). One possibility is that the

changes in autonomic function acutely associated with treatment may in some way predispose to an enhanced cardiovascular mortality (22,31,32). This explanation could establish a plausible contributing relationship between ECT, the four deaths from cardiovascular causes, and the patient who died from a ruptured abdominal aortic aneurysm, a known risk factor for ECT. However, we cannot conclude that these data indicate a definite correlation between having ECT and having a cardiovascular event, since we do not have any data on cardiovascular events in this same study group independent of ECT. The one death due to inhalation pneumonitis, one-day post-ECT, and the death due to pre-existing cardiopulmonary problems, three days post-ECT can arguably be related to ECT. None of the cardiovascular deaths or any of the reported deaths occurred on the day of ECT. The possibility exists that some of the deaths reflect the expected mortality in a group of individuals who are at higher risk because of greater age, the increased risk factors associated with depression, and poor physical health. It is also possible that having ECT and having a cardiovascular event may be unrelated but correlated because of an underlying factor that causes both events. In Texas ECT is often reserved for those patients who have not responded to psychopharmacologic agents, and, thus, as a group these patients are seriously mentally ill and, in addition, often suffer from significant physical disabilities. By the time that ECT is considered, patients may be debilitated, dehydrated, under severe stress, and suffering poor nutrition. Advanced age and the diagnosis of depression are associated with an increased risk of cardiovascular mortality.

Mortality rate commonly quoted in the literature is 1–2 deaths at the time of ECT/10,000 patients treated (33,34). In this series there were no deaths at the time of or during ECT. There were 11 deaths within four days of ECT. We can find a possible relationship with ECT in 6 of the 11 deaths. Thus, in this series the two-week mortality rate/treatment (six deaths ÷ 41,660 treatments) is 14.4 deaths/100,000 treatments. The two-week mortality rate/patient treated (six deaths ÷ 5971 patients treated) is 10 deaths/10,000 patients treated. We were unable to find any reliable data concerning the death rate within a two-week interval following ECT in the scientific literature. A study from Denmark (35) reported 22,210 ECT individual treatments in 3438 patients. The ECT was performed in the early 1970s, and a mortality rate at the time of or immediately after ECT was 2.9/10,000.

Conclusions

ECT is a safe and effective procedure. Complications resulting from ECT treatments are low. An unexpected benefit of the anti-ECT movement and the actions of the Texas Legislature is that the mandated ECT reporting requirement has provided hard data as to the efficacy and safety of ECT. Public hospitals provide a very small percentage (6%) of the total ECT performed in Texas. The indigent and minority populations are not well represented in the patient population receiving ECT. Minority populations, for one reason or another, are not receiving ECT on a level commensurate with their population base. ECT is seldom a first line medical treatment even considering its well-documented efficacy, safety, and speed of results. Thus, patients who would like to return to their productive careers (writers, lawyers, engineers, physicians, etc.) are seldom, if ever, provided the opportunity to choose ECT as a first line treatment for their condition. In Texas, ECT is seldom used for conditions other than major depressive disorder not responsive to psychopharmacologic treatment. Vast areas of Texas do not have ECT available as an option for patients.

Recommendations

The value of continuing the mandatory reporting requirement for ECT is clearly demonstrated by the present review. However, the data collected can be improved. In keeping with patient confidentiality, a mechanism could be developed for an accurate patient count. Diagnoses should be restricted to those psychiatric diagnoses in the DSM IV manual. A uniform patient self-report rating scale for symptom severity and memory impairment would be valuable in outcome analyses. If possible, post-ECT followup for a period of 90 days, especially in the area of memory impairment, should be considered. Standard rating instruments for memory impairment and symptom severity and the establishment of a 90-day follow-up period would be beneficial. Those patients who have been greatly helped by ECT should be encouraged to contact their legislators to provide positive feedback.

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