

## ELECTROCONVULSIVE THERAPY IN A HUNGARIAN ACADEMIC CENTRE (1999-2010)

Gábor Gazdag<sup>1,2</sup>, Rozália Takács<sup>3</sup>, Judit Tolna<sup>2</sup>, Zsolt Iványi<sup>4</sup>, Gabor S. Ungvari<sup>5,6</sup> & István Bitter<sup>2</sup>

<sup>1</sup>Center for Psychiatry and Addiction Medicine, Szent István and Szent László Hospital, Budapest, Hungary

<sup>2</sup>Department of Psychiatry and Psychotherapy, Faculty of Medicine, Semmelweis University, Budapest, Hungary

<sup>3</sup>1<sup>st</sup> Department of Psychiatry, Nyírő Gyula Hospital, Budapest, Hungary

<sup>4</sup>Department of Anaesthesiology and Intensive Therapy, Faculty of Medicine,  
Semmelweis University, Budapest, Hungary

<sup>5</sup>University of Notre Dame, Australia/Marian Centre, Perth, Australia

<sup>6</sup>School of Psychiatry and Clinical Neurosciences, University of Western Australia, Perth, Australia

received: 5.5.2013;

revised: 1.9.2013;

accepted: 3.10.2013

### SUMMARY

**Background:** Since the 1930s, the Department of Psychiatry and Psychotherapy at Semmelweis University (DPPSU) in Budapest has played a leading role in convulsive therapy in Hungary. The aim of this study was to describe the pattern of ECT use at the DPPSU over an 11-year period.

**Subjects and methods:** Analysis of the medical notes of all patients treated with ECT in this academic centre between 1999 and 2009.

**Results:** During the study period, 28,230 patients were admitted to the DPPSU, of whom 457 (1.6%) received ECT. More than 50% of patients receiving ECT were diagnosed with schizophrenia. The percentage of female patients receiving ECT significantly exceeded that of the male patients, above what was expected in view of the diagnostic mix.

**Conclusion:** The data indicate that in the first decade of the 21<sup>st</sup> century, ECT use shows a declining tendency in this Hungarian academic centre. The mean number of treatment sessions was relatively low and nearly the same across diagnostic groups. ECT was mainly used as a last resort for treatment-resistant patients. In the majority of cases, bifronto-temporal brief pulse stimulation was applied. Seizures were monitored with EEG and EMG.

**Key words:** ECT practice - academic centre – schizophrenia - affective disorders

\* \* \* \* \*

### INTRODUCTION

From the very beginning of its introduction to psychiatry, the Department of Psychiatry and Psychotherapy at Semmelweis University (DPPSU) has played a pioneering role in using and promoting convulsive therapy in Hungary. László Meduna conducted his neuropathological studies comparing the brains of patients suffering from epilepsy or schizophrenia while working at this Department, in an attempt to establish the theoretical basis of convulsive therapy. The Department was probably also the place where Meduna carried out his animal experiments to find the right chemical substance for seizure induction (Meduna 1985). However, the first human convulsive treatment took place in the Royal National Hungarian Institute of Psychiatry and Neurology (Gazdag et al. 2007a), because Károly Schaffer, then the head of DPPSU did not approve the direction of Meduna's research (Baran et al. 2008). Nevertheless, the DPPSU continued to play a defining role in the use of convulsive therapy in Hungary. Gyula Nyírő, the head of the Department in the 1960s, was the propagator of the regressive method of electroconvulsive therapy (ECT) in Hungary (Gazdag et al. 2007b). Among those who first applied ECT under general anaesthesia in Hungary were István Magyar and

László Tringer who both became later professors in the Department (personal communication with László Tringer, 12/11/2012). The DPPSU carried out the highest number of ECT treatments in Hungary, with 2.6 percent of the inpatients receiving ECT in 2002 (Gazdag et al. 2004a).

Over the past decade, there has been a heterogeneous pattern of ECT use around the world. In some countries, the method has experienced a renaissance (Mugisha & Ovuga 1991, Selis et al. 2008, Minhas & Ostroff 2012, Loh et al. 2012, van Waarde et al. 2009), while in others its use has decreased significantly (Leiknes et al. 2012, Plakiotis & O'Connor 2012) or it has been banned (Gazdag et al. 2012).

The aim of this survey was to describe the practice of ECT at DPPSU over an 11-year period to establish recent trends in ECT use in a centre of excellence in Central-Eastern Europe.

### SUBJECTS AND METHODS

The medical files of the patients treated with ECT at the DPPSU between 1999 and 2009 were analyzed. During that period, at least one of two authors (GG, IZS) actively participated in performing ECT and thus guaranteed the quality of the data collection. The infor-

mation extracted from the files included demographic and illness-related data and the following information on ECT: date of ECT, number of treatment sessions, number of repeated stimulations, stimulus intensity, EEG, EMG, seizure duration, dose of anaesthetics, blood pressure, heart rate and adverse effects.

### Statistical Analysis

Statistical analysis was performed using SPSS, Version 11.5 (Chicago, IL, USA). Descriptive data are given with means and standard deviations. Diagnostic groups were compared with t-test and chi-square test, as appropriate. The annual variations of the number of patients treated with ECT were examined with the “curve estimation” method (Saha-Chaudhuri & Heagerty 2012).

## RESULTS

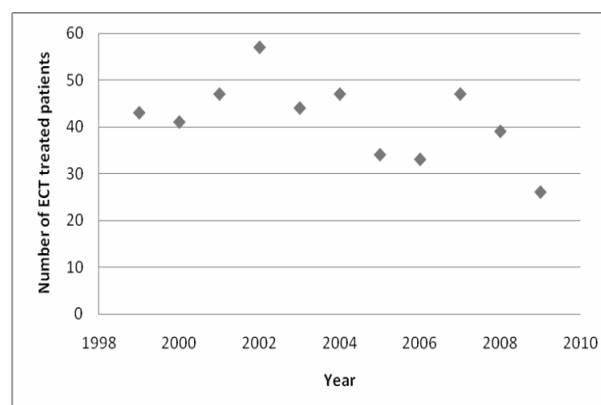
ECT was performed with a Thymatron DGx machine (delivering constant-current, brief-pulse, bi-directional square-wave impulses). After premedication with atropine (0.5mg iv.), propofol (1 mg/kg) or etomidate (0.1mg/kg) was administered as an anaesthetic together with succinylcholine (50 mg) for muscle relaxation. Convulsions were monitored using the cuff method (Fink, 1994) coupled with EEG and EMG. Diagnoses were made according to ICD-10 criteria (World Health Organization 2010) by the patients’ attending psychiatrists.

During the 11-year period, the total in-patient turnover was 28,230 patients, 457 (1.61%) of whom received ECT. Thirty-six patients (7.9%) required a second course in the same year and in 3 cases (0.65%) three ECT courses were necessary in the same year. Altogether 233 (7.9%) repeated stimulations of the total of 2,940 stimulations were required because of ineffective first stimulations. Bifronto-temporal electrode placement was applied in all cases. The age method was employed to determine the initial stimulus intensity in a

majority of the cases, except when dose titration was applied in the context of studies (Gazdag et al. 2004c, Iványi et al. 2007). Brief pulse stimulation was used in all cases. As the DPPSU lacked a proper ECT-suite, ECT was administered in general treatment rooms and the ward corridor was used for recovery.

In Hungary, ECT can only be administered under anesthesia and muscle relaxation, and the assistance of an anesthesiologist has been mandatory since 1994 (Welfare Ministry Order 1994). Contracting an anesthesiologist incurred significant costs for the institution.

The characteristics of the ECT are shown by year in Table 1. Table 2 displays the characteristics of ECT in different diagnostic groups. There was no significant difference in the number of patients treated per year ( $p=0.08$ ). The variation in the number of ECT is shown in Figure 1. The following adverse effects, all only mild and transient, were recorded: confusion (1.3%), sinus tachycardia (3.1%), psychomotor agitation (1.7%), hypertension (blood pressure above 140/90 Hgmm (Kim et al. 2013) 6.6%), nausea (0.2%), headache (1.5%), myalgia (0.7%), prolonged seizures (seizures lasting longer than 180 seconds (APA 2001; 0.4%), and sialorrhea (0.4).



**Figure 1.** Number of ECT courses between 1999 and 2009

**Table 1.** Characteristics of ECT courses between 1999 and 2009

	Number of patients	Sex (male %)	Age (mean)	Diagnosis (%)		Stimulation energy	Number of sessions
				Schizophrenia	Affective disorder		
1999	43	55.8	41.2±16.0	67.4	32.6	251.3±96.9	4.14±1.85
2000	41	43.9	40.8±17.0	70.7	29.3	272.0±102.0	4.39±1.98
2001	47	38.3	44.3±18.3	63.8	36.2	221.6±109.1	3.79±1.86
2002	55	36.8	43.5±15.7	54.5	45.5	198.4±89.2	4.63±1.84
2003	44	27.3	46.8±15.9	50.0	50.0	183.6±97.02	5.34±2.09
2004	47	42.6	44.0±16.4	55.3	44.7	151.0±60.81	5.19±2.43
2005	34	44.1	46.1±14.8	58.8	41.2	140.8±55.68	4.94±3.08
2006	33	39.4	47.0±17.3	78.8	21.2	159.5±48.79	4.18±1.89
2007	47	42.6	46.6±18.1	68.1	31.9	163.2±62.84	4.53±2.66
2008	39	33.3	45.8±17.8	66.7	33.3	164.6±61.81	4.44±1.81
2009	26	30.8	48.5±19.2	65.4	34.6	167.04±65.3	4.73±2.05
Total	457	39.6	44.8±16.9	63.0	37.0	190.85±90.5	4.75±2.19

**Table 2.** Characteristics of ECT according to diagnostic groups

	Schizophrenia	Affective disorder	Statistics
Number of patients (%)	288 (63%)	169 (37%)	
Sex (percent of males)	44.7%	30.7%	
Age	38.9±15.10	54.8±15.04	t=10.8, p<0.01
Stimulation energy	179.1±85.4	210.7±95.5	t=3.65, p<0.01
Number of restimulations	1.89±1.13	2.14±1.41	p=0.251
Number of sessions	4.63±2.25	4.49±2.10	t=3.65, p=0.42

## DISCUSSION

With the development of psychopharmacology from the 1950s, the use of ECT has been declining significantly in Hungary, as it has been in most parts of the world (Gazdag et al. 2004a, McCall 2001, Gazdag et al. 2009a, Sienaert et al. 2006). In Australia the use of ECT began declining from 2001, with a little increase in 2007 (Plakiotis et al. 2012). In the United Kingdom, a fall in the number of ECT was observed during the period of 2005-2006 (Scott 2012). The same decline in the administration of ECT in the past few years was reported from the United States (Case et al. 2013). In India, the percentage of ECT use remained constantly high over the past years, similar to the rest of Asia (Ganghadar et al. 2010, Little 2003). However, the descending trend is far from universal: ECT is increasingly more frequently administered in Germany and the Netherlands (Loh et al. 2012, van Waarde et al. 2009).

In the first decade of the 21st century the decline has continued at the DPPSU (Figure 1), although not to a statistically significant degree ( $p=0.08$ ). Anecdotal evidence suggests that similar tendency of ECT use have been observed in other Hungarian centres. This situation could have several explanations. A major restructuring of the Hungarian health system took place in 2007, resulting in the closure of the National Institute of Psychiatry and Neurology, a key clinical and biological research centre in Budapest (Gazdag et al. 2007), among other negative effects. One of the practical consequences was that the catchment area served by the DPPSU increased almost threefold, and so did the number of patients. The mean length of stay at the DPPSU decreased from 16 days in 1999 to 11.6 in 2009 rendering ECT less available. Patients requiring longer treatment are now regularly transferred to other psychiatric facilities. The rapidly deteriorating financial situation of the health system could also have contributed to the decline of ECT. In Hungary, the Diagnosis Related Group (DRG) system finances inpatient care. ECT does not have separate central funding in Hungary, and thus its use results in a significant financial burden on institutions. To date, efforts by mental health professionals to obtain special financing for the ECT have proven unsuccessful. A further possible reason for the decline of ECT practice could be that like all Hungarian psychiatric facilities, the DPPSU does not have its own anaesthesiologist, and securing an

external collaborator can be difficult. There is also a lack of well-trained ECT nurses, partly because there is no ECT nurse training in Hungary. Finally, undergraduate medical education and residency training hardly cover ECT and regular refresher courses on the topic are also lacking.

The majority of patients who received ECT treatment in Hungary during 2002 were diagnosed with schizophrenia (Gazdag et al. 2004a). Schizophrenia was also the most common indication in the DPPSU (Table 2). This finding is difficult to explain or justify, as similar to international guidelines (Royal College of Psychiatrists 2004, American Psychiatric Association 2001), the Hungarian ECT protocol (Hungarian College of Psychiatrists 2005) recommends ECT mainly for affective disorders. An earlier study (Gazdag et al. 2009b) found that the majority of Hungarian psychiatrists still regard ECT as a last resort for patients resistant to any other therapeutic interventions, and prescribe it equally frequently for treatment-resistant cases of depression and schizophrenia (Gazdag et al. 2004b). Because of the recent economical downturn and ECT's lingering stigma (Takács et al. 2012), it is nearly impossible to obtain grants for research in this area in Hungary.

The results of this survey suggest that for patients with affective disorders ECT is less frequently considered. The percentage of female patients receiving ECT in the sample significantly exceeded that of the male patients. Considering that the majority of the patients were suffering from schizophrenia, this deviance from the expected – nearly equal – sex-distribution requires further exploration. It is also worth mentioning that the mean number of treatment sessions was much lower than recommended in Hungarian and international guidelines and, even more significantly, it was nearly the same across diagnostic groups. We hypothesize that the relatively small number of treatment sessions could be explained by misdiagnosing affective disorders for schizophrenia, as the former usually need fewer ECT sessions. At the same time, short courses could have disadvantaged patients with schizophrenia because ECT may have been stopped before significant improvement occurred. Changes in the composition of the medical staff could, in part, account for the annual variations in the number of ECT treatment sessions; it appears that the new generation of psychiatrists has poor knowledge of and less faith in ECT.

During the study period, ECT was also administered for rare indications. It has proved to be effective in the treatment of mood and psychotic symptoms associated with epilepsy (Farkas et al. 2002). Treating patients with epilepsy-related psychiatric disorders is one of the profiles of the DPPSU as a tertiary referral center. The treatment of psychotic symptoms in epilepsy poses a challenge, but the use of ECT is a feasible, though rarely considered, option (Micallef-Trigona & Spiteri 2012).

The main limitation of this survey is its retrospective nature. The clinical diagnoses were not confirmed by structured interviews or other specific diagnostic tools. EEG and EMG recordings were available only about 60% of the sessions, and the seizure lengths were judged only by the cuff method in the rest of the cases. The relatively low percent of adverse effects could be because the majority of the patients treated with ECT were diagnosed with schizophrenia and certain side effects (e.g. cognitive impairment, confusion and/or disorientation) were often difficult to distinguish from the symptoms of psychosis or they might have not been documented accurately constituting another limitation of the survey. Finally, the reasons for terminating the course of ECT were not documented in the medical notes.

## CONCLUSION

Despite its limitations, this study demonstrates the continuous decline in the annual number of ECT in Hungary's leading ECT centre.

**Acknowledgements:** None.

**Conflict of interest :** None to declare.

## References

1. American Psychiatric Association: *The practice of ECT: recommendations for treatment, training and privileging*. Washington DC: American Psychiatric Press, 2001
2. Baran B, Bitter I, Fink M, et al.: *Károly Schaffer and his school: the birth of biological psychiatry in Hungary, 1890-1940*. *Eur Psychiatry* 2008; 23:449-56.
3. Case BG, Bertollo DN, Laska EM et al.: *Declining use of electroconvulsive therapy in United States general hospitals*. *Biol Psychiatry* 2013; 73:119-26.
4. Farkas M, Baran B, Kárpáti R et al.: *The use of electroshock therapy in psychoses associated with epilepsy*. *Ideggyogy Szle* 2002; 55:400-5.
5. Fink M: *Optimizing ECT*. *Encephale* 1994; 20:297-302.
6. Gangadhar BN, Phutane VH, Thirthalli J: *Research on electroconvulsive therapy in India: An overview*. *Indian J Psychiatry* 2010; 52:S362-5.
7. Gazdag G, Kocsis N, Tolna J et al.: *Etomidate versus propofol for ECT in schizophrenia*. *J ECT* 2004c; 20:225-229.
8. Gazdag G, Baran B, Kárpáti M et al.: *The history of Lipótmező, the site of the first convulsive therapy*. *J ECT* 2007a; 23:221-3.
9. Gazdag G, Baran B, Bitter I, Ungvari GS, Gerevich J: *Regressive and intensive methods of electroconvulsive therapy: a brief historical note*. *J ECT* 2007b; 23:229-32.
10. Gazdag G, Kocsis N, Lipcsey A: *Rates of electroconvulsive therapy use in Hungary in 2002*. *J ECT* 2004a; 20:42-4.
11. Gazdag G, Kocsis N, Tolna J, et al.: *Attitudes towards electroconvulsive therapy among Hungarian psychiatrists*. *J ECT* 2004b; 20:204-7.
12. Gazdag G, Palinska D, Kloszewska I, et al.: *Electroconvulsive therapy practice in Poland*. *J ECT* 2009; 25:34-8.
13. Gazdag G, Sebestyén G, Zsargó E, et al.: *Survey of referrals to electroconvulsive therapy in Hungary*. *World J Biol Psychiatry* 2009b; 10:900-4.
14. Gazdag G, Takács R, Ungvari GS, et al.: *The practice of consenting to electroconvulsive therapy in the European Union*. *J ECT* 2012; 28:4-6.
15. Hungarian College of Psychiatrists: *ECT Treatment: Professional Recommendations (in Hungarian)*. *Egészségügyi Közlöny* 2005; issue No. 12
16. Iványi Zs, Tolna J, Gazdag G: *A comparison of the impact of propofol and etomidate on seizure activity, during electroconvulsive therapy in patients with schizophrenia*. *Anesth Analg* 2007; 104:241.
17. Kim JI, Sillah A, Boucher JL et al.: *Prevalence of the American Heart Association's "Ideal Cardiovascular Health" Metrics in a Rural, Cross-sectional, Community-Based Study: The Heart of New Ulm Project*. *J Am Heart Assoc* 2013; 25:e000058.
18. Leiknes KA, Jarosh-von Schweder L, Høie B: *Contemporary use and practice of electroconvulsive therapy worldwide*. *Brain Behav* 2012; 2:283-344.
19. Little JD: *ECT in the Asia Pacific region: what do we know?* *J ECT* 2003; 19:93-7.
20. Loh N, Nickl-Jockschat T, Sheldrick AJ et al.: *Accessibility, standards and challenges of electroconvulsive therapy in Western industrialized countries: A German example*. *World J Biol Psychiatry* 2012; Mar 12 [Epub ahead of print].
21. McCall WV: *Electroconvulsive therapy in the era of modern psychopharmacology*. *Int J Neuropsychopharmacol* 2001; 4:315-24.
22. Meduna L: *Autobiography: Convuls Ther* 1985; 1:43–57.
23. Micallef-Trigona B, Spiteri J: *Maintenance electroconvulsive therapy in a patient with treatment-resistant paranoid schizophrenia and comorbid epilepsy*. *Case Rep Psychiatry* 2012; 2012:374752.
24. Minhas HM, Ostroff R: *Practice of electroconvulsive therapy in a tertiary care hospital in Pakistan*. *J ECT* 2012; 28:7-9.
25. Mugisha RX, Ovuga EB: *The use of electroconvulsive therapy in the treatment of psychiatric illness at Umzimkulu Hospital in Transkei. A retrospective study*. *S Afr Med J* 1991; 79:391-3.
26. Plakiotis C, George K, O'Connor DW: *Has electroconvulsive therapy use remained stable over time? A decade of electroconvulsive therapy service provision in Victoria, Australia*. *Aust NZ J Psychiatry* 2012; 46:522-31.
27. Royal College of Psychiatrists: *The ECT Handbook, second edition: the third report of the Royal College of Psychiatrists' special committee on ECT*. London: Royal College of Psychiatrists, 2004

28. Saha-Chaudhuri P, Heagerty PJ: Non-parametric estimation of a time-dependent predictive accuracy curve. *Biostatistics* 2012; Jun 25. [Epub ahead of print].
29. Scott A: Is the use of electroconvulsive therapy falling because of fewer referrals of patients with severe depression? *J ECT* 2012; 28:162-4.
30. Selis MA, Kaye F, Leentjens AF: The practice of electroconvulsive therapy in Malawi. *J ECT* 2008; 24:137-40.
31. Sienaert P, Dierick M, Degraeve G, et al.: Electroconvulsive therapy in Belgium: a nationwide survey on the practice of electroconvulsive therapy. *J Affect Disord* 2006; 90:67-71.
32. Takács R, Ungvari GS, Gazdag G: Electroconvulsive therapy on Hungarian websites. *Psychiatr Danub* 2012; 24:86-9.
33. van Waarde JA, Verwey B, van den Broek WW, van der Mast RC: Electroconvulsive therapy in the Netherlands: a questionnaire survey on contemporary practice. *J ECT* 2009; 25:190-4.
34. Welfare Ministry Order No. 15/1994 (IX/28) (in Hungarian), *Népjóléti Közlöny*, 1994 44(15), p. 1335-1336.
35. World Health Organization: *International Classification of Diseases (ICD)*. Stylus Publishing, LLC Herndon, United States. Retrieved November 23, 2010.

Correspondence:

Gábor Gazdag, MD

Center for Psychiatry and Addiction Medicine, Szent István and Szent László Hospital

Gyali ut 5-7, 1097 Budapest, Hungary

E-mail: gazdag@lamb.hu