

## Introduction

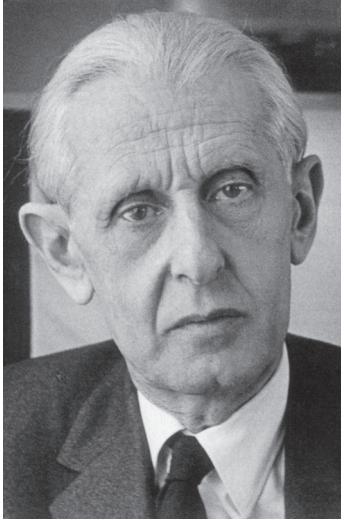
I interviewed Dr. Lothar Kalinowsky on a sunny and breezy afternoon in his Manhattan apartment in the autumn of 1990. At the time, his health was declining and his wife Hilda was with us helping with memories and actively participating in the conversation in their elegantly decorated and unpretentious living room. Dr. Kalinowsky gave me the impression of being a rather simple man with a degree of sobriety and frugality that in Europe is usually associated with a German attitude, the same which may also explain his certainties about the treatment he helped the most to make popular in the United States. His interventions during our conversation were concise partly because of his slow rhythm of speech but more for what I thought it was his personal *weltanschauung*.

I have also used the interview with Dr. Kalinowsky as an occasion to describe facts and controversies about ECT and people who directly and indirectly participated in its discovery and development.

I particularly liked one comment made by his wife: “My husband had very prominent people who had ECT. Of course you can’t mention their names. It’s too bad because it would help ECT so much if you could say: ‘Now look at Miss so and so. She has no memory loss and she had ECT’”.

Many well-known persons have been treated with ECT, with varying degrees of public acknowledgment of the fact. For a list of celebrities who supposedly were treated with ECT you may refer to Leonard (2006).

ECT has been described in several motion pictures (usually in a negative light), including *the Snake Pit*, *Frances*, *Requiem for a Dream*, *One flew Over The Cuckoo’s Nest*, *Melrose Place*, *The Caretaker*, *The Best of Youth*, *House*, *The Bell Jar*, *Shine*, *Girl Interrupted*, *Insanitarium*, *Changeling*, *Ciao! Manhattan*, *Next to Normal*, *Return to Oz*, *Private Practice*, *Ghost Whisperer*, *From Beyond*, *A Beautiful Mind*, and *Helen* (Wikipedia 2011).



**Lothar B. Kalinowsky, M.D. (1899-1992)**

**Interview by Leonardo Tondo, M.D., M.Sc.**  
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**Manhattan, November 14, 1990**

LT: Am I right in saying that you were in Italy with Bini<sup>1</sup> and Cerletti<sup>2</sup>?

LBK: Yes, quite right.

Picture was kindly provided by Dr. Kalinowsky

## Notes

<sup>1</sup> Lucio Bini, MD (1908-1964). Italian psychiatrist who helped Dr. Ugo Cerletti to construct the first device able to induce convulsions in humans using electrical power (1938). The technique, initially known as electroshock, and now as electroconvulsive treatment (ECT). It was used as a treatment for severe psychiatric disorders (Kalinowsky 1965a). Bini was also the co-author (with Tullio Bazzi, MD) of the most important Italian textbook on psychiatry of the 1970s and 1980s. Bini's academic career was hindered by 'political' problems, as are commonly associated with Italian academic life, and by his reluctance to leave Rome. He was struck by a heart attack while preparing a lecture for his first visit to the United States. An outpatient clinic system specializing in mood disorders, with sites in Rome, Cagliari, and New York, ([www.centrobini.it](http://www.centrobini.it)) is named for him.

<sup>2</sup> Ugo Cerletti, MD (1877-1963). Italian neurologist and psychiatrist, a 'colorful personality with a wide range of interests' (Kalinowsky 1964). He studied with the most important neurologists of his time, in Paris, in Munich with Emil Kraepelin and Alois Alzheimer, and in Heidelberg with the neuropathologist Franz Nissl. After teaching in several Italian cities, he became Chair of the Department of Mental and Nervous Diseases at University of Rome (1935) where, with Dr. Bini, he developed electroconvulsive treatment based on provoking epileptic seizures – various aspects of the method had been studied since 1850 although without application as a treatment for psychiatric disorders (Harms 1955). The invention was not serendipitous but rather the result of a long animal investigation on the effects of convulsions on the brain. The discovery made him world-famous and was honored by many scientific organizations for giving "one of the few Italian contributions to modern psychiatry" (Shorter 1997). He is also credited for introducing white uniforms as a camouflage for alpine troops and invented artillery missiles with delayed-action fuses to create mine fields between enemy positions (Mora 1963, Kalinowsky 1964).

<sup>3</sup> Sante De Sanctis, MD (1862-1935). Italian psychologist and psychiatrist. His main research was on sleep and dreams. He was one of the co-founders of Italian child psychiatry along with Ferruccio Montesano and Maria Montessori. His professorial dissertation on a psychological topic was initially rejected by an academic promotions committee as it was deemed to pertain to philosophy more than to physiology and psychiatry. He published the first Italian textbook on experimental psychology.

I went to De Sanctis<sup>3</sup> who was the predecessor of Cerletti.

LT: Sante de Sanctis?

LBK: Yes. He was a child psychiatrist when I went to Italy and also director of the clinic. Do you know the clinic in Rome?

LT: The Neurology clinic in Rome? Yes, I do. Now it's also a psychiatry clinic. Were you there?

LBK: Yes, I lived in Rome from 1933 to 1939.

LT: Did you go there to practice ECT?

LBK: No, although ECT was developed in Rome in 1936. We left Germany when Hitler came to power in 1933, and we decided to go to Rome.

LT: Did you leave Rome because of the war?

LBK: Mainly because of the strong connection between Italy and Germany, and Hitler.

LT: How did you meet Cerletti and Bini?

LBK: I had been at the University Clinic in Berlin and when I went to Rome and I stayed with people from Germany: one family lived in Pavia and then I moved to Rome to work with De Sanctis.

LT: How and when was ECT started in Rome?

LBK: It started in 1936. The first shock treatment (induced by drugs) was invented by Meduna<sup>4</sup> in Budapest. When I first came to Italy there was no electroshock treatment.

LT: Was it Cerletti who related convulsions to treatment for depression?

LBK: Yes, it was Cerletti. I told him that I had been in Vienna and that I had seen electroshock treatment (without convulsion). Cerletti wanted to attempt to induce convulsions using electricity. He had been working with Viale<sup>5</sup> who experimented with epilepsy and electricity on dogs. Experimental epilepsy was routinely induced using electricity at that time, at first in animals. Initially, one electrode was put in the mouth and the other in the rectum (Viale method). Electrical current was sent through the animals' heart and this often proved fatal. Hundreds of animals died, before Bini proposed using electricity with a bi-temporal application of the electrodes (Impastato 1960).

LT: Am I right in thinking that at that point Cerletti based his experiments on Meduna's experience with chemically-induced convulsions as a rationale for ECT?

LBK: That's right.

LT: How did he conceive of ECT as a treatment for depression?

LBK: It had been known for a long time that mental patients, not only depressives, get better when they have continuous spontaneous convulsions.

LT: Were you there when the first treatment was performed?

LBK: I saw the second. They were afraid that something bad might happen and so experiments were carried out in secret<sup>6</sup>. The first was performed in a room where Bini was present with his chief assistant, Dr. Challiol<sup>7,8</sup>.

LT: What was your first impression of such treatment?

LBK: When I came home, I told my wife that I

had seen something terrible.

Mrs K.: Can I say something to that point?

LT: It would be very nice if you could take part in our conversation.

Mrs K.: Lothar came home one day as white as a sheet and he told me that what the human body can endure is unbelievable. I asked him what had happened. He told me that he had seen the first electric shock treatment and that he never wanted to see it again. That of course was the first time. Then my husband bought the first machine just before we left Rome. We didn't know what to do with it once we got to America; it was old-fashioned.

LT: How did you get the first machine?

Mrs K.: Bini built it.

LBK: Cerletti was envious of Bini's success. He said that Bini had nothing to do with the invention of ECT, that he was only a technician, and maintained that it had been his idea. He had heard about Meduna's ideas and had asked himself why Meduna didn't use electricity instead of drugs. Bini picked up the idea and put it into practice<sup>9</sup>.

LT: So, would it be fair to say that ECT was a shared discovery by Cerletti and Bini?

LBK: Yes.

LT: When you left Rome, did you have your actual ECT device with you?

LBK: No, I didn't.

Mrs K.: No, but you had the blueprints, the design of the machine. My husband took them with him and showed them to people in Paris at the Hôpital St. Anne. Then he took it to Holland and they built a machine. In

<sup>4</sup> Ladislav von Meduna, MD (1896-1964). Studied medicine in Budapest from 1914 to 1921. He was interested in medical research in neurology and neuropathology. He believed that there was an antagonism between schizophrenia and epilepsy and thought that seizures could be used to treat schizophrenia. He tried several convulsant agents and eventually found that cardiazol (metrazol in the United States) was the most suitable in humans. In 1939, he published *Die Konvulsionstherapie der Schizophrenie*, with results from 110 patients and a remission rate of 95% in acute schizophrenic patients, not without major side effects. His results inspired Drs. Cerletti and Bini's work to develop a more stable and more effective form of convulsive therapy. When ECT became safe and reliable, Meduna's metrazol convulsive therapy was abandoned. With the rise to power of the Nazis, Meduna moved to the United States in 1938 and became Professor of Neurology at Loyola University, in Chicago (Kalinowsky, 1965b).

<sup>5</sup> No information available.

<sup>6</sup> Impastato (1960) was not an eye-witness at the first ECT but reported that those present were Drs. Accornero, Bini, Cerletti, Fliescher, Kalinowsky, and Longhi. According to other sources, participants at the first ECT session were Drs. Accornero, Bini, Cerletti and Challiol.

<sup>7</sup> Vittorio Challiol. Italian neurologist and deputy director of the Neuropsychiatric Clinic of the University of Rome.

<sup>8</sup> The first treatment was given to a man whose identity was unknown at the time of the admission. He had been wandering in Rome incapable to speak. There were no reactions after the first two stimuli but with a more intense third the patient obtained a complete seizure and started speaking when woke up. He then received other treatments and was successfully followed-up for two years.

<sup>9</sup> The first ECT machine had two circuits: one for the measurement of the resistance (ohms) of patient's head and the second an alternating current to provoke the convulsion including: a timer (measuring from 100 msec to 1 min), a potentiometer measuring from 50 to 150 volts, and an amperometer.

England the first British machine was built from the same blueprint.

LBK: It never arrived here in the United States, though. Two different machines were built in England. When I went to Holland and from the blueprint, they built my machine.

LT: This was after you had left Rome?

Mrs K.: Not until 1940. We left Rome in April or March 1939 and my husband went to Paris and Holland and then we stayed in England as the war broke out. We stayed the winter in London and then got our American visa and came here on March 1<sup>st</sup>, 1940.

LT: Did you take the machine from England to the United States?

LBK: No, the machine came later.

Mrs K.: After the war, Dr. Almansì<sup>10</sup>, an Italian doctor, brought us the machine. He went into psychoanalysis later. I think he's still alive. He lives in New York and he brought the machine from Italy in 1938.

LT: You said that you came to the United States in 1939 but the ECT machine arrived after the war.

Mrs K.: Yes, but it was never used because it was old-fashioned. Dr. Almansì brought the machine over when he came here, shortly before we arrived, and he did a few treatments together with Dr. Impastato<sup>11</sup>, an American of Italian origin.

LT: When did you start using ECT here?

Mrs K.: In September, 1939<sup>12</sup>.

LT: At that time in the United States, were there any restrictions on this kind of treatment?

LBK: None at all. There were however some objections from various associations.

LT: Did you first start these treatments in a hospital?

LBK: I started in the New York State Psychiatric Institute. Before I started, Almansì had done something together with Impastato in private practice.

Mrs K.: At the same time, my husband gave treatments at a state hospital on Long Island as we lived out there. Then he came to New York and gave treatments on Mondays, Wednesdays and Fridays. On Tuesdays and Thursdays he gave treatments out on Long Island. That was the biggest state hospital with 3,000 patients.

LT: You said earlier that after the first time you witnessed electroshock, you went back to your wife and said that you didn't want to witness it ever again. What happened to change your initial opinion?

Mrs K.: He did see it again. He went back to the clinic and gave it regularly to patients who improved enormously.

LT: So when you were in Rome, you became convinced that the electroshock treatment was really effective?

LBK: There was really no question about that in the first place.

LT: You realized then that electroshock would eventually be effective against depression. How did you arrive at the decision to live in the United States?

Mrs K.: There was a reciprocal agreement between Italian doctors and English doctors. If you were on the Italian register, you could transfer to Great Britain and be registered in the English medical register, and vice-versa. The minute my husband got his degree in Italy, he was enrolled on the British medical register. We really would have liked to stay in England but as he was a medical doctor he wasn't allowed to practice since there were so many German refugee doctors in England at the time. We could have gone to Canada or South Africa or Australia but we didn't wish to do so. So we waited for our visa and came here. It was very easy for me because my mother was American. She had been born here and I had already been here twice before and knew the country. There was no point in staying in England any longer. The war had started and it wasn't very pleasant. We left in March, 1939, only two months before the blitz.

LT: Did you obtain your medical degree in Rome?

LBK: No, in Berlin. In Italy I studied Medical Pathology, Surgical Pathology and two other subjects: Tropical Medicine and Forensic Medicine in Rome,

<sup>10</sup> Renato J. Almansì (1909-2000). Italian-born psychiatrist who moved to the United States in 1939 for racial reasons since he was Jewish. He introduced the ECT along with Dr. Impastato (the first treatment in the United States was given on February 6, 1940). He later received analytical training in New York and limited himself to the practice of psychoanalysis (Endler 1988).

<sup>11</sup> David J. Impastato (1903-1986). A psychiatrist who pioneered the use of electroshock therapy in the United States and used it for the first time in the United States along with Renato Almansì. He was Associate Clinical Professor in psychiatry at New York University College of Medicine (NYT 1986).

<sup>12</sup> This information contrasts with other claims stating that the first ECT in the United States was given on February 6, 1940 by Drs. Almansì and Impastato (see footnote for Almansì). The first public demonstration of ECT was in May 1940 in Cincinnati at the annual meeting of the American Psychiatric Association (Shorter 1997).

and then I took the State Certificate in Perugia because in Italy at that time you had to take the state certificate examination in a different university from where you had studied. Of course, that was back in 1934.

LT: Do you speak Italian?

Mrs K.: Of course. We forgot quite a bit because it's been so long now.

LBK: It's easier to speak English now.

LT: Do you have any idea of how many electroshock treatments you have given—even a rough idea? (a cautious estimate would count more than 200,000 sessions)

LBK: Not even a rough idea. At the beginning I worked three days a week here in a psychiatric institute at the Medical Center and three days a week in the Long Island Hospital so I gave treatments 6 days a week. The number must be enormous.

LT: Was anesthesia given for ECT at that time?

LBK: No.

LT: When was anesthesia first used in electroshock?

Mrs K.: You saw it for the first time in Vienna, do you remember?

LBK: Muscle-relaxation was first performed using curare<sup>13</sup>. It was awful.

Mrs K.: You were in Vienna. Prof. Hans Hoch<sup>14</sup> was still alive. He was director of the Hospital in Vienna. He gave a lot of treatment and you first saw anesthesia during a treatment there.

LBK: Yes, using a barbiturate along with curare.

Mrs K.: Nobody uses curare anymore.

LBK: Many patients died because of curare.

LT: What is your impression concerning the effectiveness of ECT?

LBK: It depends on the illness. In depression it's 100%<sup>15</sup> and in schizophrenia it's lower.

LT: Initially, did you give electroshock to any kind of psychiatric patients?

LBK: I saw two large groups of schizophrenics and the therapy worked in a number of cases but not in a high percentage. In affective disorders, nearly all depressed subjects come out of depression although the effect did not always last; many depressives get better and then relapse. In schizophrenic patients there is a certain indication although long-lasting schizophrenia doesn't respond.

LT: Do you mean that chronic schizophrenic patients do not respond to ECT?

LBK: This type of patient could respond well during the first months of illness but as time passes, the response decreases and long-affected schizophrenics do not respond at all to ECT.

LT: After your first impressions that you didn't want to see any other patient given electroshock, why did you change opinion?

LBK: They didn't use anesthesia in the first treatment: it was terrible. With the use of anesthesia the patient became unconscious immediately and didn't feel anything.

LT: But then you found out that the treatment was very effective.

LBK: Yes and no fatalities occurred.

LT: Is it correct to say that you were the first to introduce ECT in the United States?

LBK: No, there was one other Italian doctor.

Mrs K.: Dr. Almansi had given a few treatments several weeks before my husband's first case.

LBK: Almansi started two months before me in his private practice, and I started in the Columbia Medical Center.

LT: Yes, but ECT in the United States is more associated with your name.

<sup>13</sup> Anesthesia is achieved using barbiturate while curare is used to obtain temporary muscle paralysis. The use of curare as a muscle relaxant was invented by A. E. Bennett (Bennett 1940).

<sup>14</sup> Paul Hans Hoch (1902-1964). Hungarian-born psychiatrist who studied in Germany and after graduation in 1927 started his career in psychiatry with his main field of interest in psychopathology of schizophrenia. He left Germany for political reasons in 1933 and moved to the United States; first in New Jersey and then in New York City at Columbia University. He had a large clinical experience with the use of insulin-shock treatment. In 1955 he was appointed to an administrative important position, Commissioner of Mental Hygiene of the State of New York. When the first antipsychotic drugs became available, he was a leader in their evaluation. He helped in the creation and became president of the Collegium Internationale Neuro-Psychopharmacologicum or CINP (Kalinowsky 1967).

<sup>15</sup> This rate is quite optimistic. The success rate is about 70% of the cases, although most of them are already resistant to other psychopharmacological treatments.



Mrs K.: My husband worked at the Psychiatric Institute and many psychiatrists from all over the country came to the institute to watch.

LT: While Drs. Almansi and Impastato practiced outside of hospitals?

LBK: The other two practiced in their offices with outpatients.

Mrs K.: Yes. You should tell Dr. Tondo about the outpatient treatment that you gave for many years.

LBK: It's still given to outpatients, by the way.

LT: Still today?

Mrs K.: Oh yes. My husband had an office with three little rooms and three beds. Patients were treated in a special room and then put to bed afterwards for an hour and that was that.

LT: Is there any difference between the initial period and more recent years in number of sessions of electroshock?

LBK: It has always been the same. Some patients require a lesser number of treatments and some need more.

LT: When you say less, what do you mean?

LBK: A depressed patient only needs a few treatments to come out of depression but a manic patient needs a lot more treatment and frequently relapses.

LT: Have you ever treated relapses with a sort of prophylactic ECT treatment? For example, giving ECT once a month?

LBK: There was maintenance ECT.

LT: Have you ever performed it?

Mrs K.: All the time.

LBK: Many patients respond to ECT and then relapse. You then have to give treatment again and can do so prophylactically. In this way patients only relapse once. Treatment can be given then once or twice a month or something like that.

LT: Once or twice a month?

LBK: Once a month.

LT: For how long?

LBK: It's a long procedure. Since there's a danger of relapses, there must be certain procedures to make sure the patient doesn't relapse or remain unresponsive to treatment<sup>16</sup>.

LT: What was the reaction of the American press to the ECT?

LBK: There was some criticism stating that doctors should use caution in the use of the treatment if the patient were affected by an illness such as epilepsy.

LT: Have you ever had problems with the press because of your use of ECT?

LBK: No, but I started at the Psychiatric Institute of Columbia, a leading psychiatric institute, so there were no objections. But at the time we were more ignorant.

LT: During the 1960s and the 1970s ECT was criticized by everybody.

Mrs K.: It was always given here. My husband always had patients.

LBK: In all well-equipped hospitals, even in the 1960s and 1970s, it was given.

Mrs K.: Not in California.

LBK: They were very much against it.

LT: Do you have any special memories of patients who received ECT?

Mrs K.: You can't talk about them.

LT: Of course not with their name.

Mrs K.: My husband gave ECT to some very prominent people. Of course you can't mention their names. It's too bad because it would help ECT so much if you could say: "now look at Miss so and so, she has no memory loss and she had ECT".

LBK: I must tell you however since Horowitz<sup>17</sup> the pianist died.

Mrs K.: He had trouble.

LT: But he was obsessive-compulsive, wasn't he?

<sup>16</sup> After the introduction of long-term lithium treatment in the 1960s, he relied more on this new prophylactic treatment than on maintenance ECT (Abrams 1988).

<sup>17</sup> Vladimir Horowitz (1903-1989). Russian-American pianist, one of the greatest of the 20<sup>th</sup> century. He fled Russia in 1925, married Toscanini's daughter in 1933 and had a daughter who died – possibly of suicide – in 1975. His career was astonishing but he had to withdraw from several public performances because of his anxiety disorder. In the 1940s he started seeking psychiatric help and was treated in the 1960s with ECT. His ability of playing declined for several years but he resumed in 1985. In his last years, he returned to Moscow where he gave an outstanding concert. He toured Europe in the following years. His last concert was in Hamburg in 1987. He died of heart attack in New York but he is buried in Toscanini's family tomb at the Cimitero Monumentale in Milan.

LBK: He also didn't accept treatment for several years.

Mrs K.: He had several breakdowns.

LT: I was wondering whether among your patients there were many artists.

Mrs K.: Yes. I just remembered about one of the patients, Rita Hayworth<sup>18</sup> who was married to Ali Khan for some years.

LBK: Maybe. I'm not sure if there is any mental impairment among these people.

LT: What I would really like to know is whether you had many patients who were involved in the arts.

LBK: Many prominent people.

LT: Probably there were some people who died – can you mention anything about this?

LBK: Nobody died of ECT.

LT: Not because of ECT, but subsequently, perhaps?

Mrs K.: I don't remember any prominent people who died but quite a number were treated. The public would be surprised if they knew some of the people who were treated.

LT: Also people in politics?

LBK: There was somebody.

Mrs K.: He almost became vice-president. He admitted himself that he had had shock treatment. He was a senator.

LT: What's his name?

Mrs K.: Eagleton<sup>19</sup>. He admitted having had shock treatment and that's why he didn't become vice-president. People said: "Well, he's not 100%".

LBK: I think the reason was because he had episodes. When somebody becomes President, it would cause an impossible situation if he were to have another episode.

Mrs K.: However, he never had any more trouble. I can't remember any people who died. Yes. I don't know whether you have seen this article in *Convulsive Therapy* (Abrams 1987); it deals with electroshock. Do you know this article?

LT: Yes, I've seen it.

Mrs K.: This is the anniversary number [showing me an issue of *Convulsive Therapy*] and there is a big interview with my husband.

LT: I see.

Mrs K.: The whole issue was dedicated to him in April when electroshock treatment celebrated its 50th anniversary. I'm still trying to think of the name of that anesthetic.

LT: Succinylcholine<sup>20</sup>.

Mrs K.: That's it, I couldn't think of the name.

LT: That's a synthetic curare-surrogate.

Mrs K.: Yes.

LT: Have you ever used unilateral ECT?

LBK: No, I never did. We started with it but saw only slight improvements, and it certainly was not effective<sup>21</sup>.

LT: When did you give up your practice?

LBK: Last year [at age 90].

LT: Up until last year you gave only bilateral ECT?

LBK: Yes, always.

LT: What kind of machine were you using lately?

LBK: Mecta, I think. I think that was a machine used by a doctor who was in the Psychiatric Institute.

LT: Is there any particular difference in the way the treatment was performed at the beginning of the 1940s and last year?

LBK: Now, we use the relaxation method and

<sup>18</sup> Rita Hayworth (1918-1987). Born Margarita Carmen Cansino, was one of the most famous Hollywood actresses from the 1940s to the 1970s. She had major troubles with alcoholism and probably mood disorders. She died of dementia.

<sup>19</sup> Thomas Eagleton (1929-2007). United States senator from Missouri, nominated as possible Democrat Vice-President in 1972 for presidential candidate George McGovern. He suffered from manic-depressive illness, was hospitalized three times between 1960 and 1966, and received ECT. Once his psychiatric condition became news, McGovern asked him to withdraw his candidacy as Vice-President. A *New York Times* poll indicated that 77% of people interviewed believed that Eagleton's medical record would not affect their vote.

<sup>20</sup> The use of succinylcholine as a muscle relaxant instead of curare was introduced by Dr. Holmberg in 1952.

<sup>21</sup> This claim is contradicted by a vast literature finding that unilateral ECT is somewhat less effective than bilateral but with the advantage of a reduced rate of side-effects.

anesthesia. Anesthesia is not given to avoid pain but because of possible fractures.

LT: I'm trying to understand if the treatment has in any way evolved since the beginning.

LBK: I think that there is muscle relaxation.

LT: Has the number of sessions always been the same?

LBK: There are several opinions about this. For example, in a patient affected by simple depression, you know he doesn't need more than a certain number of treatments. But in the case of a schizophrenic, you realize unconditionally that he needs more treatment and will have many relapses.

LT: And you have never changed your style of treatment?

LBK: New muscle relaxants were introduced; we started with curare and then succinylcholine.

LT: Up until last year you still gave maintenance treatments?

LBK: It was a very difficult situation. When someone has relapses all the time, then you give maintenance treatment. However, maintenance treatment is very difficult because some patients need it all the time and become forgetful, not permanently, but during treatment. The patient usually relapses once a month and every month you have to perform 2 or 3 treatments to get him out of the acute psychotic state and so he becomes forgetful. There is no time for the memory to recover; this is not normal. One day I may have a patient who is forgetful after a certain number of treatments, then after another week he may have no memory at all.

LT: Were you born in Berlin?

LBK: Yes.

Mrs K.: It's all in here [showing the published interview by Dr. R. Abrams].

LT: Do you go back often?

LBK: I go to Berlin every year.

Mrs K.: My husband loves it; he's such a Berliner.

LT: What then do you think about the fall of the Berlin Wall?

Mrs K.: We were living in Berlin when they put up the wall<sup>22</sup>.

LT: What can you remember about it?

Mrs K.: It was terrible. We had asked to lunch somebody who lived in East Berlin and of course she couldn't come over, so my husband went over to the other side. He was American, so he was allowed to go over. Germans couldn't cross over.

LBK: Yes they could.

Mrs K.: Oh they could? I thought it was only foreigners.

LT: Germans from the West could go to East Berlin.

Mrs K.: Yes, but it was terrible.

LT: How did you react to the fall of the Wall?

Mrs K.: We thought it was marvelous but I'm afraid people will be very disappointed, they won't have any apartments and they won't have any jobs; it will be very difficult. I think now they've opened the borders, people will start to return to the other side.

LBK: Now it's much less expensive in the East.

Mrs K.: They now have the feeling of freedom that they can come and go as they like.

LBK: You need money to live in the West.

LT: Many scientists come to the United States because they are not able to find a job.

Mrs K.: We don't know about this personally because my husband was always able to work. We have heard about this from other people and it must have been very hard.

LBK: We went to Rome and then we came to the States where we have been for many years. In Rome however there was a particular situation between Hitler and Mussolini.

Mrs K.: Himmler came to Rome once and they put most of the German refugees in prison. We found out about this and we went to Switzerland. Also we were not Jewish and our passport said so. But my husband's mother was Jewish and that's why we left Germany. It was terrible when all refugees were put into prison.

LT: You have been extremely successful here in the States but don't you feel a little disquieting being forced to leave your country?

Mrs K.: Oh yes. For my husband it was very

<sup>22</sup> Construction of the Berlin Wall started on August 13, 1961



painful. He hated to leave Germany; he didn't want to leave Europe. That's why we went to England; we couldn't have gone straight to America.

LBK: We liked Rome very much.

LT: Where did you stay in Rome?

LBK: You know Rome?

LT: Yes. I'm from Rome.

Mrs K.: Oh you are? We lived at the corner of Porta Pinciana and Via Veneto.

LT: That is a beautiful location.

Mrs K.: You know the Cafe Golden Gate? Now it's Harry's Bar; it used to be Golden Gate. We lived there and the entrance to our house was on Porta Pinciana.

LT: And your office was at the University?

Mrs K.: No, his office was at home. He didn't give shock treatments there; that was later.

LT: What was your job in Rome?

LBK: I practiced, I took the State certificate, I studied for one year and had to take my degree in Rome; and then after I sat for the State certificate.

LT: Did you work in Rome as a general practitioner?

LBK: No, as a psychiatrist.

LT: Did you get a specialization in psychiatry in Berlin?

Mrs K.: You didn't have to pass an exam in Germany, you were more a neurologist than a psychiatrist when you first went to Rome.

LT: At that time there was not much difference

between neurology and psychiatry. But you were already specialized in neurology?

LBK: No, that's not correct. In Germany, all so-called Nervenkliniken put neurology and psychiatry together. Isn't there an anti-psychiatric movement in Italy?

LT: You're right. It used to be an antipsychiatric movement but in the last few years this movement has changed.

LBK: That was Basaglia<sup>23</sup>?

LT: Basaglia, yes. The movement also gained something positive as psychiatric patients are now considered as every other patient with less stigma against them. Whom do you remember being in Rome at that time, besides Cerletti and Bini?

LBK: In your country ECT has a bad reputation though. It is due to Law 180, isn't it?

LT: Law 180 does not expressly mention ECT. The problem is that some people interpreted the law as saying that ECT is bad. I think however that it is the same in the rest of Europe. As far as I know, also in Germany and in France there is a lot of criticism of ECT, whereas in Scandinavia and England it is much more accepted.

Mrs K.: Giacomo Fumarola<sup>24</sup> was a neurologist who was also at the clinic.

LBK: There was also Sante de Sanctis.

Mrs K.: He was there before Cerletti; there was also Mario Gozzano<sup>25</sup> who followed Cerletti as his successor. We also met the Fazio<sup>26</sup>, they were very good friends of ours. Mrs Fazio and I were always very friendly.

LT: Do you get to Rome very often?

LBK: Almost every year, yes.

Mrs K.: It's not what it used to be; it was much

<sup>23</sup> Franco Basaglia (1924-1980). Italian psychiatrist who became chief of the Psychiatric Hospital in Gorizia from where he started a movement aimed at the closure of the psychiatric closed institutions in Italy. He later became director of the Psychiatric Hospital in Trieste and succeeded in closing it in 1977. He was the strongest supporter of the psychiatric reform determined to suppress psychiatric institutions, which passed despite strong objections in the Italian Parliament in 1978. The law was supposed to be temporary but it has never been modified. He wrote some books such as *L'Istituzione Negata* (1968) and *La Maggioranza Deviante* (1971).

<sup>24</sup> Giacomo Fumarola. Italian neurologist. He was acting director of the Clinic for Mental and Nervous Diseases in Rome before Cerletti.

<sup>25</sup> Mario Gozzano (1898-1986). Italian neurologist and psychiatrist. He received his medical degree in 1922 in Turin and moved to Rome in 1924 to work with the famous neurologist Giovanni Mingazzini. He had many scientific contacts abroad working with first-rank neurologists including Otto Marburg, Wolfgang Pauli, and Oskar Vogt, and pursued research on brain electrophysiology. He had several academic positions in Naples, Cagliari, Pisa, and Bologna before returning to Rome to become Chair of the University Neuropsychiatric Clinic. His main research was on neuropsychology and central nervous system degeneration. He wrote an early psychiatric textbook *Compendio di Psichiatria* (1947) and co-directed the first Italian psychiatric journal *Rivista di Psichiatria* with Prof. Giancarlo Reda. He was the author of several papers and books on topics concerning brain functions.

<sup>26</sup> Cornelio (1910-1997) and his wife Lore.

nicer when we were there. Our children went to school in Rome. One of our two daughters went to the Ginnasio 'Torquato Tasso' and was in class with the youngest son of Mussolini. Our girls spoke like little Roman girls but we always had a marked accent. We enjoyed every minute of it.

LT: What do you think of New York?

LBK: I like it.

LT: Have you ever been homesick?

LBK: Not anymore because its been such a long time.

LT: But at the beginning?

LBK: In the beginning I was in Rome and I liked Rome very much. It was different living in Rome, it was the time of Hitler and Mussolini. When Hitler came to Italy and the Gestapo established office, we left.

LT: Have you received any awards?

Mrs K.: The President of the German Psychiatric Society came from Bonn to Munich to give him an award; it was a Griesinger medal.

LT: Griesinger<sup>27</sup>, the psychiatrist.

Mrs K.: He received that medal and he also got one for electroshock.

LT: This was at the time when he was sick in Germany?

Mrs K.: Yes. It was very nice, the president came from Bonn especially to give him the medal. He's had so many awards from different societies.

LT: What has been the most important recognition of your work?

LBK: I never thought about it because I was very lucky in the field and got many awards.

LT: No special memory of something very important?

LBK: No, nothing particular.

Mrs K.: Mrs. Bini came here once in the 1960s. Bini himself died in 1964 while working on a lecture he was invited to give in New York.

LBK: Do you know Accornero<sup>28</sup>?

LT: No, I don't know him.

Mrs K.: Accornero has a son who is also in a casa della salute, Castello della Quiete.

LT: It is now a place with mixed reputation.

Mrs K.: Oh, I'm sorry to hear that.

LBK: Have you ever been to Berlin?

LT: Never but I would like to go soon.

Mrs K.: What do you think of New York? Is it your first time here?

LT: No, I know New York well.

LBK: Do you want to stay in Italy for the rest of your life?

LT: I really don't know. I think that the way things are going now, I would not move from Italy.

Mrs K.: It's very difficult to leave your home town.

<sup>27</sup> Wilhelm Griesinger (1817-1868). German neurologist and psychiatrist who studied at the University of Zürich and with François Magendie in Paris. He practiced in different locations: Winnethal, Stuttgart, Tübingen, and Kiel. In the 1850s he headed the Medical School in Cairo (Egypt), becoming an expert in tropical diseases. He then became professor of clinical medicine at the University of Tübingen and participated in the planning of the Burghölzli Mental Hospital in Zürich. He became director of the University Polyclinic in Berlin in 1865. He is famous for his ideas on manic-depressive disorders and integration of the psychiatric patients into society.

<sup>28</sup> Ferdinando Accornero (1910-1985). An Italian psychiatrist in Rome, wrote an eye-witness account of the first ECT treatment (Accornero 1970). His account is an absorbing, gripping, personal, and exciting record of the events which ushered in that treatment (Endler 1988).

**Lothar B. Kalinowsky, M.D. (1899-1992)**  
*Brief biography*<sup>29</sup>

Lothar Kalinowsky was born in Berlin on December 28, 1899. His father was a lawyer and he had planned to follow his father's career but eventually took a sudden decision to attend medical school to follow a close friend. His mother was Jewish and this circumstance led him to flee Berlin later on in his life. He graduated from Humboldt Gymnasium in Berlin 1917. He completed medical education at the Universities in Heidelberg, Munich, and Berlin where he graduated in 1922. His contact with psychiatry started with a lecture on alcoholism given by Emil Kraepelin (1856-1926) during an academic semester spent in Vienna. He was so disappointed that thought he would never study psychiatry. During the major German economic depression of the early 1920s, his path changed when he was accepted into a psychiatric internship in Hamburg that gave him room and board and a modest salary. In fact, psychiatry was the best available residency program given the competition among all World War I veterans. Initially he was in charge of patients with progressive paresis who were given malaria-fever therapy. Later, he was in charge of a small unit with schizophrenia patients but in the absence of effective treatments, his main task was to convince patients' parents to take home the less severe cases. Later he went to Vienna to work with Julius Wagner von Jauregg (1857-1940), the inventor of malaria therapy, for which he received a Nobel prize in 1927. Nevertheless, Kalinowsky soon lost interest in malaria treatment for general paresis. Instead, through the influence of his Viennese mentor, Paul Schilder (1886-1940), he developed an interest in psychotic disorders. He then moved to Berlin and studied clinical psychiatry with Karl Bonhoeffer (1868-1948). He maintained a keen interest in pathology and worked with neuropathologist Hans Gerhardt Creutzfeldt (1885-1964) and Alfons Jakob (1884-1931) – discoverers of the neurological degenerative disease spongiform encephalopathy (Creutzfeldt-Jakob disease or CJD) in 1920. However, with Bonhoeffer he learned a great deal about melancholia and about its only available treatment with opium. In 1925 married his research assistant Hilda. In 1933, he worked briefly with Manfred Sakel (1900-1957), inventor of insulin coma for melancholic patients. In the same year he left Germany after losing his academic position because his mother was Jewish and Hitler had just gained power. Although he could work in private practice, he preferred to leave. He moved to Rome, where he obtained the state license

and was able to start a clinical practice in psychiatry. He started working with Ugo Cerletti (see footnote 3) after the death of Sante De Sanctis in 1935 (see footnote 4). In 1936, he traveled to Vienna with Drs. Bini (see footnote 2) and Accornero (see footnote 27) to learn insulin coma and Metrazol (pentylenetetrazol) convulsive therapy. In Rome, Kalinowsky participated actively in the development of ECT with Cerletti and Bini. He remained in Rome until 1939 when he and his associated discovered that, during one of Hitler's visits, all German refugees could have been imprisoned. On learning of this threat, Kalinowsky left with his wife and two daughters for Switzerland. They applied for an American visa but instead they went to London. On his way, he stopped in Paris and gave the design of the ECT machine to Professor Henri Claude (1869-1945) and to another colleague in Amsterdam. After he moved to London, one ECT machine was built there (by the Solus Electrical Company) and another in Bristol. In London, the Maudsley Institute of Psychiatry was not interested in shock treatments, but he was able to use it at the Netherne Hospital at Coulsdon in Surrey, south of London. William Mayer-Gross (1889-1961) instead moved from the Maudsley to the North of England, where he studied and used both insulin and electric shocks clinically. Although his Italian medical license allowed Kalinowsky to practice in England, it was not valid for London, and this circumstance convinced him to move to the United States. In New York he started practicing psychiatry at the New York State Psychiatric Institute and was allowed to use ECT since the treatment had already been used by other psychiatrists, including Paul Hoch (see footnote 12). In the first 10 years of Kalinowsky's practice, there was little opposition to the treatment, although some criticism rose from the Group for the Advancement of Psychiatry (GAP). His first experience with ECT met with little success among chronically mentally ill patients, but with better results with intractable epilepsy for which ECT was given to minimize prodromal symptoms. The use of ECT in depression developed somewhat later and was so effective that its use in schizophrenia patients was drastically reduced. Moreover, by the early 1960s, use of the new antidepressants started to limit use of ECT in depressed patients, for whom it became largely limited to those found to be inadequately responsive to pharmacological treatments, particularly given in case of melancholic symptoms, including loss of appetite, weight and sleep, which usually were hypothetically associated with hypothalamic dysfunctions. In the 60s he established the *Herman Goldman International Lectureships in Psychiatry* in order to bring promising

<sup>29</sup> Biographic notes adapted from Abrams R. Interview with Lothar Kalinowsky, M.D., October 8, 1987. *Convulsive Therapy* 1988, 4, 24-39 and from Freedman AM. Lothar Kalinowsky, M.D. 1899-1992. *Comprehensive Psychiatry* 1992, 33, 357-358. The interview by Dr. Abrams is more revealing than the present one from a scientific point of view. In the three years passed between the two interviews, Dr. Kalinowsky's health had declined and his motivation to answer questions was probably low. In some instances, he did not seem to recall past events accurately. On the other hand, this interview at age 91 communicates more of his personality and provides accounts of his everyday life and past memories.

young psychiatrists to the United States.

In Alfred Freedman's words, Dr. Kalinowsky was "a keen clinician, an erudite scholar with a strong sense of history, and a superb teacher. He had a continuing interest in neurology and neuropathology". On a personal note, "he seemed to have a more ebullient personality abroad", and although he felt more committed professionally to the United States, "he felt most comfortable in Europe, where he became a fast driver and a casino-goer".

In his interview by Richard Abrams in 1989, Dr. Kalinowsky claimed that his major contribution to psychiatry was his neurobiological approach, which was typical of German psychiatry. The last sentence of the interview is particularly notable:

*Abrams:* In an interview with *Psychiatric News* in 1978, you closed with a sentence from the first edition of your book: "At present we can only say that we are treating empirically disorders whose etiology is unknown, with methods whose action is also shrouded in mystery". Do you still subscribe to that view?

*Kalinowsky:* Yes, I do.

Dr. Kalinowsky died of heart failure in New York City in 1992.

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Dr. Kalinowsky published papers on somatic treatments and updated the state of the art of ECT over 44 years (1944-1988).

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<sup>30</sup> I included the complete Kalinowsky's bibliography to show that ECT went through a continuous process of investigation and research and has not been merely a procedure empirically and clinically used but poorly studied. Other references by Dr. Kalinowsky are cited in text and included in the general list of references at the end of this paper.



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## Notes on Electroconvulsive Therapy

### *Steps toward ECT*

1905. Alois Alzheimer (1864-1915) found neuropathological signs associated with dementia in general paresis, encouraging Cerletti to suspect an infectious etiology that was confirmed in 1913.

1917. Julius Wagner von Jauregg used malaria-induced therapy for the treatment of tertiary syphilis (general paralysis) and in 1927 was awarded a Nobel Prize for this work (von Jauregg 1918, 1919).

1920. Jacob Klaesi (1883-1980) introduced barbiturates as narcotherapy in mental illness at Bùrgholzli Asylum in Zürich (Klaesi 1922).

1933. Manfred Sakel used narcotherapy and insulin (discovered in Toronto in 1922) in insulin-shock therapy for treatment of patients with schizophrenia and other psychotic disorders, although the aim of the treatment was not the induction of seizures (Sakel 1937).

1934. Von Meduna in Budapest used convulsions to treat psychosis (based on an assumption of antagonism between epilepsy and schizophrenia) first using camphor oil (as suggested in the 16th century by Paracelsus [born Philippus Aureolus Theophrastus Bombastus von Hohenheim, 1493-1541] and used to treat mania and depression in the 18th century) and then



pentylentetrazol (Metrazol), a cardio-respiratory stimulant (von Meduna 1937).

1935-1936. Cerletti and his team (Ferdinando Accornero, Lucio Bini, Clemente Catalano-Nobili, Giannetto Cerquetelli, Mario Felici e Lamberto Longhi) studied effects of electrically-induced seizures on brain structure in animals.

1937. First report by Bini on safe seizures in dogs at the first international symposium on *New Therapies for Schizophrenia in Switzerland*. The report passed unnoticed because of other more established ways of inducing convulsions with pentylentetrazol (Cardiazol, Metrazol; Bini 1938; Faedda et al. 2000).

1938. April. First ECT given to a mute schizophrenia patient who was wandering on the streets. "Transtemporal electrodes were applied and secured with an elastic band. Seventy volts were applied for 200 milliseconds. The patient stiffened and lost consciousness for a brief time. A later application of 110 V for 500 milliseconds produced a typical epileptic convulsion. When the patient awakened, Cerletti inquired "What has been happening to you?" The patient answered in clear Italian, "I don't know; perhaps I have been asleep" (Geddes 2002).

1939. At the *3rd International Neurological Congress* in Copenhagen, Lucio Bini reported on the first use of treatment with electrically-induced convulsions in psychotic patients. In two years, "the discovery of ECT amounted to a therapeutic revolution, helping millions of mentally ill patients and adding a new therapeutic tool to further the scientific understanding of several disorders" (Faedda et al. 2000).

1940. First ECT in the United States was given at Columbus Hospital in new York City, on February 6th, 1940 by Dr. David Impastato (Endler 1988, Lebensohn 1999) to a 29-year-old woman of Italian descent suffering from severe schizophrenia. The machine used was made in Italy and brought to the United States in 1939 by Dr. Renato Almansi (Lebensohn 1999). However, there is a claim about the first treatment given at the Parkway Sanitarium in Chicago by Victor E. Gonda on January 20th, 1940 with a machine built in Genoa (Endler 1988).

In 1940. A.E. Bennett discovered the use of curare (extracted from the South American plant *Chondodendron tomentosum*) as a paralytic muscle relaxant to avoid fractures during seizures. In addition, to spare the patient from the unpleasant sensation of the muscle paralysis, anesthesia with a fast-acting barbiturate was added (Bennett 1940).

1957. Frost (1957) introduced unilateral ECT, placing the electrodes on the nondominant temporal region in order to avoid the speech areas.

1952. Succinylcholine replaced curare as suggested by Dr. Holmberg.

1973. Abrams and Taylor (1973) introduced bifrontal ECT by moving the electrodes forward over the forehead.

#### *Controversy about the invention*

Ugo Cerletti "was a very brilliant person who was full of ideas" (Abrams 1988). He made also inventions unrelated to psychiatry. Dr. Cerletti was working with two assistants, Drs. Lucio Bini and Ferdinando Accornero and had studied experimental epilepsy from a neurophysiologic and neuropathologic points of view. Dr. Kalinowsky, along with Drs. Bini and Accornero, in Vienna, saw the effects of insulin and metrazol treatment. When they returned to Rome, they told Cerletti about those treatments. His reaction was, "Why does he do it that way; why doesn't use electricity?" Dr. Bini easily grasped the challenge. After initial experiments with animals (half of them died), Cerletti grew more and more doubtful but Bini attributed all fatalities to the electrode placement – one in the mouth and the other in the rectum, so passing the electricity through the heart – and started placing the electrodes bitemporally. However, in 1950, Cerletti published a paper in English claiming that Bini was only a technician and was upset when the method was called 'Cerletti-Bini' or even 'Bini-Cerletti'. Following this disagreement, Cerletti did his best to prevent Bini's academic promotion so that the latter never became a professor but chaired a neurological service at one of the general hospitals in Rome. It can be said that electroconvulsive treatment would not have been invented without the contribution of both researcher-clinicians.

#### *ECT in the United States*

Cerletti's publications on ECT (Cerletti 1938, 1950) stirred major interest in the 1940s and 1950s internationally, including in the United States. In May 1940, Cincinnati psychiatrist Douglas Goldman, M.D., demonstrated ECT at the annual meeting of the American Psychiatric Association (Shorter 1997). The treatment spread quickly throughout the United States, and several books were published on the topic (Shorter 1997). The United States military used it widely for severe depression. In the 1950s, a patient hospitalized for depression stood an excellent chance of receiving ECT, and an even better chance of benefiting from it (Shorter 1997). In the following years, ECT almost disappeared from psychiatry and training was very limited from the 1960s to the 1980s (Shorter 1997, Lebensohn 1999), a phenomenon not entirely explained but the introduction of pharmacological treatments or by the widespread use of psychoanalysis and possibly involving a more complex discussion about the mind-body conflict of the time. Other reasons that would justify the opposition to ECT need to be cited and in particular the overuse of this treatment for diagnoses for which was ineffective and with procedures that were not standardized. In addition to the lack of muscle relaxants and anesthesia, in the first few years patients were lined up and treated all together in a very insensitive and crude way that was responsible for the horror stories emerged from patients after the treatment (Lebensohn 1999). It is likely that the general opposition to psychiatry by the flower-children generation was

epitomized in the Ken Kesey's book *One Flew Over the Cuckoo's Nest* in 1962 and helped the anti-ECT propaganda sponsored by the Scientology sect. The movie from the Ken Kesey's book in 1976 hit badly the reputation of ECT and associated this with lobotomy and mind control.

A wave of attacks against the therapy in the 1970s resulted in a 1974 law against ECT in California in a peculiar move of eliminating a useful and safe medical procedure which resulted in a punishment for patients with grave illnesses. California legislation acted as a cold shower for the American Psychiatric Association. In 1975, the APA gathered a working group on ECT that reported in 1978 (APA, 1978) endorsing some appropriate measures limiting its use and introducing the requirement of informed consent from patients. After long years of silence, the discipline's professional association (APA) uttered a rather feeble imprimatur. Restoration of ECT started with a consensus conference on the subject, organized by the Office of Medical Applications of Research of the National Institutes of Health and the National Institute of Mental Health, and strongly supported by Max Fink, M.D., an advocate of ECT. A final summary of the conference published in *JAMA* (1985), noted, "Not a single controlled study has shown another form of treatment to be superior to ECT in the short-term management of severe depressions" (Shorter 1997).

Despite all these efforts and relevant publications, it seemed that the press made a major effort to distance its readership from the treatment. Moreover, there are fewer and fewer trainers who feel comfortable with it and ECT is rarely included in trials, symposia or sponsored meetings. Edward Shorter comments, "The logic seems clear to me, ECT would show superior efficacy to whatever they have to offer, and they prefer to keep it out of scientific discussion. I once, rather puckishly, asked a drug company to support a conference on ECT and received a scrawled handwritten reply from the head of psychopharmacology saying basically, 'Are you kidding?'. Requests from senior psychiatrists to include papers on ECT at industry-financed meetings are routinely refused." The reading of Shorter's (1997) and Lebensohn's papers is highly recommended for details of the use of ECT in the United States. Today, an estimated number of 100,000 patients are treated each year with ECT. Considering a cautious prevalence of 5% of severe major depressive disorder (the most likely indication for the therapy) in population at risk (approximately 250 million), only the 0.008 of patients receive it, indicating a rare treatment for the most severe cases.

#### *The procedure*

A worldwide consensus agrees that ECT should be reserved primarily for severe depression, particularly with suicidal preoccupations, and usually resistant to other treatments. The patient may refuse it but the psychiatrist should consider it in severe cases. Before treatment, the patient signs an informed consent document (signed by an advocate or family member if not competent). The most common number of treatments is between 6 and 12, usually at three times a

week. The patient has to fast (food and drink) for about 10 hours before each session to minimize risk of aspiration during the procedure; bladder and bowels should be emptied, and dentures removed. Sedatives may be used, but anticonvulsants are usually gradually suspended in the weeks before treatment. Atropine may be given to dry secretions in the mouth and airway. An electrolyte jelly (to increase conductivity and prevent burns) is applied to the two areas where electrodes are placed. Blood pressure is recorded. A 10-15 minute anesthesia is obtained with a short-acting barbiturate, and soon after succinylcholine is injected to relax muscles and prevent possible fractures or joint dislocations (they were very common in the pre-curare era), although jaw fractures are still possible in rare cases by direct electric stimulation of the masseter. Since succinylcholine causes paralysis of respiratory muscles, patients need to be artificially respiration with oxygen until the effect of the paralytic drug ends and spontaneous respiration resumes. Anesthesia is given in part to avoid the terrifying experience of being unable to breathe. Muscle relaxants and anesthesia often are not given in underdeveloped countries to reduce costs of the treatment. A rubber gag is inserted in the patient's mouth to possibly prevent broken teeth and tongue-biting. Electrodes are positioned on the head and kept in place by an elastic headband. The stimulus involves 70 to 500 volts of electricity for a fraction of second to 8 seconds, to induce an epileptic convulsion lasting 30-60 seconds. Modern equipment would record the amount of electricity as well as EEG. Sometimes, an elastic tourniquet is applied before succinylcholine is given, so that some motor indication of seizure can be monitored. The patient is then resuscitated and allowed to recover with close supervision over 30-60 minutes. Possible immediate adverse effects are, headache, dizziness, nausea, confusion, muscle aches and soreness, physical weakness, euphoria, agitation, arrhythmia, brief or prolonged apnea with consequent cyanosis. Disorientation and memory loss are the most important adverse effects and may last longer (even weeks) and are those which receive most negative attention. The unilateral ECT has decreased cognitive side effects, probably at the expenses of lesser effectiveness. Death is possible but according to the last statistical data, it occurs at a rate of 1/10,000 sessions (Leonard 2006, Tondo 2008).

#### *Criticism*

ECT is by far the most controversial treatment in psychiatry. It is not clear why this is the case. Certainly not the use of convulsion as a treatment, since pharmacological convulsive procedure would not have stirred so much criticism. Even the use of electricity is not unknown in medicine since there are several electrical procedures widely used and accepted like the defibrillator. It is likely that opponents see ECT as an instrument of social control, in the past administered by means of coercion or outright force and seldom with genuine informed consent (Leonard 2006). It is also claimed that psychiatrists performing it earn far more than with standard psychiatric treatments, but at the cost of much more expensive liability insurance. Opponents of ECT claim that it is not effective, a wrong statement, and that cognitive adverse effects are more

severe than are typically reported, and this is probably right (Tondo 2008).

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