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ORIGINAL PAPER

Brigitta Baran · István Bitter · Gabor S. Ungvari · Zoltán Nagy · Gábor Gazdag

The beginnings of modern psychiatric treatment in Europe

Lessons from an early account of convulsive therapy

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Abstract Convulsive therapy (COT) is a major European contribution to the psychiatric armamentarium and biological psychiatry. COT was introduced in psychiatry by László Meduna, a Hungarian neuropsychiatrist. All subsequent publications about the first patient treated with COT, Zoltán L (ZL), were based on Meduna's papers and autobiography. After 4 years of catatonic stupor, ZL received camphor-induced COT which resulted in full remission and discharge from the institution. The aim of this paper is to reconstruct ZL's case history from the original case notes—partly written by Meduna himself—which were recovered from the archives of the National Institute of Psychiatry and Neurology. The case notes show that ZL repeatedly received COT between 1934 and 1937, first with camphor and then with cardiazol induction. After the first course of COT the catatonic stupor was resolved and the psychotic symptoms subsided. However, the remission lasted for only a few months and was followed by a relapse. Despite repeated courses of COT, ZL never became symptom free again, was never discharged and died in the Institute in 1945. This historical case is discussed from both the diagnostic and therapeutic points of view, and an attempt is made to explain the possible reasons for the discrepancies found between Meduna's account and ZL's case notes.

Key words convulsive treatment · camphor · cardiazol · László Meduna · history of psychiatry

B. Baran, MD · Prof. I. Bitter, MD, PhD, DSc
Dept. of Psychiatry and Psychotherapy
Faculty of Medicine
Semmelweis University
Budapest, Hungary

Prof. G.S. Ungvari, MD, PhD
Dept. of Psychiatry
Chinese University of Hong Kong, Shatin Hospital
Shatin, N.T.
Hong Kong SAR, China

Prof. Z. Nagy, MD, PhD, DSc
National Institute of Psychiatry and Neurology
Budapest, Hungary

G. Gazdag, MD, PhD (✉)
Consultation-Liaison Psychiatric Service
Szt. László Hospital
Gyáli út 5–7
1097 Budapest, Hungary
E-Mail: gazdag@lamb.hu

EAPCN 816

Introduction

Following the introduction of malaria-induced fever for the treatment of neurosyphilis in 1917 [24] the next two decades saw significant efforts to advance psychiatric therapy by European psychiatrists: prolonged sleep therapy [14] insulin shock [21], camphor and later cardiazol-induced convulsive therapy (COT) [18], frontal lobotomy [3] and a modified version of COT, electroconvulsive therapy (ECT) [20]. The history of most of these treatments ran the same course: after an initial period of interest, great expectations and exaggerated claims, disappointment set in followed by abandonment of the method. COT—the beginnings of which are the focus of this paper—still has a well-defined place in the therapeutic armamentarium of psychiatry, albeit in a greatly improved form as ECT [8].

After animal experiments conducted in 1933 [17], COT was first tried on patients by László J. Meduna (1896–1964), a Hungarian neuropsychiatrist, in early 1934 at the "Lipótmező" Royal National Hungarian Institute of Psychiatry and Neurology in Budapest, Hungary.

Meduna received his medical degree in 1921 in Budapest. He started his scientific career at the Interacademic Institute for Brain Research, directed by Károly Schaffer [1, 15]. Meduna studied the structure of the pineal gland first, but later his interest turned to glia cells and epilepsy. While epileptic brains showed an intensive glia cell reaction, glia cells

was found to have disappeared in brains of schizophrenia patients [12] suggesting antagonism between these two conditions, also supported by clinical data [19]. These clinical and neuropathological findings led Meduna to conclude that schizophrenia can be treated with induction of epileptic seizures. To this end, Meduna found camphor as the most appropriate substance for the induction of epileptic seizures and conducted a series of animal studies with this compound [17].

It is still controversial who and when received first COT and, more importantly, what was its outcome leading to the decision to proceed further with this intervention. Meduna's retrospective appraisal of COT [16] and his autobiography [15], on which other accounts [2, 6, 8–10, 13, 22] were based, identified the first patient treated with as Zoltán L. who was injected with camphor-in-oil in the morning of January 23, 1934. According to Meduna's recollection, "*This patient had suffered from catatonic stupor for about four years. He never moved, never ate, never took care of his bodily needs and had to be tube-fed..[…]...He received five camphor injections and two days after the fifth injection, on the morning of February 10, for the first time in four years, he got out of his bed, began to talk, requested breakfast…was interested in everything around him..*" Meduna followed Zoltán's illness until he left Hungary in 1939 for the United States. In Meduna's account, Zoltán's illness was in remission until 1939 as a result of COT [15].

This oft-repeated account is incorrect in more ways than one. A recent search in the Archives of the National Institute of Psychiatry and Neurology, Budapest unearthed the case notes of Meduna's first cohort of patients who received COT. Scrutiny of these records reveals that his memory betrayed Meduna when he wrote his overview [16] and 'Autobiography' [15] some 30 years after the first COT.

From a broad historical perspective it is a relatively minor inaccuracy that Zoltán was not the first patient who received COT. There were two catatonic patients (József W. and Elemér R.) whose treatment commenced on January 2, 1934 as described in his 1937 book on COT [18] by Meduna himself. On page 102, concluding the case of Zoltán L., Meduna noted that in his first publication, he had described Zoltán as the first case of his series who received COT for therapeutic purposes.

More important than the exact identification of the first patient is the course of Zoltán's illness and his response to COT induced first by camphor and later cardiazol (pentylenetetrazol; Metrazol). In an attempt to re-evaluate the success of Zoltán L.'s COT, his medical history is reconstructed here on the basis of his original case notes also from the Archives of the National Institute of Psychiatry and Neurology, Budapest. It was recovered among the records of patients who had died or left the institute between 1933 and 1945.

A description of Zoltán's illness

The circumstances of his admission to the Institute

The 33-year-old, married electrician Zoltán L. was admitted to the Royal National Hungarian Institute of Psychiatry and Neurology of Lipótmező, Budapest on October 18, 1930. This was Zoltán's first psychiatric admission.

The reason for the admission was that lately he had been apathetic, disturbed and on the day of admission he fought with his wife because "*I did not want her to leave the room.*" The medical certificate committing Zoltán to the institution stated: "*According to the account given by his family, this afternoon he scuffled with his wife in a way that made them believe he wanted to strangle her. She was freed from his hands by family members. The patient does not recall this scuffle.*" The admission diagnosis on the medical certificate was "*Schizophrenia*".

Concerning Zoltán's family history of psychiatric illness, one of his brothers and his paternal uncle both had psychoses the exact nature of which was not identified. His medical history included a childhood infectious disease. Zoltán contracted syphilis in 1921 that was said to have been "cured" with eight sessions of treatment, possibly with malaria-induced fever.

His father, Móric L., a retired senior clerk, "a tall, quiet man", had worked as a clerk for eight years at the same psychiatric institute where Zoltán was admitted. His mother "was a short, obese, cheerful woman who died at age of 53 of renal and cardiac causes".

Since his early school years, Zoltán's academic performance fluctuated but "*his school performance was satisfactory; he was a very lively child.*" Having passed his first year in secondary school, he failed the second year three times and eventually dropped out. He became a locksmith apprentice but quit soon, because he felt his physique could not stand the strain of work and because he forgot everything. Then he started training as an electrician, but did not manage to acquire sufficient skills in this trade either and could be employed only as an assistant electrician. In 1916, he was sentenced for four months in jail for accepting stolen property. In late 1918, he was conscripted, but he did not see battle. In 1925, he married and had a healthy daughter. There is no information about his wife other than that she occasionally visited her husband in the institution.

On admission Zoltán mentioned that he used to find people to be particularly unfriendly, but this feeling had since passed. These days he sensed that people became conspicuously friendly toward him and even strangers often waved to him. Other times he felt that "people are passing past his face and animals sneaking in front of his feet". He frequently heard strange voices, sometimes coming from his stomach; occasionally he understood what the voices said. Since the birth of his daughter, the doubt that he was not her father kept occupying him. He claimed

that he could not have fathered a child and his brother might have seduced his wife. He did not know why he was admitted to a psychiatric institution, but did not mind this, because he had long desired to be here as this was his home. He did not know whether he was actually insane: maybe yes, maybe not.

The medical certificate reported that before the outbreak of his illness "..he displayed neurasthenic symptoms, weariness, listlessness, apathy, and muddled thinking. Sometimes he would feel his body was terribly hot, other times very cold. When examined, he did not reply when addressed, but kept talking to his wife about his child. He would sit staring into the air and exclaim that he is hearing voices from inside his body: "Tell him who baby Böbi's father is"...[Böbi was his daughter's name.] About 4 weeks ago he asked his wife for some poison to kill himself."

Zoltán's mental state on admission

On admission "*he was calm, nearly mute, and answered questions only with monosyllables*". He had an "*asthenic constitution*" being 161 cm tall and weighing 51 kg. Vital signs and neurological examination were within normal range. The description of his mental state emphasized impaired vigilance and tenacity of attention, disorientation in time, low intellectual capacity, withdrawn and hesitant behavior, and ongoing visual and auditory hallucinations.

The course of Zoltán's illness until 1934

Between October 20 and 28 1930, Zoltán was "withdrawn" and "depressed", "was not interested in his surroundings", "he keeps lying under his blanket the whole day, he is autistic", and was "affected by delusions". [The term 'autism/autistic' is used in Bleuler's sense meaning extreme social withdrawal throughout this paper.]

On the 12th day after his admission (30 October, 1930), there was a Court inspection as well as a psychiatric evaluation conducted by the consultant-in-charge. This examination concluded that "*During the whole interview, the observed individual was sitting on his chair with his head down, did not respond to questions, at most moved his lips without making a sound; apart from that, he was completely unresponsive. According to his records, he would bang his head against the wall and would try to strangulate himself. He suffers from a schizophrenic psychosis and his treatment in a psychiatric hospital is justified.*"

From November 1930 until April 18, 1931, Zoltán was mostly negativistic, mute, showed no interest in his environment and poorly ate. He was either lying in his bed or standing facing the wall behind the door the whole day. His condition mildly fluctuated; on rare occasions he was able to spend a week at home or walked in the Institute's park with his wife. Because of frequent refusal of food his weight dropped to 48 kg therefore on April 18, 1931 tube feeding was commenced that continued to be necessary time and again up to early 1934, when his COT started. The years 1932 and 1933 passed without any significant change in his condition.

Following his admission, Zoltán was treated with opium for several months, then between December 3 and 17, 1933 he received strychnine, but neither medication produced noticeable effects.

Description of Zoltán's convulsive treatment

On January 23, 1934, in view of his ongoing catatonic stupor, Zoltán began camphor and cardiazol induced COT, the progress of which is tabulated underneath.

Session number	Date	Injection	Seizure	Mental state
1	January 23, 1934. 10:30 a.m.	4 g camphor i.m.	60-s clonic seizure at 11:15, then tenebrosity	Unchanged
2	January 27 9 a.m.	4 g camphor i.m.	9:45 a.m.: 40-s seizure	Unchanged
3	January 31 9 a.m.	4.5 g camphor i.m.	9:30 a.m.: 60-s seizure	Unchanged
4	February 4 9 a.m.	4.5 g camphor i.m.	None	Unchanged
5	February 8 12 a.m.	4.75 g camphor i.m.	12:50 a.m.: 35-s seizure 1:40 p.m.: 40-s seizure	Unchanged
	February 10	*"He asked for some food, spoke and has been more active. He would get up and stand by the radiator the whole day... he inquired since when he had been here..."*		
6	February 11 9:15 a.m.	4.5 g camphor i.m.	–	11:30 a.m.: *"He has became very anxious... keeps flouncing, screaming... fears being struck by a thunder, feels he is being taken somewhere and keeps protesting this. This whole condition reminds of an epileptic tenebrosity..."*
	February 12	Catatonic stupor again, tube feeding		

Session number	Date	Injection	Seizure	Mental state
7	February 14 9:15 a.m.	4.5 g camphor i.m.	–	Unchanged
8	February 17 9:10 a.m.	5 g camphor i.m.	10:45 a.m.: 50-s seizure	Unchanged
	February 18	''*He got up by himself, conversed intelligently, asked for his wife, who visited him in the afternoon... he does not remember the onset of his illness, he used to feel himself in a fog-like condition... ''My body has already eaten, that is why I do not want to eat again''—he justified his nutritional negativism; he reports ongoing auditory hallucinations*.''		
	February 25	''*He is in a bad mood, wordless, reclusive. He stayed in bed but has taken his meals*.''		
9	March 8 9:52 a.m.	4 g camphor i.m.	9:53 a.m.: unusually strong, 60-s seizure with a tongue bite	''*was distressed the whole day; by evening his mind became clear, he spoke intelligently*''
	March 10	''In the morning he went to walk in the park with permission; he went home without permission, came back in the afternoon, and apologized for being late.''		
	March 26	''*His condition has been improving day by day; he is becoming outgoing, cheerful, communicative, polite... He does repairs in the workshop*.'' (Dr. Meduna)		
	April 3	''*Under supervision, he does repair jobs in the workshop... he can move freely in the institute, goes out to the city twice a week and always returns in time... he parries questions concerning his illness with an 'I don't know'...*''		
	May 9	''*He is depressed, reports malaise. Therapy: a solution of bromide, codeine and paraldehyde*.''		
	June 25	''*Does not want to eat, he is dejected; mild anxiety*.''		
10	July 12 11 a.m.	5 g camphor i.m.	12:15 a.m.: 60-s tonic-clonic seizure + 3–4 min of tenebrosity 1:35 p.m.: 70-s seizure with enuresis, tongue bite	*''Talks spontaneously again, feels good and asks for food...''*
11	July 17 10 a.m.	5 g camphor i.m.	10:45 a.m.: 55-s seizure + 5 min of tenebrosity	''*Does not answer questions, only nods or shakes his head*.''
12	July 20 10:45 a.m.	3 g camphor i.m.	–	
13	August 10 9:45 a.m.	30 cg cardiazol i.v.	A prompt, 50-s epileptic seizure, ending in sleep	''*He listens but does not respond, has sweat all over his body*''
14	August 14 10:30 a.m.	40 cg cardiazol i.v.	56-s seizure + 6–8 min of tenebrosity, uncoordinated movement of the upper limbs lasting for a few seconds	Unchanged
15	August 21 9:30 a.m.	40 cg cardiazol i.v.	60-s seizure, 2 min of tenebrosity that ends in sleep	''*He asked for food spontaneously and asked to be given some work, which he is now doing industriously. As a whole, a very fine remission*.''
16	August 28 10:30 a.m.	40 cg cardiazol i.v.	56-s seizure with enuresis, tongue bite + 2 min of tenebrosity	''*Gives polite, intelligent, relevant answers to questions*'' (Meduna)
17	October 18	''Camphor inj.''	No information is given	''*he is calm, withdrawn, would not talk, just smile*''
18	October 24	''Cardiazol inj.''		
19	October 31 1935	''Cardiazol inj.''		
20	February 22 11 a.m.	4 g camphor i.m.	–	Calm, does not talk
21	February 26 10 a.m.	5 g camphor i.m.	12:30 a.m: 45-s seizure	Does not talk, hardly ate anything.
22	March 1 11 a.m.	5 g camphor i.m.	–	''*He is calm, lies in bed, does not speak sometimes smiles*.''
23	March 5 11 a.m.	6 g camphor i.m.	11:30 a.m.: 50-s 12:30 a.m.: 60-s seizure	''*He is tranquil, does not speak*.''
24	March 8 11 a.m.	6 g camphor i.m.	–	'' *his arms were going numb, had a headache. He was talking and had a meal*.''
25	March 12 11:30 a.m.	6 g camphor i.m.	2:00 p.m.: 60-s seizure	''*At the beginning of the seizure, he rolled off his bed, his scalp ripped open.. his wound was clamped with three clips...*'' He is tranquil, does not speak.
26	March 15 10 a.m.	6 g camphor i.m.	–	''*.reported nausea, he keeps spitting, has a stomach ache*.''
27	March 22 10 a.m.	6 g camphor i.m.	–	Enuresis after the injection. Does not talk.
28	March 26 10 a.m.	7 g camphor i.m.	58-s, with enuresis	''*ate poorly, keeps lying in bed*.''
29	March 30	7 g camphor i.m.	–	''*Nauseated, spits a lot, does not speak…*''
30	April 2 10:00 a.m.	8 g camphor i.m.	11:00 a.m.: 50-s seizure with enuresis 12:00 a.m.: 65-s seizure, then 2 min of tenebrosity	*''..after the injection he had nausea... was moaning then became calm, did not speak...''*

Session number	Date	Injection	Seizure	Mental state
	April 5	*" He is tidy, well-behaved and somewhat awkward; besides this, with a genial smile he asked not be given any more injections. He told me he had remained mute because the patients used to talk to him a lot, and he had noticed that if he spoke a lot, his chest would hurt, so in order to spare his chest, he had decided not to make any kind of sound any more. No sign of delusions, he does not display delusion of reference, has no hallucinations, he is calm, cheerful, he is in remission. He works in the garden, does his job with pleasure."* [Dr. Meduna]		
	August 14	*" He is behaving better again; sometimes he breaks into a smile for no apparent reason, laughs to himself, then if asked, he would tell that he keeps hearing the most diverse voices again. These voices are usually about what he has just done, most of them are friendly. The voices arise either from inside his head or from somewhere behind his head. Therapy: cardiazol."* [Dr. Meduna]		
31	August 16 10:00 a.m.	50 cg cardiazol i.v.	45-s seizure + 15-min tenebrosity (he is very uneasy, flounces)	
32	August 20 10 a.m.	50 cg cardiazol i.v.	48-s	Felt good, had a meal
33	August 23 9:30 a.m.	50 cg cardiazol i.v.	50-s	Unchanged
	August 24	*"He is much more open, direct, less inhibited, auditory hallucinations have already become less loud; occasionally he feels his body is electrified. Therapy: continued."* [Dr. Meduna]		
34	August 27 10 a.m.	50 cg cardiazol i.v.	54-s	Feels good
35	August 30	50 cg cardiazol i.v.	49-s	Unchanged
36	September 27 12:15 p.m.	50 cg cardiazol i.v.	–	
	October 1	*"he is inhibited to a lesser degree, complains about auditory hallucinations, everything he sees he usually hears as well. Occasionally he hears derisive voices too. Therapy: continued."*		
	November 23	"He is calm, does some work and allowed to move freely."		
	1936	He was either calm or wrathful; occasionally did some work but did not talk to his co-patients and reported voices buzzing in his ears repeatedly. Treated for cutaneous mycosis.		
	1937			
	January 13–22	Refuses to take his medication, to be injected, fights.		
	January 23	Injected with 200 cm^3 hydrocarbonate		
	January 26	Injected with 15 cg cardiazol, no seizure is induced		
	January 30	20 cg cardiazol, no seizure 30 cg cardiazol, 45-s seizure During the rest of the year, the entries are like those in the previous year. Mostly, he did not do any work, did not speak, but was lying in bed calmly, was quiet, took his meals and slept at night		

The course of Zoltán's illness after 1938 until his death

In 1938 and 1939 Zoltán remained mute. He was at times confused and did not show interest in his environment, but he did eat (sometimes poorly), slept at night and did not work. Between October 22 and November 15, 1940, he received insulin on 15 occasions. Five comas and three epileptic fits were induced without any clinical effect but his condition did not change; he spoke little and smiled awkwardly when being talked to. In 1941 "*he is manneristic and shy, but calm and quiet. His mood varies, sometimes he is depressed for days, mooching idly in the corridor and would not respond just smile; other times, he is more communicative, giggles. Occasionally, due to his somatic hallucinations, he comes forward with various complaints…*" In 1942: "*Sometimes he is peevish, exclaims his delusions, but mostly he gets on well with his fellow patients; he is calm, mute, withdrawn, not interested in anything, but occasionally, he becomes anxious, irritable, hot-tempered, "…at such times he usually asks to be released from here, because he can no longer bear being teased here so much…*" In 1943–1944 more and more frequently "*…he taunts his fellow patients, he cannot get along with others… he is unkempt…neglects his appearance, the footwear he is given… he tears his clothes and would only wear them that way, gets his clothes dirty, lies on the floor. His behavior is autistic,…*" but he also has conflicts, fights with fellow patients regularly. Hallucinations and paranoid delusions continue. He is quarrelsome and resistant—even broke a window. Since the beginning of 1945 "*…he has been weak, he is physically declining, he is lying in bed, he is pale, he has no fever, he is disturbed, not interested in his surroundings, though he takes meals and sleeps at night." 02.23.45.: in bed, quiet, confused, had no breakfast. No fever. Breathes laboriously in the morning. He dies of dementia praecox at 12:45 pm."*

Discussion

Zoltán's COT followed a relentlessly deteriorating condition lasting over 3 years and characterized by negativism, stupor, poorly elaborated delusions and auditory hallucinations. The progress notes reveal that Meduna's assessment of Zoltán's response to COT was overly optimistic. In the first course of COT, Zoltán was injected with camphor on nine occasions. This was followed by a 4-month pause during which

he was active in the first 2 months and then became incapacitated again. From July 1934 onwards, he received cardiazol-induced COT on ten more occasions; six sessions resulted in seizures. This course of COT was followed by another pause of treatment lasting about 4 months. There was no sustained improvement in his mental state this time other than the abolishment of severe stupor and refusal of food.

In 1935, there were ten additional injections of camphor resulting in an incomplete remission of about 4 months. (In Meduna's observation, the "best remissions" were achieved with camphor) [16]. Then Zoltán received a course of six COT sessions again with cardiazol following which he never became asymptomatic again. All in all, in 1934–1935 he received a total of 36 sessions of COT delivered in 4 separate courses. In January 1937, after Meduna's departure from the institution, further three low-dose cardiazol COT were given of which only one could induce a seizure without therapeutic effect. Neither was his condition improved by a 15-session insulin coma given in 1940 resulting in five comas and three epileptic fits. Between 1940 and 1945, there was further gradual decline in both his mental and physical condition, though tube feeding was no longer required nor did severe stupor develop. Zoltán was never discharged form the institution after his admission in 1930.

The cause of his death remains unclear. No autopsy information is available. Starvation and the poor hygienic conditions caused by the siege might explain his death, although there were no symptoms of infection recorded in his medical history. On January 1, 1945 his weight was only 43 kg.

According to the European diagnostic standards in the 1930s, Zoltán's diagnosis of schizophrenia was never questioned by the distinguished examining psychiatrists trained in the spirit of classical German psychiatry. The diagnosis of schizophrenia would also be the first choice using modern classificatory systems. The almost continuous, mainly mood-incongruent auditory hallucinations, ever-present suspiciousness and vague paranoid ideation, extreme social withdrawal, bizarre, idiosyncratic behavior coupled with the relentlessly deteriorating course of illness would support the diagnosis of schizophrenia.

Apart from being a historical document marking the beginnings of the 73-year-old history of modern COT, what lessons can be gleaned from Zoltán's case? Meduna was unrealistically optimistic about the effectiveness of COT. Lack of more prolonged remission in Zoltán's case may have been due to the relatively few treatment sessions; modern authors assert that up to 20 sessions of COT in a course are necessary for more persistent remission in schizophrenia [5, 23].

In one aspect Meduna's therapeutic enthusiasm seemed to have been justified: once COT had been started, Zoltán never became severely stuporous in need of tube feeding. There is a wide consensus in modern psychiatry that COT is the most efficacious treatment for catatonia and stupor of various origins [11].

In a broader perspective, Zoltán's case is another example of the boundless enthusiasm whenever a new mode of treatment arrives at the scene. A perennial circle is repeated: the initial tremendous enthusiasm will soon be tempered by a more critical evaluation and eventually the treatment finds its place in the therapeutic armamentarium with limitations. The wide acceptance of a new treatment depends upon the socio-cultural and ethical forces ("social and ethical warrants") [2] supporting or hindering the acceptance and spread of the new therapy.

Due to the closer scrutiny of society over the psychiatric profession in the past 20–30 years, and the vastly improved self-governance by the profession itself, the indications, efficacy and risk-benefit ratio of new treatments are identified and appropriate measures are taken a lot faster than before. This is exemplified by the early recognition of the metabolic syndrome associated with the introduction of second-generation antipsychotic drugs.

Although COT may not have been as effective as Meduna saw it in 1934 and recalled later, Meduna's place in the history of psychiatry as one of the pioneers of biological psychiatry is beyond doubt. Meduna introduced a new psychiatric treatment on the basis of what in his time was considered sound scientific foundation based on his previous neuropathological work and clinical observations. As Fink [7] opined, the introduction of COT in psychiatry was the logical consequence of Meduna's preceding scientific activity and not a serendipitous discovery. Wagner-Jauregg's fever therapy [24] served for Meduna as a model of curing a disease by inducing another pathological condition. COT initiated a paradigm shift in the approach to the whole concept of schizophrenia because it successfully challenged the dogmatic view of therapeutic nihilism in the endogenous psychoses. The introduction of COT initiated biological research in psychiatry and also boosted the morale and professional self-esteem of psychiatrists.

From a practical viewpoint, despite its limited effectiveness, COT was a real breakthrough since it was still far more effective than any therapeutic intervention before. COT fast became widespread in Europe and the United States; by the end of 1938, the new therapeutic method had been introduced in 92 psychiatric institutions in England and Wales having treated 3,531 patients with COT [4]. By 1940 there had been 3,900 papers published on COT including ECT illustrating the excitement the new therapeutic method generated in the scientific community [16]. More importantly, over the past seven decades COT has reduced the suffering of tens of thousands of patients.

References

1. Baran B, Bitter I, Fink M, Gazdag G, Shorter E (2007) Károly Schaffer and his school: the birth of biological psychiatry in Hungary, 1890–1940. European Psychiatry 2007 Dec 8; [Epub ahead of print]
2. Berrios GE (1997) The scientific origins of electroconvulsive therapy: a conceptual history. Hist Psychiatry 8:105–119
3. Berrios GE (1997) The origins of psychosurgery: Shaw, Burckhardt and Moniz. Hist Psychiatry 8:61–81
4. Board of Control for England & Wales (1939) The Twenty-fifth Annual Report of the Board of Control, 1938. London, HMSO
5. Chanpattana W, Andrade C (2006) ECT for treatment-resistant schizophrenia: a response from the Far East to the UK NICE report. J ECT 22:4–12
6. Fink M (2001) Convulsive therapy: a review of the first 55 years. J Affect Disord 63:1–15
7. Fink M (2004) ECT: serendipity of logical outcome? Psychiatric Times January 1, vol 21, no 1
8. Fink M (2004) Induced seizures as psychiatric therapy. J ECT 20:133–136
9. Fink M (1984) Meduna and the origins of convulsive therapy. Am J Psychiatry 141:1034–1041
10. Fink M, Taylor MA (2003) Catatonia: a Clinician's Guide to Diagnosis and Treatment. Cambridge University Press, Cambridge
11. Fink M, Taylor MA (2001) The many varieties of catatonia. Eur Arch Clin Neurosci 251(Suppl 1):8–13
12. Hechst B (1931) Zur Histopathologie der Schizophrenie mit besonderer Berücksichtigung der Ausbreitung des Prozesses. Z Ges Neurol Psychiatr 134:163–267
13. Kalinowsky LB (1986) History of convulsive therapy. Ann N Y Acad Sci 462:1–4
14. Klaesi J (1922) Über die therapeutische Anwendung der "Dauernarkose" mittels Somnifen bei Schizophrenen. Z Ges Neurol Psychiat 74:557
15. Meduna L (1985) Autobiography. Convulsive Ther 1:43–57, 121–138
16. Meduna L (1954) The convulsive treatment: a reappraisal. J Clin Exp Psychopathol 15:219–233
17. Meduna LJ (1934) Über experimentelle Campherepilepsie. Arch Psychiat Nervenkr 102:333–339
18. Meduna L (1937) Die Konvulsionstherapie der Schizophrenie. Carl Marhold Verlagsbuchhandlung, Halle
19. Nyírő G, Jablonszky A (1929) Some data concerning the prognosis of epilepsy, with special attention to constitution. (Néhány adat az epilepszia prognosisához, különös tekintettel a constitutióra). Orv Hetil 28:679–681
20. Passione R (2004) Italian psychiatry in an international context: Ugo Cerletti and the case of electroshock. Hist Psychiatry 15:83–104
21. Sakel M (1933) Neue Behandlung der Morphinsucht. (Eine Insulinkur beseitigt die Abstinentenzerscheinungen durch Ausgleich des während der Entziehung gestörten Gleichgewichtes im vegetativen Nervensystem)(in German). Zschr Neurol Psychiat 143:506–534
22. Shorter E, Healy D (2007) Shock Therapy: the History of Electroconvulsive Treatment in Mental Illness. Rutgers University Press, New Brunswick
23. Tharyan P, Adams CE (2002) Electroconvulsive therapy in schizophrenia. Cochrane Database System Review, 2002 (2):CD000076
24. Whitrow M (1993) Julius Wagner-Jauregg (1857–1940). Smith-Gordon, London