ELECTROCONVULSIVE THERAPY

ASCP Slide Collection 2006 Optional Slides

Max Fink, M.D.

SUNY at Stony Brook

Fink M. *ELECTROSHOCK: Restoring the Mind* (Oxford U Press, 1999)

ECT in Neurology: Uses

Status Epilepticus and NCSE

Parkinsonism

Malignant catatonia- NMS

Delirium- Stupor

Pseudodementia

Mental Retardation

ECT in Neurology: Physiology

Increases brain dopamine

Raises seizure threshold

Releases neuroendocrine hormones

Prolactin, TRH, ACTH

Lowers brain, CSF calcium

ECT in Neurology: *Problems-1*

- Increased CSF pressure
  - Brain lesion
- Recent 'stroke'- bleeding
- Paralysis or burn
  - Succinylcholine to atracurium
- High doses of BZD -- flumazenil

ECT in Neurology: *Problems-2* Conditions that are Not a Bar

CSF shunt

Skull metal - plate or shrapnel

Ventilator

Intravenous feeding

Normal CSF pressure in meningioma

ECT in Neurology
SE and NCSE

Customary Treatments

- Phenytoin, carbamazepine
- Benzodiazepines
- Barbiturates, Propofol
  - Induced anesthesia
- ECT

ECT in Neurology

Parkinsonism- 1

Efficacy in rigidity and 'on-off' phenomenon

ECT releases brain dopamine

Risk of dopaminergic psychosis

Manifests as delirium, excitement

ECT in Neurology
Parkinsonism -2

Half age dosing, bitemporal electrodes

Frequency of treatments reduced

Continue dopamine agonists but reduce dosage 24-36 hours prior to ECT

Continuation ECT

ECT in Neurology
Pseudodementia

No effective method to separate a structural from a functional form of dementia

A feature of affective disorders

Treatment: When medications fail, ECT

No special technical features in ECT

ECT in Neurology

Mental Retardation

Indications: same as non-MR patients

Efficacy: same as non-MR patients

Safety: no special risks are associated with MR state

Ref: Thuppal M, Fink M. ECT and mental retardation. JECT 1999; 15:175-177.

2006 ECT Technique - 1

- Electrode Placement
- Seizure Threshold Estimation
- Energy Dosing
- EEG Monitoring for Effective Seizure
- Continuation ECT

2006 ECT Technique - 2

- Electrode Placement
  - **Types**
    - **Bitemporal (BT)**
    - **Right Unilateral (RUL)**
    - **Bifrontal (BF)**
  - **BT and BF – Greater Efficacy**
  - **Disadvantages of RUL is Poor Efficacy**
  - **Side-effects of RUL, BT, BF**

2006 ECT Technique -3

- Seizure Threshold Estimation by Titration is Necessary for RUL
  - Titration Schedules
  - Formula Methods
    - Half-age
    - 75% energy
    - Full age
- Energy Dosing by Formula

2006 ECT Technique -4

- EEG and EMG Monitoring Advised
- Defining “An effective seizure”
  - EEG Pattern
  - EEG measures
- Aborted seizure
- Prolonged seizure
- Why EMG?

2006 ECT Technique - 5

- Need for Continuation Treatments
  - Relapse rates in ECT
- Medication continuation
  - Efficacy
  - How to optimize
- Continuation ECT
  - Efficacy and safety

Technical Responses That Reduced Risks - 1

Risks	Response
Death	**Anesthesia; Recovery Room monitoring**
Panic and Fear	**Anesthesia**
Tardive Seizures	**Barbiturate anesthesia**

Technical Responses That Reduced Risks - 2

Risks	Response
Amnesia	**Oxygenation; airway management** **Electrode placement** **Brief-pulse currents** **Frequency of treatments**
Post-ECT delirium	**Methohexital, diazepam, droperidol, midazolam**
Post-ECT headache	**Analgesics pre- or post-ECT, sumatriptan**
Prolonged seizures	**Diazepam**

Drugs and ECT Combined

Psychoactive Drugs	Use in ECT
Antipsychotics (Neuroleptics)	Synergism demonstrated and use recommended. Preferably low sedation, low anticholinergic agents
Antidepressant drugs (TCA, MAOI, SSRI)	No synergism demonstrated Use not recommended
Anticonvulsants & anxiolytics (Benzodiazepines, phenytoin, carbamazepine)	Block efficacy of ECT Use interdicted
Lithium	Increase confusion Use not recommended
Caffeine, theophylline	Enhance seizure duration Use to increase seizure adequacy

Pre-ECT Checklist

- Patient and family are fully informed
  - ideally they can see an ECT video
- Written valid informed consent is signed by patient
- and “significant family member”
- Physical exam and detailed neurological exam
- Assess for medical or medication contraindications
- Basic tests - CBC, UA, ECG, HR, BP, Temp
- Additional tests warranted by examination

Once upon a time in Hungary . .

Ladislas Meduna

1896-1964

Biography

- 1896 Born
- 1914 Graduated Catholic High School
- 1914 Began Medical School; Interrupted by military service; graduated 1921
- 1922: Interacademic Institute Brain Research: Prof Karl Schaffer
- 1927: Transferred to Department of Psychiatry

Biography

- 1934, Jan 23: First patient treated with camphor-induced seizures
- 1939: Emigrated to USA; appointed to Loyola University
- 1943: Appointment in Illinois NP Institute
- 1953: President, Society Biological Psychiatry
- 1959: Founding Editor, *Journal of Neuropsychiatry*
- 1964: October 31. Died

Első" korrektura-levonat.

Méltóságos Dr Schaffer Károly egyetemi nyilvános rendes tanár úrnak Budapest IV. Kálvin tér 4. sz.

Dr Meduna László / Érkezett 1928. VI/5.

1927 XII. 5.

KÍSÉRLETES VIZSGÁLATOK A MIKROGLIA HISTOPATHOLOGIÁJÁRÓL.

MEDUNA LÁSZLÓ-tól.

Experimental Examination of the Histopathology of Microglia

(Mitteilung der Kgl.-Ung. Staatlichen Irren- und Nervenheilanstalt Budapest-Lipótmezö [Direktor: Priv.-Dozent Dr. *Rudolf Fabinyi*].)

Versuche über die biologische Beeinflussung des Ablaufes der Schizophrenie.

I. Campher- und Cardiazolkrämpfe

Von

Oberarzt Dr. **Ladislaus v. Meduna.**

(Eingegangen am 18. Januar 1935.)

Reprinted from the Archives of Neurology and Psychiatry
February 1936, Vol. 35, pp. 361-363

NEW METHODS OF MEDICAL TREATMENT OF SCHIZOPHRENIA

L. DE MEDUNA. M.D., BUDAPEST, HUNGARY

Ignorance of the pathobiologic processes underlying schizophrenia renders therapy of the etiologic factors as yet impossible. There are, however, accidentally discovered correlations which may form the starting point of therapeutic efforts, as in the case of dementia paralytica, in which remissions coinciding with accidental fevers led to the establishment of a biologic antagonism between the disease process and the febrile condition and thus to malarial therapy. Fever therapy has been applied also in cases of schizophrenia, but without results worth mentioning, owing, according to my conception, to the absence of a biologic antagonism between fevers and schizophrenia. My task was, then, to look for probable biologic antagonists of schizophrenia. Observations in this direction had been made before, without, however, being systematized and utilized for conclusions regarding therapy.

Die Konvulsionstherapie der Schizophrenie

Von

Dr. Ladislaus von Meduna

Oberarzt der kgl. ung. staatl. psychiatrischen Heilanstalt Budapest-Lipótmező

1937

Carl Marhold Verlagsbuchhandlung, Halle a. S.

Sonderabdruck aus
Psychiatrisch-Neurologische Wochenschrift
Schriftwalter: Sanitätsrat Dr. **Joh. Bresler**,
Kreuzburg (Oberschlesien).
Jahrg. 1937, Nr. 30. — Verlag: Carl Marhold Verlagsbuchhandlung, Halle a. S.

Die Bedeutung des epileptischen Anfalls in der Insulin- und Cardiazolbehandlung der Schizophrenie.

Von Dr. **L. von Meduna**, Budapest

Aus der Ungarischen Staatlichen Heilanstalt für Geisteskranke Budapest-Angyalföld. (Direktor Prof. Dr. Y. Nyirö).

Vierjährige Erfahrungen mit der Cardiazol-Konvulsionstherapie [1])

VON

Dr. L. MEDUNA, *Chefarzt.*

(Mit VIII Tabellen).

Four Year Experience with Cardiozol-Convulsion Therapy

228.

Sonderabdruck aus

Psychiatrisch-Neurologische Wochenschrift

Schriftwalter: Sanitätsrat Dr. **Joh. Bresler,**
Kreuzburg (Oberschlesien).

Jahrg. 1938, Nr. 8/9. — Verlag: Carl Marhold Verlagsbuchhandlung, Halle-S.

Aus der Budapester Staatlichen Heilanstalt für Nerven- und Geisteskranke in Angyalföld (Direktor: Prof. Dr. Julius Nyirö).

Über die häufigsten Fehler bei der Konvulsionstherapie.

Von Dr. med. **Ladislaus von Meduna,** Oberarzt.

Extrait des *ANNALES MÉDICO-PSYCHOLOGIQUES*
(N° 4. Avril 1939)

GENÈSE DU TRAITEMENT DE LA SCHIZOPHRÉNIE PAR LE CARDIAZOL

PAR

Ladislaus VON MEDUNA

PARIS
MASSON ET Cie, EDITEURS
LIBRAIRES DE L'ACADÉMIE DE MÉDECINE
120, Boulevard Saint-Germain (6e)
—
1939

Oneirophrenia

THE CONFUSIONAL STATE

BY L. J. MEDUNA, M.D.
The Illinois Neuropsychiatric Institute

THE UNIVERSITY OF ILLINOIS PRESS
Urbana : 1950

CARBON DIOXIDE THERAPY

A Neurophysiological Treatment of Nervous Disorders

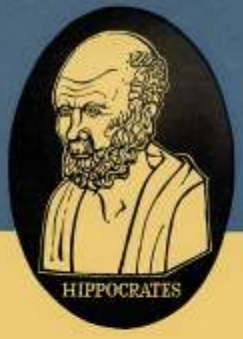
By

L. J. MEDUNA, M.D.

Professor of Psychiatry
University of Illinois
College of Medicine
Chicago, Illinois

CHARLES C THOMAS · PUBLISHER
Springfield · Illinois · U.S.A.

Journal of Neuropsychiatry



Reprinted from the JOURNAL OF NEUROPSYCHIATRY, January-February 1963, Vol. 4, No. 3.

Convulsive Therapy
1(1):43–57

Historical Article

Autobiography of L. J. Meduna

Meduna's Lessons

- Grand mal seizures relieve psychosis
- Antagonism of seizures and psychosis
- Glia reduced in psychosis; gliosis follows seizures
- ***It is the seizure, not the induction method!***

Meduna's Science

- Seizures alter psychiatric state and have positive benefits
- Glucose metabolism is altered in psychosis
- Defined *oneirophrenia* and showed its sensitivity to seizures.