ELECTROCONVULSIVE THERAPY IN THE GERIATRIC PATIENT

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DISCLOSURES

Dr. Suvalsky has no financial relationships to disclose.

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OBJECTIVES

- Understand the history of electroconvulsive therapy
- Understand the theories re: mechanism of action of electroconvulsive therapy
- Understand the indications and contraindications for electroconvulsive therapy, **especially with regard to geriatric patients**
- Understand what is involved in the pre-treatment work-up for electroconvulsive therapy, **especially with regard to geriatric patients**
- Understand the complications, risks, and side effects of electroconvulsive therapy, as well as effectiveness

ELECTROCONVULSIVE THERAPY (ECT): GENERAL HISTORY

- **1500s** – Paracelsus induces seizures by administering camphor (by mouth) to treat psychiatric illness
- **1785** – First published report of the use of seizure induction to treat mania using camphor
- **1934** – Ladislas von Meduna begins the modern era of convulsive therapy using IM camphor for catatonic schizophrenia
- **1938** – Ugo Cerletti and Lucio Bini conduct the first electrical inductions of a series of seizures in a catatonia patient and produce a successful treatment response
- **1940s** – ECT is introduced to the United States

ELECTROCONVULSIVE THERAPY (ECT): GENERAL HISTORY (cont)

- **1950s** – Complications of bone fractures in early treatments essentially eliminated with the addition of using anesthesia and muscle relaxants
- **1960s** – RCTs of the efficacy of ECT vs. medications in the treatment of depression yield response rates that are significantly higher with ECT
- **1978** – APA published the first Task Force Report on ECT to establish standards for consent and the technical and clinical aspects of ECT
- **Late 1970s-Early 1980s** – Randomized, controlled trials demonstrate that ECT is more effective than sham treatment for major depression
- **1985** – NIH and NIMH Consensus Conference on ECT endorse a role for the use of ECT and advocate research and national standards of practice.

ELECTROCONVULSIVE THERAPY (ECT): PUBLIC CONTROVERSY

Vilification by the press

- Reporter Dennis Cauchon (USA Today) – ECT is part of a Medicare abuse scheme, reported death rate secondary to ECT as 1 in 200 – blindly accepted by public
- Geraldo episode (1990) – group of female ECT recipients spoke about "horrific" experiences – all were unusual in scope and circumstances of treatment. Counterpoint on program, ECT expert Harold Sackheim, was invited to speak by phone only

Portrayal in movies – often exaggerated and inaccurate

- *One Flew Over the Cuckoo's Nest, Shock Corridor, A Woman Under the Influence,* etc.

Lay anti-psychiatry/anti-ECT social movements

- Portrayed ECT in terms of implication of social control, some related to public reaction to side effects of treatments

Publicized failed treatments of famous people

- Ernest Hemmingway and Sylvia Plath both completed suicide despite prior treatments with ECT

ELECTROCONVULSIVE THERAPY (ECT): PUBLIC CONTROVERSY (cont.)

- Easy target due to early application of treatments, often violating biomedical ethical principles (often employed without informed consent)
- Early ECT/shock treatments done without muscle relaxation or anesthesia, significantly increasing anticipatory fear and sometimes resulting in bone fractures, body aches following treatments
- Ironically, as scientific methodology improved and ECT became more humane, public concern, anti-ECT lobbying and anti-ECT legislation had increased
- It's not all bad – several public figures have disclosed battles with depression and other mental illnesses with successful ECT treatments:
  - Dick Cavett (talk show host, comedian with Bipolar Disorder)
  - Kitty Dukakis (author and wife of MA governor Michael Dukakis with MDD and alcohol use disorder)
  - Vladimir Horowitz (Russian born American classical pianist and composer)
  - Roland Kohloff (New York Philharmonic timpanist)

ELECTROCONVULSIVE THERAPY (ECT): PROFESSIONAL OPINION

- Pippard and Ellam (1981) – surveyed 3,221 psychiatrists in UK, 87% believed effective for a limited number of diagnoses
- Janicak (1985) – years of experience of physicians, nurses, social workers increased willingness to recommend ECT
- Support from NIMH and NIH and development of APA taskforce reports emphasizing benefits (while conceding importance of informed consent)
  - APA Task Force 14 on ECT (1978): survey of 4,000 psychiatrists, 72% felt appropriate for some diagnoses, safe, less expensive, more effective, 7% felt it was obsolete
  - NIH and NIMH Consensus Conference on ECT (1985) endorse a role for the use of ECT
- Historical changes in patient viewpoints of ECT paralleled by changes in mental health professionals' viewpoints of ECT
  - Salient point – knowledge and attitude of mental health professionals are pivotal in reducing fear and promoting understanding of ECT by patients and others

ELECTROCONVULSIVE THERAPY (ECT): EFFICACY

Consensus from multiple studies show:

- Positive result in 70-90% of patients with severe depression vs medications, which average a 50-60% success rate
- Longer remission periods in patient's with severe, treatment-resistant bipolar depression and mixed states
- ECT demonstrated higher speed of response and higher incidence of remission
- CORE studies found continuation ECT preventative for remitted illness to relapse
- Immediate response rates of between 55% and 85% in 10 naturalistic prospective studies
- Immediate response rates ranging from 48% complete recovery to 92% improvement in 14 retrospective studies.
- Duration of bipolar depressive episode correlated to earlier relapse after ECT treatment

ELECTROCONVULSIVE THERAPY (ECT): MECHANISM OF ACTION

General understanding: Electrical activity triggers a generalized seizure in the brain, which somehow alters the effects of neurotransmitters in the central nervous system

Diverse changes observed or theorized from ECT treatments:

1. **Neurophysiologic –** increase in cerebral blood flow, use of glucose and oxygen, and permeability of the blood-brain barrier
2. **Neurobiochemical**
   - **Genetic –** altered target gene expression, improved neuronal connectivity
   - **Neurotrophic factors –** prevention of cell death
   - **Immune –** possible mediating effects with neuroprotective properties (higher levels of inflammatory mediators in depression and schizophrenia)
   - **Hormones –** hypothesized to enhance release/action of norepinephrine, dopamine, glutamate, neuropeptide Y
3. **Neuroplasticity –** promotion of neurogenesis in the hippocampus

ECT INDICATIONS: FDA & APA APPROVAL

FDA Neurological Devices Advisory Panel (The FDA Final Order to Reclassify ECT Devices)

- Evaluated evidence related to the effectiveness and safety of ECT
- Approved *"for the treatment of **catatonia** or a **severe major depressive episode (MDE)** associated with **major depressive disorder (MDD) or bipolar disorder (BPAD)** in patients **age 13 years and older** who are **treatment-resistant** or who **require a rapid response** due to the severity of their psychiatric or medical condition"*
- Specifies that *"FDA is not permitted to limit or interfere with the authority of a healthcare professional to administer any legally marketed device to a patient for any condition or disease within a legitimate clinician-patient relationship"*
- *"FDA does not regulate off-label use of ECT by physicians."*

ECT INDICATIONS: FDA & APA APPROVAL

Expert consensus (APA's 2001 ECT Task Force Report and correspondence with the FDA)

- Supports the clinical appropriateness of ECT in "*patients **under age 13** and in individuals with **schizophreniform disorder**, **schizophrenia**, **schizoaffective disorder**, and **manic episodes** as well as in other clinical circumstances.*"

ECT DIAGNOSTIC INDICATIONS: SUMMARIZED

PRIMARY DIAGNOSTIC INDICATIONS

- Major Depressive Episode (unipolar or bipolar)(esp. with psychosis)
- Bipolar Affective
- Disorder (manic, hypomanic and mixed episodes)
- Schizophrenia, Schizoaffective disorder, Schizophreniform

SECONDARY DIAGNOSTIC INDICATIONS

- Catatonia (unrelated to other disorder)
- Parkinson's Disease
- Neuroleptic malignant syndrome
- Delirium
- Intractable Seizure Disorder
- Mood Disorder Secondary to Physical Conditions

OTHER POTENTIAL DIAGNOSTIC INDICATIONS

- PTSD
- Primary delusional disorder
- Chronic pain along with affective disorder
- Personality Disorders (particularly borderline) along with affective disorder
- Drug-induced extrapyramidal symptoms

ECT CLINICAL DECISION MAKING: GENERAL CONSIDERATIONS

Decisions are made on a case-by-case basis to have ECT, per APA Guidelines, involves combination of factors

- Psychiatric diagnoses
- Prior treatment history and response to ECT
- Type and severity of symptoms
- Consideration of alternative treatment options
- Consumer preference

ECT CLINICAL DECISION MAKING: CONSIDERATIONS IN OLDER ADULTS

- Evidence shows that advanced age in and of itself is not a contraindication to ECT use
- Patients should not be denied access to ECT treatment based on age alone
- Reasonable to conclude that older people are no less likely to benefit from ECT than younger people and are entitled to have access to treatment that might benefit them
- Can be used in patients with severe co-existing medical illnesses, side effects of ECT may be less problematic than side effects of some psychiatric medications in the elderly

ECT CLINICAL DECISION MAKING: CONSIDERATIONS IN OLDER ADULTS (cont.)

- All medical and surgical conditions should be assessed and, where possible, stabilized or treated prior to starting ECT
- Monitoring of older people receiving ECT should include attention to possible changes in their physical state and cognitive function
- Geriatric population is not at higher risk to develop cognitive problems than the general population from ECT (even with dementia), however, usually take a little longer to resolve when it does occur
- ECT technique should be modified as necessary to minimize any cognitive adverse effects during ECT in those people deemed to be at a higher risk

ECT CLINICAL DECISION MAKING: CONSIDERATIONS IN OLDER ADULTS (cont.)

- The ECT clinic's treatment protocols, such as choice of anesthetic agent, should take account of increase likelihood of high seizure threshold among older adults
- Dementia with underlying mood disorder is understudied but some reports indicate improvement in both mood and certain cognitive symptoms at all stages of dementia
- Some reports show effectiveness for dementia-related agitation and screaming episodes in those with and without underlying mood disorders

ECT CLINICAL DECISION MAKING: RATIONALES FOR PRIMARY VS SECONDARY USE

Primary Use

- Rapid definitive response required on medical or psychiatric grounds
- Risks of alternative treatments outweigh the benefits
- Past history of poor response to medications or good response to ECT
- Patient preference

Secondary Use

- Failure to respond to pharmacotherapy in the current episode
- Intolerance of pharmacotherapy in the current episode
- Rapid definitive response necessitated by deterioration of the patient's condition
- Rapid development of suicidal ideation
- Development of pronounced lethargy

PRIMARY INDICATIONS FOR ECT: MAJOR DEPRESSIVE EPISODE (UNIPOLAR OR BIPOLAR)

General Population

- Strongly consider ECT if:
  - Refractory Depression
  - Psychotic features (ECT is Gold Standard)
  - Catatonia
  - Acute/Persistent suicidal intent
  - Food refusal leading to nutritional compromise or dehydration
  - Pregnancy
  - Previous positive response to ECT
  - Those who have medical conditions that prevent the use of antidepressant medications
  - Other situations where a rapid antidepressant response is required

PRIMARY INDICATIONS FOR ECT: MAJOR DEPRESSIVE EPISODE (UNIPOLAR OR BIPOLAR)

Geriatric Considerations

- Refractory major depression
  - Geriatric bipolar depression often does not respond to pharmacotherapy
  - For refractory patients whose depression does not respond to 3-5 medication trials, ECT is considered appropriate
- Reversible dementia
  - Reversible dementia (pseudodementia) – patient registers little of immediate environment, unaware of day's events and compromised memory that is associated with depression
  - Difficult to distinguish from an Alzheimer type dementia but when depression-related, can be reversed with ECT
  - If etiology is irreversible structural brain disease (i.e. Alzheimer), symptoms will remain unchanged or potentially worsen (improves back to baseline when treatment is stopped)
  - Favorable odds might argue for a course of ECT treatment in elderly patients with a diagnosis of dementia, especially if the condition made a sudden appearance

PRIMARY INDICATIONS FOR ECT: BIPOLAR DISORDER (MANIA & HYPOMANIA)

General Population

- At least equal to lithium for acute mania in the general population
- Pharmacologic treatments are highly effective, so ECT use is limited to situations when specific contraindications to all anti-manic agents exist
- Strongly consider ECT if:
  - Extreme, sustained agitation
  - Manic delirium
  - Dangerous levels of exhaustion from manic behavior
  - Psychotic features unresponsive to neuroleptics
  - Acute/Persistent suicidal intent
  - Pregnancy
  - Previous positive response to ECT
  - Medical conditions that prevent the use of anti-manic medications
  - Other situations where a rapid anti-manic response is required

PRIMARY INDICATIONS FOR ECT: BIPOLAR DISORDER (MANIA & HYPOMANIA)

Geriatric Considerations

- Pharmacotherapy is generally used for geriatric mania and hypomania but need for ECT may arise due to diminished efficacy over time and renal impairment
- Lithium with ECT can help to lower the seizure threshold, which is often higher in geriatric patients (caution possible worsening of delirium)
- Electrode placement and other aspects of ECT techniques for geriatric bipolar disorder have not been standardized
- ECT is typically administered with the same technique and duration used for other indications
- Little direct evidence for the anti-manic efficacy of ECT in geriatric patients but several high-quality studies suggest that ECT is effective for mixed-age manic patients (which includes geriatric patients)

PRIMARY INDICATIONS FOR ECT: SCHIZOPHRENIA, SCHIZOAFFECTIVE & SCHIZOPHRENIFORM

General Population

- Effective treatment for the symptoms of acute schizophrenia, however, not for chronic schizophrenia
- Efficacy is about as equal as antipsychotics, but improvement may occur faster
- Second most common reason given for ECT (MDE is most common)
- Most likely responders
  - Marked positive symptoms
  - Catatonia
  - Affective symptoms
  - Prior positive response

Geriatric Considerations

- Data shows use of maintenance treatments for geriatric patients with schizophrenia leads to reduced number of psychiatric hospitalizations and mean hospital stay duration

SECONDARY INDICATIONS FOR ECT

- **Catatonia** (unrelated to catatonia secondary to depression or schizophrenia)
- **Parkinson's Disease**
  - Motor symptoms often improve (esp. on-off variety)
  - If effective, will likely need maintenance treatments indefinitely
  - May need to adjust dose of Parkinson's meds if treatment-emergent dyskinesia or psychosis develops
- **Neuroleptic Malignant Syndrome**
  - Discontinue antipsychotics
  - Achieve autonomic stability before Initiating

SECONDARY INDICATIONS FOR ECT (cont.)

- **Delirium**
  - Only if needing urgent treatment AND medical treatment for underlying cause has been initiated
  - Ensure all underlying issues are being addressed (concomitant presence of delirium SHOULD NOT impede consideration of urgent ECT)
- **Intractable Seizure Disorder**
  - Paradoxically can treat status epilepticus unresponsive to conventional treatments
- **Mood Disorder Secondary to Physical Conditions**
  - Reversible medical causes should first be addressed to speed resolution of symptoms and lessen ECT risks

OTHER POTENTIAL INDICATIONS FOR ECT

- Some data suggest ECT might be appropriate in some primary anxiety disorders, including PTSD or for primary delusional disorder
- Chronic pain along with affective disorder might experience improvement in mood but also an analgesic effect
- Personality Disorders (particularly borderline) might benefit if also with affective disorder, but likely reduced response rate overall and higher relapse rate at 1 year
- Drug-induced extrapyramidal symptoms showed transient improvement with ECT – cause and effect?

CONTRAINDICATIONS TO ECT

- ECT is generally safe and there are no absolute contraindications, even in patients whose general medical status is compromised

- Some medical conditions might alter the risks of treatment – sometimes recommended for medically ill because has fewer side effects

- Conditions needing further evaluation:
  - Unstable/severe cardiovascular disease
  - Implanted automatic defibrillator
  - Recent myocardial infarction
  - Aneurysm or vascular malformation
  - Recent intracranial surgery
  - Increased intracranial pressure
  - Recent CVA
  - Pulmonary insufficiencies
  - Medical status rated ASA level 4 or 5
  - Eye conditions – acute narrow angle glaucoma or retinal detachment
  - Pheochromocytoma

ECT CLINICAL GUIDELINES: PRE-TREATMENT EVALUATION

- Obtain complete psychiatric history, including past ECT response and relevant substance use
- Mental status examination (with baseline cognitive examination)
- General medical history to identify risks, including past response to anesthesia
- Review of all medications, including prescribed and OTC
- Medical stability
  - Minimal requirements should include:
    - Laboratory studies typically include basic “admit” labs (CBC and CMP)
    - Geriatric patients should get a UA
    - Consider spine films in patients with known significant vertebral arthritis
    - EKG recommended, especially in geriatric patients
    - Cardiology evaluation for patients with history of severe cardiac disease
- Ophthalmologic evaluation for patients with known history of acute angle glaucoma

ECT CLINICAL GUIDELINES: FOCUSED HEALTH RISK ASSESSMENTS

Cardiovascular

- Assess for specific risk factors: coronary heart disease, valvular disease, heart failure, hypertension, hypercholesterolemia, diabetes mellitus, and advanced age
- ECT will be delayed with unstable angina, decompensated heart failure, or severe symptomatic valvular disease until stabilized
- Continue nitrates, beta blockers, and other antihypertensive drugs in patients with preexisting cardiac conditions.
- When in doubt, consult cardiology

ECT CLINICAL GUIDELINES: FOCUSED HEALTH RISK ASSESSMENTS

Central Nervous System

- ECT considered safe for patients with intracranial metallic objects, brain tumors and certain structural abnormalities like Chiari I malformation ***without*** increased intracranial pressure (ICP)
- When in doubt, consult neurosurgery

Diabetics

- Hold oral hypoglycemics and short-acting insulin the morning of ECT if NPO

Warfarin therapy

- Can be continued during ECT if INR $\leq$ 3.5 and CHA_2DS_2-VASc score >1

ECT CLINICAL GUIDELINES: TYPICAL COURSE OF ECT

- Frequency and number of ECT treatments in a course is determined by severity of illness and relative benefits and risks of ECT treatment
- **Index course – induces remission**
  - Generally 6-12 treatments, 3 sessions per week (Monday, Wednesday, Friday)
- **Maintenance course – reduces relapse**
  - Typically once per week, bi-weekly or monthly. No set limit on duration but commonly 6-12 months
- Use of >1 adequate seizure/treatment session is discouraged
- Number and timing of treatments can change during a course, typically for adverse effects with need for continued treatment

ECT CLINICAL GUIDELINES: INPATIENT VS OUTPATIENT SETTING

Should consider:

- Risk associated with type and seriousness of mental illness
- Ability to detect and manage anticipated risks during treatment and at home
- Level of supervision needed by treating provider during and in-between treatments
- Availability of caregivers who would agree to providing appropriate supervision
- Patient and caregiver are willing and capable to follow necessary requirements

Limitations of outpatient

- Patient often needs to avoid activities most likely to be substantially impaired by adverse cognitive effects of ECT
  - E.g. driving during index treatment course, certain IADLs
- Following prescribed dietary, bowel, bladder, and grooming instructions
- Complying with specified medication regimens
- Monitoring adverse effects and apparent changes in medical conditions

ECT CLINICAL GUIDELINES: TECHNICAL ASPECTS OF TREATING OLDER ADULTS

- Increased likelihood of high seizure threshold in an elderly person, particularly in older males
- Clinics should agree on protocols regarding the choice of anesthetic agent and other age-related factors
- Special attention should be paid to electrode placement, removal of skin oil and timely placement of electrode gel to ensure hydrated skin. This will reduce impedance and increase the chances of successful treatment without the need to resort to high-stimulus doses

DETERMINATION OF ECT COURSE OUTCOME

Important to monitor and document therapeutic response and adverse effects

- Clinical assessment should be done at least every 1-2 treatments within 24 hours
- Use of clinical rating scales to trend therapeutic response as well as adverse reactions, especially with regard to cognition*
- Ensure medical and psychologic tolerability endures throughout treatment

Predictors of benefit

- High pre-morbid functioning
- Lack of personality disorder
- Schizoaffective disorder – severity of symptoms often predicts level of benefits from (more severe, more likely to benefit)
- Pseudodementia secondary to severe depression likely to show cognitive improvement (though may have brief worsening first)

POTENTIAL ADVERSE EFFECTS FROM ECT

Mortality

- ECT is one of the safest procedures performed under general anesthesia.
- Modern anesthesia techniques have lowered the mortality rate
- Low mortality rate plus potential life-saving benefit is compelling enough that absolute contraindications to treatment no longer exist
- Risk defined as serious morbidity and mortality (most likely cardiopulmonary – considered in line with risk associated with other low-risk procedures under general anesthesia)
- Many quoted numbers for mortality, most accepted:
  - *Individual* treatment = 2/100,000 (0.002)
  - *Course* of 8 treatments = 1.6/10,000 (0.016)

POTENTIAL ADVERSE EFFECTS FROM ECT (cont.)

Cardiovascular

- Serious complications are rare, almost always in older patients with underlying CV disease
- Tonic phase of treatment: parasympathetic discharge that can lead to arrhythmias, premature atrial and ventricular contractions, atrioventricular block, and asystole
  - In one study of older adult patients, 66 percent had asystole lasting greater than five seconds with no lasting complications
- Clonic phase of treatment: catecholamine surge that causes tachycardia and hypertension
  - Increased heart rate may attenuate with successive treatments so should not necessarily prohibit completing full course of ECT
  - Hemodynamic responses continue into the postictal period, usually resolve within 10-20 minutes after the seizure

POTENTIAL ADVERSE EFFECTS FROM ECT (cont.)

Pulmonary

- Prolonged apnea – adequacy of oxygenation assessed through pulse oximetry during and after treatment
  - Often due to intentional hyperventilation by anesthesiology as a technique to lower seizure threshold
  - Policy should address management

Central Nervous System

- Several cerebral effects occur with ECT, including increases in cerebral blood flow and intracranial pressure
- Memory loss, disorientation, and delirium are the primary clinical manifestations.

POTENTIAL ADVERSE EFFECTS FROM ECT (cont.)

Musculoskeletal

- Tongue laceration
  - Paralytic agent does not paralyze against direct electrical stimulus to the masseter, can result in tongue laceration if bite block is improperly placed
- Body aches
  - Depolarization from succinylcholine can result in sore muscles
  - Etomidate as anesthetic agent can cause significant dystonic contractions, resulting in body aches
  - Inadequate paralysis may allow for some degree of a motor seizure, leaving the patient sore
  - Headaches commonly reported post-seizure
  - Vertebral or other fractures almost non-existent now with advent of paralytic agent utilization

A CLOSER LOOK AT COGNITIVE SIDE EFFECTS

- Retrograde memory problems are most common
- Occasional reports of difficulty laying down new memories
- Most reported cognitive problems are time-limited, resolving within several months of treatment completion, but some report permanent difficulties
- Confusion immediately after treatment (lasts minutes to hours) but rarely last longer (more noticeable in older adults) – doesn't necessarily predict worse long-term outcome of memory problems

A CLOSER LOOK AT COGNITIVE SIDE EFFECTS

Mitigation

- Multiple studies on the nature of memory loss and electrode placement during ECT conclude right unilateral placement as generally preferable to bilateral in regards to degree of memory loss (bilateral is considered more effective, however)
- Review of multiple studies concluded:
  - Bilateral produced greater anterograde memory loss than right unilateral ECT
  - Bilateral pronounced more extensive retrograde amnesia than unilateral ECT
  - Reactivating memories just before ECT did not produce amnesia
  - Capacity for new learning recovered substantially by several months after ECT
  - Memory complaints were common in individuals who had received bilateral

CONCLUSIONS:

- The history of ECT is one of controversy but has been shown to be a very effective way to treat certain psychiatric conditions
- While there are a number of in-depth theories as to why ECT is an effective treatment for certain psychiatric conditions, the true mechanism of action of this treatment is not well understood
- Geriatric patients have been show to benefit greatly from ECT and should not be denied treatment based on age alone
- ECT is indicated for several psychiatric conditions, with major depressive disorder (especially with psychosis), being the most common and schizophrenia being the second most common

CONCLUSIONS (cont.):

- When ECT is being considered, all coexisting medical and surgical conditions would be assessed and, where possible, stabilized or treated before ECT. Such conditions tend to accumulate with increasing age
- There are no absolute contraindications for ECT and in fact, there are some medical conditions in which ECT might be considered safer than psychopharmacologic management of symptoms
- There are complications, risks, and side effects to ECT as with any other treatment, however, over time it has become clear that many are manageable with careful selection and with anesthesia monitoring during treatments

QUESTIONS?

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