ECT May Cause Three Types of Memory Disturbance

- **Acute Confusional State**
  - Lasting up to an hour after each treatment and varies with age
  - Consequence of both the seizure and the anesthetic agents

- **Retrograde Amnesia**
  - Affects memories of events from the period of illness and treatment
  - Greater for public events than for personal information
  - A small subset of patients will complain of more severe symptoms not matched by objective cognitive testing

- **Anterograde Amnesia**
  - Anterograde amnesia refers to the impairment in retaining new memories after ECT
  - This deficit typically resolves within 1 to 3 weeks after a course of ECT
1,250 Electroconvulsive Treatments without Evidence of Brain Injury
Bilateral ECT remains the “gold standard”
- Associated with more short-term and long-term cognitive side effects than right-unilateral ECT

Historical debate as to the relative effectiveness of unilateral vs. bilateral ECT
- Literature confounded by less-than-optimal electrode placement or dosing strategies for unilateral ECT
Electrode Placement

Bi-Frontal

Bi-Temporal

Right Unilateral
Drugs for Anesthesia

**Anesthetic Agents**

- Rapid onset of action and short duration preferable
  - Methohexital \((0.75 – 1 \text{ mg/kg})\)
    - Short-acting barbiturate
    - Most commonly used
    - Low anticonvulsant effect
    - Low cost
  - Thiopental \((2 – 5 \text{ mg/kg})\)
    - Greater risk of cardiac side effects
  - Ketamine \((0.5 – 1 \text{ mg/kg})\)
    - Proconvulsant
    - Tends to worsen ECT induced HR and BP changes
  - Propofol \((2 – 3 \text{ mg/kg})\)
    - Anticonvulsant effects
  - Etomidate \((0.2 – 0.3 \text{ mg/kg})\)
    - Few cardiac effects

**Muscle Relaxants**

- Succinylcholine \((0.5 – 1.5 \text{ mg/kg})\)
  - Depolarizing agent - leads to visible fasciculations
  - Rapid onset (1- 2 minutes)
  - Duration of action less than 10 minutes
  - Easy to use and low cost
  - Agent of choice

**Anticholinergics**

- Used to blunt asystole associated with electrical shock and to control excessive salivation
  - Atropine \((0.4 – 1 \text{ mg})\)
    - Centrally acting leading to CNS effects
  - Glycopyrrolate \((0.1 – 0.4 \text{ mg})\)
    - Peripherally acting
Technique

- For many years, it was assumed that all seizures were equally efficacious.
- Stimulus dose affects efficacy
  - Especially in RUL ECT
  - The degree to which stimulus intensity exceeds seizure threshold, and not the absolute stimulus dose administered, is critical in determining outcome.
Technique

- Changes in seizure threshold occur in less than 20% of patients during the treatment course.
- Seizure should be monitored during every treatment.
  - Motor and EEG
- Stimulus dosing must be adjusted when an inadequate seizure is induced.
Stimulus and Dosing Recommendations

- **Constant Current**
- **Waveform**
  - Brief-pulse
    - Sine-wave considered obsolete
- **Dose**
  - Maximum Outputs in USA limited to 504-576 mC
    - Higher in rest of the world
  - Bitemporal/Bifrontal
    - Minimally Dose Sensitive
  - Unilateral
    - Strong dose-response relationship

*Parameters in a bidirectional brief pulse stimulation*

*(overlapping sine-wave)*
Treatment

Number of Treatments

- No fixed number of treatments in a “Course”
- 6-12 treatments are usually needed for a response to occur
- Treat until the patient is well
  - Or no further improvement over two treatments
- Continuation treatment is necessary

Twice a week ECT

- An effective schedule
- Therapeutic outcome not different from three times a week ECT
- Slower onset of action
- Less cognitive effects
- ECT three times a week specifically indicated when early onset of clinical effect is of primary importance
Continuation treatment is necessary to sustain remission

Relapse rates after ECT
- Placebo: 84%
- Nortriptyline: 60%; Nortriptyline and Lithium: 32 – 39%
- Continuation ECT: 32%
EEG Monitoring

- **Post-ictal suppression**
  - The fall in EEG amplitude at the end of the seizure
  - Has emerged as the only significant predictor of therapeutic outcome

- **Seizure duration *per se***
  - Does not correlate with ECT outcome
  - Although seizures greater than 25 seconds are associated with better outcomes
Pre-ECT Evaluation

No “routine” pre-ECT medical evaluation should be required for all patients

Detailed physical exam and neurological exam

– Assess for presence of medical conditions or medications that increase risk of procedure
– A collaborative approach between the ECT psychiatrist, medical consultants, and anesthesia providers is more meaningful than simply asking for “clearance” before ECT
– Recommendations should be sought to optimize the patient’s medical status and/or to modify the treatment procedure to minimize medical risk
Pre-ECT Evaluation

- Spine x-rays are not routinely required
- EEG or neuroimaging should be considered when other clinical information suggests that a relevant neurological disorder might be present

The pre-ECT evaluation should document

- Cognitive status
  - Evaluation of orientation and memory
  - More detailed neuropsychological assessment is useful in patients with pre-existing cognitive impairment or dementia
- Capacity to engage in an informed consent process
Informed Consent

- Full explanation of procedure in layman’s terms
- Presentation of risks and potential benefits of treatment offered and alternatives
- Statement that patient may withdraw consent at any time and for any reason

- Patient and family are fully informed
- Written valid informed consent is signed
  - By patient
  - “Significant family member”
- Consent should be obtained before the beginning of each phase of treatment and periodically afterwards
Informed Consent

- Ideally patient and family can see an ECT video
  - For education and unambiguous documentation of information presented
Mechanism of Action

- Still largely unknown
- Two demonstrated neurobiological effects are the basis for interest
  - Hypercortisolemia
    - Accompanies melancholia and catatonia
      - Melancholia responsive to ECT > 90%
    - Reverses with effective ECT
    - Demonstrated using the Dexamethasone Suppression Test (DST) or Dexamethasone-CRH Test
      - Normal DST follows remission
      - Abnormal DST predicts relapse
  - Anatomic changes in animal trials using ECS
    - Neuronal sprouting without cell loss
    - Enhanced neurogenesis in the dentate gyrus
ECT in Britain:  
A Shameful State of Affairs

“If ECT is ever legislated against or falls into disuse it will not be because it is an ineffective or dangerous treatment; it will be because psychiatrists have failed to supervise and monitor its use adequately. It is not ECT which has brought psychiatry into disrepute. Psychiatry has done just that for ECT.”
Reference Texts


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Reference Texts


Posttest Question 1

ECT has demonstrated efficacy in the treatment of:

A. Depressive Episodes
B. Manic Episodes
C. Catatonia
D. Acute Psychotic Episodes
E. All of the above
Posttest Question 2

Methohexital is the preferred anesthetic agent for ECT because:
A. It is relatively inexpensive
B. It is only moderately anticonvulsant
C. It has quick onset of action
D. It has brief duration of action
E. All of the above
Posttest Question 3

Which best describes the role of the medical consultant in the pre-ECT evaluation?

A. To provide clearance to undergo ECT
B. To help optimize the patient’s medical condition prior to ECT
C. To tell the psychiatrist if ECT is appropriate for the patient
D. To identify contraindications to ECT
Posttest Question 4

Which is NOT true concerning the seizure during ECT?

A. Should be monitored with EEG
B. Should be monitored with EMG
C. Cumulative seizure length during a course of ECT is closely correlated with clinical outcome
D. Failure to elicit a seizure is associated with lack of efficacy
E. Seizure threshold increases during the treatment course
Posttest Question 5

Discovery of which of the following medical conditions in a patient being evaluated for ECT is most concerning?

A. Type II Diabetes
B. Recent Myocardial Infarction
C. HIV/AIDS
D. Psoriasis
E. Epilepsy
Posttest Answers

1. E
2. E
3. B
4. C
5. B