Electroconvulsive Therapy (ECT)

RANZCP Webinar series for rural trainees
Tuesday 30 June 2015
WEBINAR OUTLINE

- **Introduction & Housekeeping**
  Dr Greg Young, Clinical Senior Lecturer, Department of Psychological Medicine, Otago University and member of the RANZCP Rural Psychiatry Working Party.

- **Electroconvulsive Therapy: A Critical Update**
  Prof John Tiller, Professor Emeritus of Psychiatry, The University of Melbourne, Director of the Electroconvulsive Therapy (ECT) Service and Director of the Parent Infant Unit, at Albert Road Clinic.

- **Potential topics for Exams or Assessments**
  Dr Raju Lakshmana, Consultant Psychiatrist at Goulburn Valley Health, Senior Lecturer in Psychiatry with Rural Health Academic Centre.

- **Questions & answers**
  Participants (that’s you!) & presenters
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• Let us know who’s participating

• Send in your questions. Use the chat box!
ELECTROCONVULSIVE THERAPY
A CRITICAL UPDATE

Prof John Tiller
Professor Emeritus, Department of Psychiatry, The University of Melbourne,
Albert Road Clinic
ELECTROCONVULSIVE THERAPY: A GUIDE, 2ND EDITION

JWG Tiller and RW Lyndon, Editors
Health Education Australia Limited, Publishers

2013

www.heal.edu.au/bookshop
ECT

- Often referred to as a single treatment, as if unchanged for years
- Not a single treatment
  - Use of electrical stimulus to cause a fit for therapeutic purposes
  - Multiple techniques with quite different outcomes
- What treatment should I prescribe?
- How should I use it (titration?) and adjustments
- Do medicines help?
ADDITIONAL ISSUES

• ECT is contentious, even though
  – There is no logical reason why this should be so
  – Focus of anti-psychiatry movement from the 1970s
  – Active misinformation in public arena

• The most effective treatment for some disorders
  – Mania
  – Severe depression
  – Resistant schizophrenia with positive symptoms

• Medical Practice
  – Medical framework
    • Evidence based and clinical experience
  – Social framework – respond to society expectations and fears
  – Legal framework – must comply with the law
    • Specific legislation and regulation regarding ECT
ELECTROCONVULSIVE THERAPY

• Advantages
  – Effective when other treatments don’t work
  – Most effective with most severe illness

• Disadvantages
  – Multiple brief anaesthetics
  – Acute confusional states
  – Memory impairment
    • anterograde and retrograde
    • not with new memories after ECT
MULTIPLE TYPES OF ECT

- **Stimulus**
  - sine wave; brief pulse square wave, 1-2.5 ms; ultrabrief pulse 0.25 ms, 0.3 ms, 0.5 ms; intermittent pulses
- **Repetition frequency** (100 pps, 25 pps),
- **Train Duration** (typically 1-20 secs)
- **Electrode placement**
  - Bilateral (bitemporal), bifrontal, right unilateral, left unilateral
- **Monitoring**
  - Fronto-mastoid with acromioclavicular ground, or none
- **Dosing**
  - Titration, age based, maximal for all
- **Dose range**
  - 10 - 504 mC, 10 – 1008 mC, 25 – 504 mC, 25 – 1008 mC
- **Options**
  - 40,000+
MAJOR CHANGES WITH ECT ANAESTHETICS

- Adequate oxygenation
- Hyperventilation to increase neuromuscular excitability
- Consistent quality anaesthetics (recovery best with propofol)
  - Extremely low mortality <1:100,000?
- Adequate muscle relaxant
  - Suxamethonium, or
  - Rocuronium/sugammadex
- Avoid opiates as not anaesthetics, risk of awareness
• Figure one: Bitemporal electrode placement

The images for this section of the presentation are available in:

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• Figure 2: Bifrontal electrode placement

The images for this section of the presentation are available in:

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Figure 4: Unilateral electrode placement (d’Elia)

The images for this section of the presentation are available in:

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• Figure 8: Electroencephalographic monitoring electrode placement

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STIMULUS WAVEFORMS

- Sine wave
- Square wave
- Bidirectional brief pulse
- Unidirectional brief pulse
• Figure 7: Bidirectional square wave stimulus 0.3ms pulse width (ultrabrief pulse)

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WHY ULTRABRIEF (0.3MS PULSE WIDTH)?

• Pulse width optimal to induce a fit
  – Greater energies needed at
    • 0.25, 0.5, 1.0, 1.5 and 2 ms to induce a fit
• Effective, right unilateral and bifrontal
• Titration, appropriate dosing, no drugs
• Smaller zone of direct stimulation
• Dramatic reduction in cognitive a/e

PARTICULAR ISSUES WITH UB ECT

• Patients remember everything up to anaesthetic induction, and from very soon after recovery
  – Maintain discretion in ECT suite
• Avoid opiates
  – Not anaesthetics
  – Increased risk of awareness
• Motor fit may be brief (5-10 secs) or longer, but still efficacious
• Slow development of anticonvulsant response over treatment course
  – May complete course with minimal dose increase
• Cannot assess effectiveness until up to 6-10 ECT. Some respond quickly, others slowly as for other types of ECT
• Short courses seem associated with more relapse
  – Consolidate improvement after recovery (empirical, recovery +2)
• Treatments to recovery similar to other placements ~10-12
THERAPEUTIC WINDOW WITH ECT?

• Dose too low
  – Ineffective, and confusion

• Dose OK, most effective, few if any A/E
  – Most common – suxamethonium induced aches

• Dose too high
  – Less effective, and confusion
  – If in doubt – re-titrate
COGNITIVE ADVERSE EFFECTS

• The main objection to ECT
• Especially autobiographical memories
• MMSE does not assess adversity well
• Cognitive tests are mostly long and cumbersome
• Modified CAPECT
  – Do you have memory problems?
  – How badly do they affect you?
• Some newer instruments may be a help
WHAT NOW?

- Depends on balance of effectiveness, speed of recovery, and relevance of possible cognitive adverse events
- Any treatment may be first-line for a particular patient
- If minimising cognitive adverse events is most important, then consider as a starting point:
  - First-line
    - Right unilateral ultrabrief (0.3ms), 6x threshold
  - Second line
    - Right unilateral “DGx (1ms)” settings, 5x threshold
    - Bifrontal ECT “Ultrabrief” settings, 1.5x threshold
    - Bifrontal ECT “DGx” settings, 1.5x threshold
    - Bitemporal ECT “DGx” settings, 1.5x threshold
WHAT ABOUT MEDICATIONS AND ECT?

• Antidepressants for depression
  – Generally do not improve on ECT alone
    • Rate of response, degree, or numbers responding
    • Obscures whether it is antidepressant or ECT that is working
    • Commence once ECT shown effective

• Antipsychotics for psychosis
  – Improve acute positive symptoms – better with ECT
    • Not residual symptoms or negative schizophrenia
    • May get illusion of negative symptoms response if treating depression with schizophrenia

• Medicines that interfere with ECT
  – Anticonvulsants, lithium
ECT ADMINISTRATION A SUPER SPECIALTY

- Psychiatrists with additional training
- Certification of training, or expectation of adequate training
  - Must be able to document adequate training
- Regular reviews, increasing expertise, and introducing new techniques
- Prescribing doctor
  - Increasingly unaware of optimal ECT options
  - Discuss options with ECT service if uncertain
- Not just a doctor “hitting the button”
- >30 staff involved in giving 1 ECT
CONCLUSIONS ABOUT ECT

• ECT remains a useful treatment in psychiatry
  – Uniquely therapeutic for some, but not effective for all
  – Manifest adverse effects (but minimal now)
• Role not extinguished by pharmacotherapy
• Major changes in technology, training, procedures – expertise essential
• Ultrabrief technique appears to offer significant advances in tolerability
• Focus of continued development, research and understanding
ECT- Potential topics for Exams or Assessments

Dr Raju Lakshmana
Consultant Psychiatrist at Goulburn Valley Health
Senior Lecturer in Psychiatry with Rural Health Academic Centre
• How many are preparing for:
  a) Written Exam
  b) Clinical Exam
  c) Workplace Based Assessments
  d) None
WRITTEN EXAMS

- Core knowledge about ECT
  - Indications/ Contraindications
  - Technique
  - Anesthetics
  - Side effects and management of SEs
  - EEG aspects
- Applied Knowledge:
  - ECT as a part of various treatment algorithms
  - Decision making before and during course of ECT
Which of the following conditions are contraindication for ECT:

a) Seizure Disorder
b) Increased intracranial pressure
c) Supraventricular tachycardia
d) Phaeochromocytoma
e) IDDM
• 67 y.o man with recurrent depressive disorder presents with severe depressive episode of 2 month duration. He has developed nihilistic delusions and is very agitated over the last 2 weeks. He has been on Escitalopram 20 mg/day for last 2 years.
  – Discuss the management
CLINICAL EXAMS- OSCE

- Consent
- Explaining the technique
- Interpreting EEG and making further decisions
- Assessment of cognitive functions in patients receiving ECT
- Management of ECT related side effects
- Explaining ECT to carer/ family member
- ECT as a treatment option
- ECT governance
WORK PLACE BASED ASSESSMENT

- Mini-Clinical Evaluation Exercise
- Case Based Discussion
- Professional Presentation
- Scholarly project
CONSENT

- Capacity to provide informed consent (= Right to refuse)
- Accurate information in simple language*
- Indications and alternatives
- Adequate time to consider and no “coercion”
- Right to withdraw consent
- Access to another opinion
- Conflicts of Interest
- Witness and documentation
- Reassess between treatments
POLL QUESTION

• If a patient arrives at the ECT suite with all paper-work (including consent) completed but seems reluctant to receive treatment, you should
  a) Continue to provide treatment
  b) Refuse to provide treatment
  c) Re-assess the patient’s consent
  d) Call the treating Psychiatrist
  e) None of the above
• Motor seizure not important in Modified ECT
• Good or Adequate EEG seizure:
  – Duration (15-20s)
  – Synchronicity and amplitude
  – Recruitment (<10s)
  – Post-ictal Supression (>70%)
• Clinical Response is the best predictor
Patient related issue:
- Increasing Threshold during treatment

Other reasons:
- Anticonvulsant drugs
- Poor baseline recording
- Poor contact of leads, movement abnormalities

Decision to increase dose only if clinical progress inadequate
### A QUANTITATIVE APPROACH TO EEG ASSESSMENT

#### (a) Quantitative indices derived by Thymatron

1. If the Seizure Energy Index (SEI) is:
   - $\geq 800$ : 0 pts.
   - $< 800$ but $\geq 600$ : 1 pt.
   - $< 600$ but $\geq 400$ : 2 pts.
   - $< 400$ : 3 pts.

2. If the Post-Ictal Suppression Index (PISI) is:
   - $\geq 70\%$ : 0 pts.
   - $< 70\%$ but $\geq 55\%$ : 1 pt.
   - $< 55\%$ but $\geq 40\%$ : 2 pts.
   - $< 40\%$ : 3 pts.

#### (b) Qualitative measures to be scored ONLY if the above quantitative indices are NOT available from the Thymatron printout.

1. If the slow wave amplitude appears to be uniformly low on subjective appraisal: 1 pt.
2. If the post-ictal EEG trace appears to be insufficiently suppressed (flattened) compared to baseline, on subjective appraisal: 1 pt.

#### (c) Measures of Seizure Duration

1. If the total EEG seizure duration is:
   - $\geq 20$ sec.: 0 pts.
   - $< 20$ sec. but $\geq 15$ sec.: 1 pt.
   - $< 15$ sec. but $\geq 10$ sec.: 2 pts.
   - $< 10$ sec. but $\geq 5$ sec.: 3 pts.
   - $< 5$ sec.: 4 pts.

2. If a reliably observed motor seizure is:
   - $\geq 12$ sec.: 0 pts.
   - $< 12$ sec. but $\geq 9$ sec.: 1 pt.
   - $< 9$ sec. but $\geq 6$ sec.: 2 pts.
   - $< 6$ sec. but $\geq 3$ sec.: 3 pts.
   - $< 3$ sec.: 4 pts.

#### (d) Measures of Slow Wave regularity

If the TOTAL duration of regular, well formed spike-wave and/or slow wave complexes in Left and Right Traces considered SEPARATELY and then ADDED together, is:

- $\geq 20$ sec.: 0 pts.
- $< 20$ sec. but $\geq 10$ sec.: 1 pt.
- $< 10$ sec.: 2 pts.

Courtesy: Dr Shane Gill, 2014 (South Australia)

#### (e) Measures of inter-hemispheric concordance.

If the TOTAL duration of L-R concordant spike-wave and/or slow wave complexes is:

- $\geq 10$ sec.: 0 pt.
- $< 10$ sec. but $\geq 5$ sec.: 1 pt.
- $< 5$ sec.: 2 pts.

#### (f) Miscellaneous Factors

1. If, on subjective appraisal, the end-point appears to be indistinct, patchy or prolonged: 1 pt.
2. If there have been 4 to 6 consecutive treatments delivered at the same stimulus dose: 1 pt.
3. If there have been 7 or more treatments delivered at the same stimulus dose: 2 pts.

If score $\geq 8$ then increase dose at next session
POLL QUESTION

Looking at EEG 1 and 2, please choose the incorrect statement:

a) EEG 1 is of better quality
b) You may recommend increasing the dose of ECT based on EEG 2 alone
c) You will correlate EEG 2 to clinical improvement and other factors and make a decision
d) You will continue treatment as usual
PRE-ECT WORKUP

• Informed Consent
• Physical Examination
• Investigations: FBE, U/E, ECG, CXR
• Physician review of comorbid medical conditions
• Anaesthetic review if poor anaesthetic history
• Second opinion
• Optimization of medication
HIGH RISK OR SPECIAL POPULATIONS*

- Pregnant, Medically unstable, Children
- Second opinion a must
- Documented ECT management plan from all teams involved re special issues
- Close monitoring (ensure ECT centre is well resourced or shift to a tertiary centre)
- Involve family/ care givers in all decisions
• Anterograde Amnesia
• Patchy autobiographical retrograde amnesia
• Be upfront and advise making note of important information
• Monitor regularly: MMSE, MOCA*, VF, Time to orientation (Please do baseline to compare)
• Post-ECT confusion
• UB<UL<BF<BL, frequency of ECT, dosing and EEG quality, concomitant medication
CHOOSING BILATERAL AS FIRST LINE

- Urgent Response required
- Good response in the past to BL
- Minimize titration or exposure to GA
- Conditions other than depression
- Poor response to UL in past
- Beware of cognitive issues
ECT GOVERNANCE

• Setting up a new service
• Documentation
• Compliance with Legislation
• Risk Management
• Dealing with complaints and adverse outcomes
Following are medico-legally responsible for conduct of ECT:

a) Psychiatrist providing ECT
b) Psychiatrist prescribing ECT
c) Director of Clinical Services
d) ECT Nurse
e) ECT Anaesthetist
Upcoming events:
The next webinar in this series will be **First Episode Psychosis** webinar on **Tuesday 7th of July** this will be chaired by Dr Greg Young with speakers Prof David Castle and Dr Dominiek Baetens. To register for this webinar [click here](#)
Thank you for your participation

Help us by completing the exit survey for this webinar

Continue the conversation on the new College online forums [www.ranzcp.org(forums)](www.ranzcp.org/forums)
- Use your College membership details to login
- Agree to the Terms and Conditions
- Find our thread in the Clinical Practice issues section titled ‘Electroconvulsive Therapy (ECT) Webinar discussion’
FURTHER RESOURCES


- **Consent:** Wesley Mental Health Service – Facts about Electroconvulsive Therapy (2012) available at: [https://www.youtube.com/watch?v=5Ct90t_iF6Q](https://www.youtube.com/watch?v=5Ct90t_iF6Q)


- **Cognitive Issues:** [Montreal Cognitive Assessment (MOCA) V7.1](https://www.montrealcogtest.com)