BILATERAL ECT

TREATMENT PROTOCOL FOR THE THYMATRON IV

Method 1 – preferred method to minimise cognitive side-effects.

1. Measure seizure threshold (ST) in millicoulombs (mC)

- Set machine at level 2 = 10% energy, 50mC, for both sexes over 20 yrs (see chart).
- Increase one level at a time until a seizure is produced (ST is therefore below this dose).
- Give a maximum of three* stimulations on any one ECT day.
- If not successful, check your procedure and begin at level 4 next time.
- For young people, start at level 1.

2. First 'full' treatment session (note, this will usually be on the next ECT day)

- Set machine at a level which represents ST + 50% (this will usually be + 2 levels).
- Position ECT electrodes over fronto - temporal areas bilaterally (see diagram).
- Follow the instructions for use of the Thymatron System IV machine.
- Accept as satisfactory if a fully generalised 'tonic-clonic' seizure is produced.
- Record length of seizure for reference.

3. Stimulus dosing for subsequent ECT

- Increase dose by one level if no clinical improvement after four ECT treatments.
- Consider increase dose by one level if seizure shortens *progressively* to 50% original.
- Decrease by one level if cognitive side-effects are troublesome.

4. Termination of prolonged seizures

- Seizures lasting more than 120secs on EEG should be terminated.
- Help prepare midazolam, diazemuls or anaesthetic agent for the anaesthetist at 90secs.

* If no seizure was obtained at levels 2 and 3, consider an increase to level 5 (176mC) for clinical efficacy.

Method 2 – alternative method for patients > 20 years or when speed of response is important.

1. Estimate seizure threshold (ST) to be 55mC +/- 20mC

2. First Treatment Session

- Set machine at 25% energy (ie. level 4, 126 mC, a level estimated to be approx. ST + 75mC).
- Position ECT electrodes over fronto-temporal areas bilaterally (see diagram).
- Follow the instructions for use of the Thymatron System IV machine.
- Accept as satisfactory if a fully generalised 'tonic-clonic' seizure is produced.
- Re-stimulate at one level higher if no seizure, to a maximum of three stimulations.
- Record length of seizure for reference.

3. Stimulus Dosing for subsequent ECT

- Increase dose by one level if no clinical improvement after four ECT treatments.
- Consider increase dose by one level if seizure shortens *progressively* to 50% original.
- Decrease by one level if cognitive side-effects are troublesome.

4. Termination of prolonged seizures

- Seizures lasting more than 120secs on EEG should be terminated.
- Help prepare midazolam, diazemuls or anaesthetic agent for the anaesthetist at 90secs.

MODERATE DOSE UNILATERAL* ECT

TREATMENT PROTOCOL FOR THE THYMATRON IV

Method 1 – preferred method to minimise cognitive side-effects.

1. Measure seizure threshold (ST) in millicoulombs (mC)

- Set machine at either level 1 (females) or 2 (males), see chart of levels.
- Increase one level at a time until a seizure is produced (ST is therefore below this dose).
- Give a maximum of three** stimulations on any one ECT day.
- If not successful, check your procedure and begin at either level 3 (females) or level 4 (males) next time.

2. First treatment session (note, this will usually be on the next ECT day)

- Set machine at a level which represents 8 x seizure threshold (mC), see chart.
- Position ECT electrodes over right temple and right parieto-occipital areas.
- Follow the instructions for use of the Thymatron System IV machine.
- Accept as satisfactory if a fully generalised 'tonic-clonic' seizure is produced.
- Record length of seizure for reference.

3. Stimulus dosing for subsequent ECT

- Increase dose by one level if no clinical improvement after four ECT treatments.
- Consider increase dose by one level if seizure shortens *progressively* to 50% original.
- Decrease by one level if cognitive side-effects are troublesome.

4. Termination of prolonged seizures

- Seizures lasting more than 120secs on EEG should be terminated.
- Help prepare midazolam, diazemuls or anaesthetic agent for the anaesthetist at 90secs.

** If no seizure was obtained at levels 2 and 3, consider an increase to level 7 (378mC) for clinical efficacy.

Method 2 – alternative method for patients > 30 years or when speed of response is important.

2. Estimate seizure threshold (ST) to be 45mC +/- 20mC

2. First Treatment Session

- Set machine at 75% energy (ie. 378 mC, a level estimated to be approx. 8 x ST).
- Position ECT electrodes over right temple and right parieto-occipital areas.
- Follow the instructions for use of the Thymatron System IV machine.
- Accept as satisfactory if a fully generalised 'tonic-clonic' seizure is produced.
- Record length of seizure for reference.

3. Stimulus Dosing for subsequent ECT

- Increase dose by one level if no clinical improvement after four ECT treatments.
- Consider increase dose by one level if seizure shortens *progressively* to 50% original.
- Decrease by one level if cognitive side-effects are troublesome.

4. Termination of prolonged seizures

- Seizures lasting more than 120secs on EEG should be terminated.
- Help prepare midazolam, diazemuls or anaesthetic agent for the anaesthetist at 90secs.

ECT Treatment Notes:

- The aim is to deliver effective treatment for ***each*** patient on ***each*** occasion.

for unilateral ECT:

- ECT is given to the non-dominant hemisphere, usually the right, even in left-handed patients. For left handed people, first measure seizure threshold with right unilateral ECT and if confusion occurs switch to left unilateral ECT next time. Do not increase dose until sure of laterality.
- The seizure threshold is less than for bilateral ECT.
- The effective dose of electricity is between 5 – 8 times seizure threshold.
- Even at high doses the cognitive side-effects are negligible so this is presently the treatment of choice for young people, patients where speed of response is **not** paramount or those suffering from dementia.
- Because of reduced cognitive side-effects, measurement of the seizure threshold may be less critical than for bilateral ECT.
- It may be necessary to change to bilateral ECT if there has been no beneficial effect after 4 unilateral ECTs.

for bilateral ECT:

- This involves giving a dose of electricity approximately 50-100% above seizure threshold using a bi-temporal electrode position.
- Most patients (75%) will have a seizure threshold (ST) below 100mC but there may be considerable variation between individuals so it is best to measure the ST.
- If there has been no clinical improvement after 4 apparently 'adequate' ECTs then increase the dose next time by 75-100mC, *provided* there have been no cognitive side-effects.
- It is vital to record any post treatment confusion because this is an indication that the dose of electricity has been too high for that particular patient, who may therefore be at increased risk of cognitive side-effects.
- If cognitive side-effects are troublesome:
  i) reduce dose by 50mC OR
  ii) consider high dose unilateral ECT

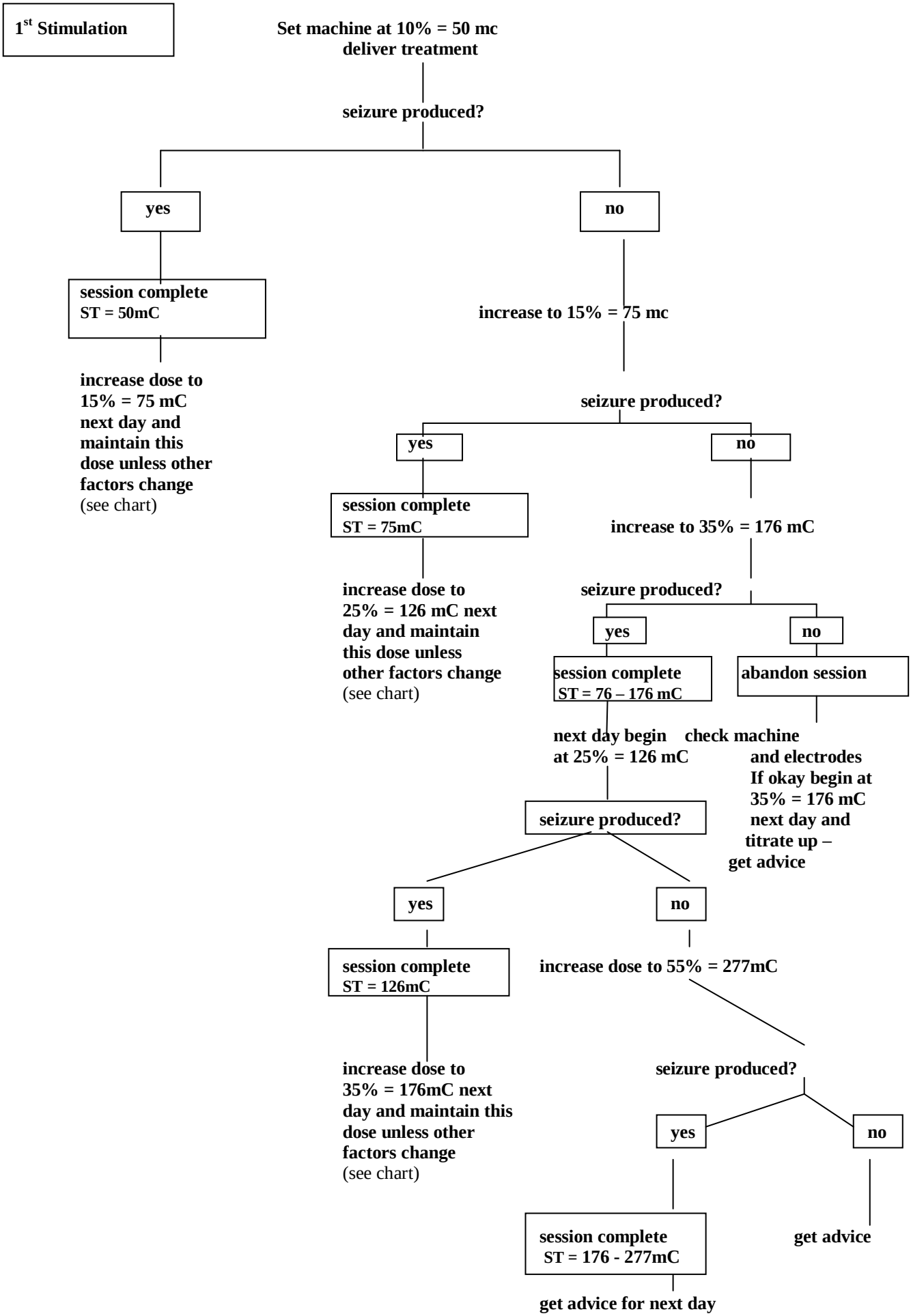
for all:

- Both efficacy and side-effects increase with the dose above seizure threshold for any given individual.
- The seizure length is idiosyncratic and is **not** itself an indicator of efficacy.
- However as the course of treatment proceeds it may be necessary to increase the dose of electricity given to take account of the anticonvulsant action of ECT. A progressive shortening of the seizure may give some indication of this.
- The timing of the visible seizure is taken from the end of stimulation to the end of bilateral seizure activity.
- The seizure length as determined by the EEG will usually be 10 - 40 % longer than the visible seizure; the relationship between these also tends to be idiosyncratic.
- There is good correlation between short EEG seizures and short visible seizures but the converse is **not** true, up to 6% of patients with a short visible seizure may be experiencing pronged cerebral EEG activity. Such seizure activity should be terminated after 120 seconds.
- ECT machines are not directly comparable in terms of effect for a given total charge.
- The above procedure will be reviewed in the light of clinical research.

Refs: The ECT Handbook, second edition, 2005. Royal College of Psychiatrists.
McColl & Sackeim, Archives Gen Psychiatry May 2000. vol 57, 438-444.
Mayur PM et al 1999 Brit J Psych. 174: 270-2

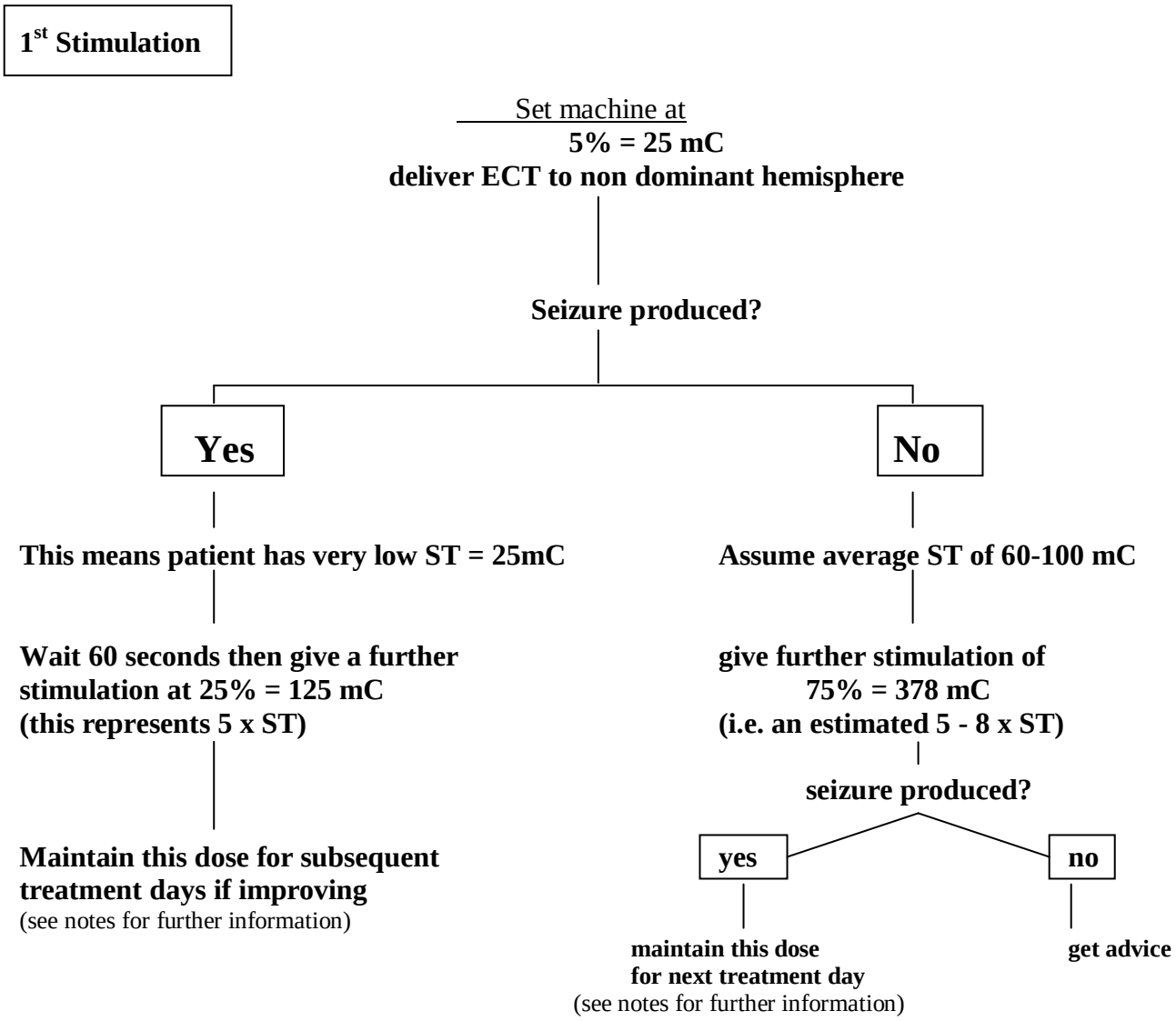
FLOWCHART FOR BILATERAL ECT: MEASURING SEIZURE THRESHOLD

Dr G Fergusson 2006



FLOWCHART FOR UNILATERAL ECT : FIRST SESSION

Dr G Fergusson 2006



Notes:

- ECT is given to the non-dominant hemisphere, usually the right, even in left-handed patients. For left handed people, first measure seizure threshold with right unilateral ECT and if confusion occurs switch to left unilateral ECT next time. Do not increase dose until sure of laterality.
- The seizure threshold is less than for bilateral ECT.
- The effective dose of electricity is between 5 – 8 times seizure threshold.
- Even at high doses the cognitive side-effects are negligible so this is presently the treatment of choice for young people, patients where speed of response is **not** paramount or those suffering from dementia.
- Because of reduced cognitive side-effects, measurement of the seizure threshold may be less critical than for bilateral ECT.
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