Appendix C
Guidelines for treating status epilepticus in adults and children

1.1 Treating convulsive status epilepticus in adults

General measures

1st stage (0–10 minutes)
- Secure airway and resuscitate [Early status]
- Administer oxygen
- Assess cardiorespiratory function
- Establish intravenous access

2nd stage (0–30 minutes)
- Institute regular monitoring
- Consider the possibility of non-epileptic status
- Emergency AED therapy
- Emergency investigations
- Administer glucose (50 ml of 50% solution) and/or intravenous thiamine (250 mg) as high potency intravenous Pabrinex if any suggestion of alcohol abuse or impaired nutrition
- Treat acidosis if severe

3rd stage (0–60 minutes)
- Establish aetiology [Established status]
- Alert anaesthetist and ITU
- Identify and treat medical complications
- Pressor therapy when appropriate

4th stage (30–90 minutes)
- Transfer to intensive care [Refractory status]
- Establish intensive care and EEG monitoring
- Initiate intracranial pressure monitoring where appropriate
- Initiate long-term, maintenance antiepilepsy drug therapy

Emergency investigations
Blood should be taken for blood gases, glucose, renal and liver function, calcium and magnesium, full blood count (including platelets), blood clotting, antiepilepsy drug levels; 5ml of serum and 50ml of urine samples should be saved for future analysis, including toxicology, especially if the cause of the status epilepticus is uncertain. Chest radiograph to evaluate possibility of aspiration. Other investigations depend on the clinical circumstances and may include brain imaging, lumbar puncture.

Monitoring
Regular neurological observations and measurements of pulse, blood pressure, temperature. ECG, biochemistry, blood gases, clotting, blood count, drug levels. Patients require the full range of ITU facilities and care should be shared between anaesthetist and neurologist.
EEG monitoring is necessary for refractory status. Consider the possibility of non-epileptic status. In refractory status epilepticus, the primary end-point is suppression of epileptic activity on the EEG, with a secondary end-point of burst-suppression pattern (i.e. short intervals of up to 1 second between bursts of background rhythm).
1.1.1 Emergency antiepilepsy drug treatment for convulsive status epilepticus

<table>
<thead>
<tr>
<th>Stage</th>
<th>Treatment</th>
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<tbody>
<tr>
<td><strong>Premonitory stage</strong> (pre-hospital)</td>
<td>Diazepam 10–20 mg given rectally, repeated once 15 minutes later if status continues to threaten, or midazolam 10 mg given buccally</td>
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<td>If seizures continue, treat as below</td>
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<tr>
<td><strong>Early status</strong></td>
<td>Lorazepam (i.v.) 0.1 mg/kg (usually a 4 mg bolus, repeated once after 10–20 minutes; rate not critical)</td>
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<td>Give usual AED medication if already on treatment</td>
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<tr>
<td><strong>Established status</strong></td>
<td>Phenytoin infusion at a dose of 15–18 mg/kg at a rate of 50 mg/minute or fosphenytoin infusion at a dose of 15–20 mg phenytoin equivalents (PE)/kg at a rate of 50-100 mg PE/minute and/or Phenobarbitone bolus of 10-15 mg/kg at a rate of 100 mg/minute</td>
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<tr>
<td><strong>Refractory status</strong></td>
<td>General anaesthesia, with one of:</td>
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<td>o propofol (1-2mg/kg bolus, then 2-10mg/kg/hour) titrated to effect.</td>
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<td></td>
<td>o midazolam (0.1-0.2mg/kg bolus, then 0.05-0.5mg/kg/hour) titrated to effect.</td>
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<tr>
<td></td>
<td>o thiopentone (3-5mg/kg bolus, then 3-5mg/kg/hour) titrated to effect; after 2-3 days infusion rate needs reduction as fat stores are saturated.</td>
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<td>Anaesthetic continued for 12–24 hours after the last clinical or electrographic seizure, then dose tapered</td>
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</table>

*In the above scheme, the refractory stage (general anaesthesia) is reached 60/90 minutes after the initial therapy.

This scheme is suitable for usual clinical hospital settings. In some situations, general anaesthesia should be initiated earlier and, occasionally, should be delayed.

Experience with long-term administration (hours or days) of the newer anaesthetic drugs is very limited. The modern anaesthetics have, however, important pharmacokinetic advantages over the more traditional barbiturates.

**Long term antiepilepsy drug therapy**

Long-term, maintenance, antiepilepsy therapy must be given in parallel with emergency treatment. The choice of drug depends on previous therapy, the type of epilepsy, and the clinical setting. Any pre-existing AED therapy should be continued at full dose, and any recent reductions reversed.
If phenytoin or phenobarbitone has been used in emergency treatment, maintenance doses can be continued orally or intravenously guided by serum level monitoring. Other maintenance AEDs can be started also, with oral loading doses. Care needs to be taken with nasogastric feeds, which can interfere with the absorption of some AEDs. Once the patient has been free of seizures for 12–24 hours and provided that there are adequate plasma levels of concomitant antiepilepsy medication, then the anaesthetic should be slowly tapered.

1.2 Guidelines for treating status epilepticus in children

1.2.1 Treating convulsive status epilepticus

In 2000, a consensus guideline was produced by the Status Epilepticus Working Party of the British Paediatric Neurology Association. This was based on a systematic review of paediatric status epilepticus evidence, which identified only two randomised controlled trials. The guideline was therefore based on both evidence (paediatric and adult where appropriate) and clinical experience. The guideline is primarily designed for the A&E department or the hospital paediatric ward. The investigation of the cause of status epilepticus is not addressed.

Generalised convulsive (tonic-clonic) status epilepticus is defined as a generalised convulsion lasting 30 minutes or longer, or repeated tonic-clonic convulsions occurring over a 30 minutes period without recovery of consciousness between each convulsion. However, the guideline stated that ‘for practical purposes, the approach to the child who presents with a tonic-clonic convulsion lasting more than 5 minutes should be the same as the child who is in “established” status – to stop the seizure and to prevent the development of status epilepticus’.

The consensus protocol can be seen in Figure 1.
Figure 1  Treatment guideline for an acute tonic-clonic convulsion including established convulsive status epilepticus¹. Modified from Appleton 2000. Permission sought and awaiting response.
1.3 Non-convulsive status epilepticus in adults and children

Suggested by GDG

This is less common than tonic-clonic status epilepticus. Treatment for non-convulsive status epilepticus is less urgent than for convulsive status epilepticus. Treatment should be considered as follows:

- Maintenance or reinstatement of usual oral AED therapy
- Use of intravenous benzodiazepines under EEG control, particularly if the diagnosis is not established
- Referral for specialist advice and/or EEG monitoring

Reference List