Epilepsy, defined as a tendency to recurrent unprovoked seizures, is a common disease, affecting approximately 1/100 (37,000) people in Ireland. Although ideally, the majority of patients presenting with epilepsy should be seen at some point by a neurologist (approximately one-third will require continuous specialist care), protracted waiting-lists shift greater responsibility onto GPs. Combined care between GP and neurologist, with neurology input at regular intervals, eg. annually, would probably offer optimal management to patients with epilepsy.

Here, we present an overview of the approach to diagnosis and treatment. Advice on practical aspects of care, including advice pertaining to lifestyle, work, contraception and driving are probably most relevant. However, a brief reminder of epilepsy classification is important (see Table 1), as failure to classify can lead to suboptimal treatment. Because unfamiliarity with new antiepileptic drugs (AEDs) can create reluctance to change or introduce new AEDs, we will discuss some firstline treatment options and common side-effects.

**Treatment after first seizure**

It is generally advised that treatment be withheld until a second unprovoked seizure occurs, then fulfilling the criteria for epilepsy. Two-thirds of patients presenting with a first seizure will not develop a second one.

Patients with a structural lesion on imaging are more likely to develop recurrent seizures (localisation-related epilepsy). The question of benefit in commencing prophylactic AED in the setting of CNS tumours often arises. Standard first-line therapy is recommended if seizures develop (eg. carbamazepine, oxcarbazepine, levetiracetam, sodium valproate, phenytoin). Although data do not favour a particular agent, those which have little or no induction of hepatic cytochrome p-450 enzymes, eg. levetiracetam, oxcarbazepine, topiramate and zonisamide are attractive, since they avoid potential interactions with other commonly-used drugs in general practice.

There is little evidence that prophylactic AED in metastatic or primary brain tumours prevents seizure onset. A review by the Quality Standards Subcommittee of the American Academy of Neurology showed that prophylactic anti-convulsants did not affect frequency of subsequent seizures, and were associated with deleterious interactions with cytotoxic drugs and corticosteroids.

**Combined therapy-warnings**

Slowly titrate and wean AEDs. If adding a second AED, it makes sense to choose an agent with a different mechanism of action and side effect profile. Our policy is to add a second AED prior to reduction of initial AED.

‘Prognosis’ depends upon epilepsy diagnosis and control after AED initiation. Complete seizure control can be attained on monotherapy or combined therapy in only 70%-80% of patients. In primary generalised epilepsy, the prognosis for complete seizure control is approximately 90%. Sometimes, after a few years of seizure freedom, weaning off AEDs is possible on a trial basis. If seizure control is not achieved on first AED, introduction of a second agent offers a 5% chance of control; addition of a third offers only 3% chance.

**Specific warnings**

Enzyme-inducing agents (carbamazepine, phenytoin, phenobarbitone) all induce the hepatic enzyme p450 system, thereby increasing metabolism of other drugs relying on this system for metabolism (eg. OCP, statins, antibiotics, antidepressants, cardiovascular, chemotherapy and immunomodulatory drugs). The dose of these drugs may need to be elevated for standard therapeutic effects.

Valproate and lamotrigine are widely used in learning dis-
ability. Any dose of valproate increases serum lamotrigine concentration by ~100%. Thus, the dose of lamotrigine usually needs to be decreased with the addition of valproate.

Checking drug levels

The levels of only a few AEDs can be checked routinely in hospital laboratories, ie. sodium valproate, lamotrigine, phenytoin, phenobarbitone and carbamazepine.

Levels of levetiracetam can be checked in UK labs, but are not routinely checked in practice. Levels simply a guide; toxicity can occur even at levels within the normal reference range. Similarly, therapeutic effects may only be achievable at levels beyond the reference range (if side-effects are tolerable). The risk of Steven-Johnson syndrome and toxic epidermal necrolysis in new users is highest within the first two months.

Seizures and alcohol dependence syndrome

A small amount of alcohol (2-3 drinks/day) is unlikely to provoke a seizure. After binges, withdrawal seizures, which occur more commonly with chronic alcohol abuse, may occur within 6-72 hours after discontinuation (provoked seizure). The exact cause of alcohol-associated epilepsy is unclear; no one cause predominates. Whether it occurs in withdrawal states or during binges, recurrent seizures in alcoholic patients should be treated, unless abstinence is achieved. Even after discontinuation of alcohol, these patients may develop recurrent unprovoked seizures and require treatment.

Increase in seizure frequency

A number of questions should be asked regarding: compliance, recent new prescriptions, inter-current infection, altered sleeping pattern, stressors, alcohol and pregnancy.

Levels should be checked if possible and AED dose maximised. A second agent should be considered. Ensure correct epilepsy classification. Updated imaging (MRI) and EEG can also be helpful. The facility to communicate with a consultant neurologist/epilepsy nurse specialist (EpNS) could guide management of complex cases; some centres offer access via e-mail (epilepsy@stjames.ie and teleneurology@stvincents.ie)

Status epilepticus – management in the community

Although traditionally, status epilepticus was defined as 30 minutes of continuous seizure activity or a series of seizures without return to full consciousness between seizures, self-termination is unlikely after five minutes. In practice, convulsions lasting more than two minutes should be treated.1,2

Options in the community include:
- Rectal diazepam (Stesolid) 10mg/ 0.1–0.3mg/kg IV
- Buccal midazolam (Epistatus) 10mg,
- IV lorazepam 2mg (0.1mg/kg IV at 2mg/minute)

For further guide to status epilepticus visit www.bmjlearning.com or www.uptodate.com.

Referral for neurosurgery/vagal nerve stimulation

Patient profile: Localisation-related epilepsy, commonly mesial temporal sclerosis/hippocampal sclerosis, or patients with recurrent uncontrolled seizures.

The International League Against Epilepsy recommends neurosurgical referral for patients with poor control interfering with activities, education, employment and social activities, if duration is greater than two years (unless a focal lesion) with persistent seizures despite adequate trial of AED

Table 1

<table>
<thead>
<tr>
<th>Classification of epilepsy</th>
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<tbody>
<tr>
<td>(A) Epilepsy (recurrent unprovoked seizures)</td>
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<tr>
<td>Generalised</td>
</tr>
<tr>
<td>(1) Idiopathic generalised epilepsy</td>
</tr>
<tr>
<td>• Juvenile myoclonic</td>
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<tr>
<td>• Absence</td>
</tr>
<tr>
<td>• Grand mal seizures on awakening</td>
</tr>
<tr>
<td>• Benign familial convulsions</td>
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<tr>
<td>(2) Symptomatic (cryptogenic) generalised</td>
</tr>
<tr>
<td>• West Syndrome</td>
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<tr>
<td>• Lennox-Gastaut</td>
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<tr>
<td>• Epilepsy with myoclonic absence</td>
</tr>
<tr>
<td>• Other</td>
</tr>
<tr>
<td>(3) Symptomatic generalised epilepsy, cause known</td>
</tr>
<tr>
<td>• Generalised seizures complicating disease states</td>
</tr>
<tr>
<td>• Non-specific aetiology</td>
</tr>
</tbody>
</table>

Localisation (partial onset)

(1) Idiopathic localisation-related epilepsy |
• Benign rolandic |
• Childhood epilepsy with occipital spikes |
• Primary reading epilepsy |
(2) Symptomatic localisation-related epilepsy |
• Temporal lobe epilepsy |
• Frontal lobe epilepsy |
• Parietal lobe epilepsy |
• Occipital lobe epilepsy |
• Epilepsia partialis continua |

Caused by:
- • Lesion (tumour, stroke, trauma, other – hippocampal sclerosis) |
- • Metabolic |
- • Toxic |
- • Meningitis |
- • Encephalitis |
- • Other |

Epilepsy syndromes undetermined whether focal or generalised (ie. both)

(B) Provoked seizures (single or clustered acute symptomatic seizures, but not yet epilepsy)
| Lesion-related (tumour, stroke, trauma, other) |
| Metabolic |
| Toxic |
| Meningitis |
| Encephalitis |
| Other |

Treatment not indicated

(C) Non-epileptic seizures
| Psychogenic |
| Cardiogenic |
| Other |

Seizure types

(1) Partial
• Simple partial |
• Complex partial |
• Partial seizure secondarily generalised
(2) Generalised
• Absence |
• Myoclonic |
• Tonic |
• Atonic |
• Clonic |
• Tonic/Clonic
In Ireland, legally, patients may resume driving a car when they have been seizure-free on anti-epileptic treatment for one year. A leaflet on driving regulations is available at www.epilepsy.ie Recent changes to the law have allowed specific exceptions, eg, nocturnal seizures (may drive during daytime if having nocturnal seizures only for previous two years). 

Road traffic regulations state that an applicant with epilepsy (even in the past) will not be certified to drive lorries, buses or heavy goods vehicles. 

Sport: Advise to avoid situations in which patient might be alone and vulnerable should a seizure occur, e.g. swimming/sailing alone in the sea, walking along cliff-edges. 

Alcohol: May lower seizure threshold and interfere with hepatic metabolism of certain AEDs. Thus, abstention or minimal intake, e.g. two units/sitting, are advised. 

General advise 

AEDs and osteoporosis 

For many patients, AED therapy is life-long. Certain AEDs, especially hepatic enzyme-inducers, can accelerate osteoporosis, and a relationship with treatment duration has been demonstrated. Therefore, calcium/vitamin D supplementation is recommended, with DXA scanning after years on treatment. 

Hormonal contraception/pregnancy in patients with epilepsy 

Hormonal contraception, eg, the combined/oestrogen oral contraceptive pill, may fail if hepatic cytochrome p-450-inducing AEDs are taken (eg. carbamazepine, phenytoin, phenobarbitone, topiramate [high dose], oxcarbazepine [rare]). Intra-uterine devices or depot progesterone injections are possible alternatives to oestrogen dose escalation (minimum 50mcg ).

Low serum folate in epilepsy is independently associated with an increased risk of major fetal malformations. Valproate and carbamazepine decrease concentration of folate and it is recommended that folic acid (5mg/day) be taken for one to three months prior to conception and during the first trimester. Patients of child-bearing age who are not planning pregnancy should take a minimum of 0.4-0.8mg/day.

The pregnancies of > 90% of women with epilepsy have been successful, although detectable in breast milk, most AEDs are not contra-indications to breast-feeding. Sedating drugs and benzodiazepines may lead to irritability and somnolence in infants; if so, breastfeeding may need to be stopped. Lamotrigine is excreted extensively in milk, and high concentrations may occur in infants due to their limited capacity to eliminate it. The significance of this is unclear.

Lifestyle advice 

Driving: In Ireland, legally, patients may resume driving a car when they have been seizure-free on anti-epileptic treatment for one year. A leaflet on driving regulations is available at www.epilepsy.ie Recent changes to the law have allowed specific exceptions, eg, nocturnal seizures (may drive during daytime if having nocturnal seizures only for previous two years).

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Alcohol: May lower seizure threshold and interfere with hepatic metabolism of certain AEDs. Thus, abstention or minimal intake, e.g. two units/sitting, are advised.

Dentures: Remind patients to remove dentures when planning to sleep/nap.

Occupation: Depending upon seizure control, most patients with epilepsy should be able to follow their chosen occupation. Very few are absolutely contra-indicated (e.g. commercial piloting).

Operation of heavy machinery, metal work, construction work on high scaffolding are unadvisable. Shift-work and inherent erratic sleeping patterns should also be avoided. Patients are not legally obliged to inform employers of their diagnosis.

It is advisable to explain what to do in the setting of a seizure to a few immediate workmates.

Seizure diary: It is often difficult to get a true picture of seizure control as the patient may not recall or record all events. It may be helpful if a parent/spouse keeps a record of seizures, along with the patient's own diary, especially in the setting of nocturnal seizures or complex partial seizures.

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References 

1. Logroscino G, Cascino G. Short-term mortality after a first episode of status epilepticus. Epilepsia 1997; 38: 1344