Current Practice

PRACTICAL NEUROLOGY

Epilepsy

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Epilepsy is a symptom of many diseases. Before a diagnosis of idiopathic epilepsy can be made primary metabolic disorders or intracranial lesions must be excluded. A diagnosis can usually be made after a careful history and examination, but simple outpatient investigations such as electroencephalography (E.E.G.), radiographs of the skull, and biochemical tests are often helpful. Occasionally full inpatient studies are necessary. This article does not attempt to discuss the various causes of epilepsy or the methods of investigation.

If there is an underlying metabolic disorder or intracranial lesion, such as a tumour, the primary condition must be treated. If the cause can be completely removed, so that the further attacks of epilepsy are very unlikely, then treatment of the epilepsy is unnecessary. Unfortunately this is so rare that, on the whole, symptomatic as well as idiopathic epilepsy must be treated with anticonvulsant drugs.

In the management of epilepsy there are two major considerations. The first is the control of the seizures. Drug therapy should aim to prevent the attacks without producing disabling unwanted effects. Second is the social care of the patient—for children education may be difficult, and for adults there are often problems with employment and personal life.

Drug Therapy

Anticonvulsants can be divided into two main groups—those for grand mal and focal epilepsy and those for petit mal (including the rarer akinetic seizures and some forms of myoclonus). Grand mal and focal motor seizures produce little difficulty in diagnosis. Petit mal, which consists of short episodes of unconsciousness with little or no motor activity, must not be confused with focal temporal lobe (psychomotor) epilepsy, which has a wide variety of manifestations, including disorders of behaviour, sensation, and orientation. It is more important to diagnose the type of epilepsy than its cause when deciding on the type of anticonvulsant.

Drugs for Epilepsy

Drug	Adult Daily Dose	Chief Unwanted Effects
GRAND MAL AND FOCAL EPILEPSY		
Phenobarbitone	60-180 mg.	Drowsiness
Primidone	0.25-1.5 g.	Drowsiness
Phenytoin	100-300 mg.	Gum hypertrophy, ataxia, folate deficiency
Ethotoin	1-3 g.	Similar to phenytoin
Sulthiame	200-600 mg.	Psychotic reaction
Carbamazepine	20-800 mg.	Ataxia, rash
Diazepam	5-40 mg.	Drowsiness, hypotonia
Paraldehyde	5-30 ml.	Injection abscess
PETIT MAL		
Ethosuximide	0.25-1.5 g.	Rash, photophobia
Troxidone	300-1,200 mg.	Leucopenia photophobia
Paramethadione	600-1.5 g.	Similar to troxidone

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For grand mal, if the attacks are rare, then a single drug may be given. Phenytoin or phenobarbitone are usually the best. The dose should be gradually increased until there are minimal side-effects, then lowered to the highest level at which there are no unwanted effects, and kept at that level. Very small maintenance doses are to be avoided, because further seizures are more probable and will cause the patient and the doctor to lose faith in the therapy. If further attacks occur a second drug (either phenobarbitone or phenytoin) can be given and its dose gradually raised and adjusted in the same way as the first. In patients whose attacks are frequent, and when more rapid control is required, two drugs (phenytoin and phenobarbitone) can be started simultaneously, but then the assessment of side-effects becomes more difficult, and if the attacks cease the necessity for two drugs can never be established. Because of the need to adjust the level of two drugs separately, combined capsules should not be used unless, after stabilization of therapy, the dosage happens to coincide with those in the combined capsule. Three drugs should never be used initially, but if two drugs at doses which produce unwanted effects do not control the convulsions a third one such as primidone or sulthiame may be tried. The dose should be gradually increased to minimal toxic levels. If there is still insufficient improvement the third drug should be stopped completely and another tried or one of the other two drugs decreased and the third drug further increased. This is because toxic effects from combined treatment develop at lower levels for each drug than when each is given alone. There is no purpose in giving a small dose of an anticonvulsant if it is not helping—it is better to stop the drug completely and try another one.

For petit mal it is less important to attempt to stop all the "absences," since the attacks themselves are not so disabling. Ethosuximide is the drug of choice. The prevention of all attacks is often very difficult, and it is only rarely justified to allow side-effects to occur. In some patients treatment even in high doses has no effect, and in these instances it should be stopped completely. For patients with both petit and grand mal the treatment should attempt initially to control the grand mal. There is some evidence that the drugs used to control grand mal may make the petit mal worse and vice versa.

Most drugs used for epilepsy have a fairly long action, and twice daily dosage is usually sufficient. It is relatively easy to make tablet-taking a routine by selecting suitable times such as going to bed and getting up.

Special Categories

The Single Attack of Epilepsy.—Patients with frequent attacks of grand mal should always be treated, but when the patient has only one attack the problem arises of

whether to start treatment. The following factors should be considered.

(1) The aetiology is probably the most important factor. In an adult with abnormal physical signs a single seizure of unknown aetiology is an indication for further investigations. If there is an underlying lesion, such as a tumour, an abscess, or traumatic brain damage, treatment for the epilepsy should be begun immediately, without waiting for further investigations and surgical treatment. Convulsions following head injury require treatment.

(2) Precipitating factors will often indicate whether treatment is necessary.

(3) An E.E.G. may help to decide whether treatment should be given. Though there is no constant relationship, the more frequent the epileptic discharges on an E.E.G. the more likely is the patient to have grand mal. Similarly an unstable background activity with theta waves is more likely to be associated with clinical epilepsy.

(4) The nature of the seizure. A single or very occasional temporal focal seizure or petit mal does not warrant treatment.

(5) The certainty of the diagnosis. It is often difficult to make a definite diagnosis of epilepsy after a single attack of unconsciousness.

In conclusion, if there are no abnormal physical signs and if any investigations which are done are negative, treatment should not be given but the diagnosis reviewed later. However, if after a single attack the patient has been given therapy, it should be continued, because the withdrawal of the drugs may tend to precipitate further attacks. If the drugs are to be stopped after a single attack this should not be done for at least three months.

Nocturnal epilepsy can be defined as convulsions occurring when the patient is asleep. It is often immediately followed by continued sleep, so that apart from tongue biting, incontinence, muscle pain, or headaches the patient may be unaware of the convulsions. If these occur infrequently they are best left untreated, but if treated it is essential to give the therapy to cover the 24 hours; otherwise there is a slight risk that the patient may have attacks during the daytime.

Epilepsy during drowsiness differs from nocturnal epilepsy in that it occurs when the patient is falling to sleep or awakening. It does not occur in the middle of the night, and tends to be most frequent during the hour before getting out of bed and in the evening while the patient is relaxing in a chair. The importance of this group is that if the anticonvulsants make the patient drowsy the frequency of the convulsions may increase, and they may occur throughout the day. For this group it is better to give phenytoin rather than barbiturates or primidone, and the initial dose should be small.

Photogenic Epilepsy.—In a proportion of patients epilepsy occurs only when they are looking at a flashing light or television.¹ The convulsions are similar to those of ordinary grand mal or petit mal. During the E.E.G. these patients may often show epileptic features at rest, though characteristically photic stimulation precipitates the discharges. It is important to advise the patient about his sensitivity. He should not sit close to a television screen,^{2,3} never watch television when sleepy, and never watch a screen that is flickering or being adjusted.

Focal Epilepsy.—The commonest form is temporal lobe epilepsy. Occasionally focal seizures occur without grand mal, and in these circumstances the drugs for grand mal are usually satisfactory, but if they fail sulthiame should be tried.⁴

Status epilepticus is a medical emergency and always needs hospital admission. The immediate treatment is to maintain an adequate airway and to prevent anoxia, but medication should be started at once. This can be intramuscular phenobarbitone up to 180 mg. or intravenous phenytoin 50 mg./min. up to 500 mg. for an adult. However, excessive phenobarbitone

and short-acting barbiturates must be avoided, since they will cause respiratory depression. Facilities for artificial respiration should be made available. Paraldehyde either intramuscularly or, if needed in larger doses, intravenously in a drip can be given, but it is important to ensure that it is fresh, and it must not be given in plastic containers, which are soluble in paraldehyde. More recently intravenous diazepam in 10 mg. doses every 15 minutes in a drip has been advocated, but it must be used with caution, as occasional fatalities have been reported. In severe cases of status epilepticus muscle relaxants with anaesthesia may be used. Other treatments have been used, but there is still no really satisfactory way of controlling fits.

Epilepsy during pregnancy does not require any special management except that adequate dosage is very important owing to the slightly increased tendency to develop status epilepticus.⁵

Emotional stress may occasionally precipitate attacks. This could be related to metabolic changes such as may occur during hyperventilation. As sedatives may lessen the frequency of the attacks phenobarbitone is better than phenytoin.

Childhood epilepsy is considered in a separate article in this series.

Prophylaxis

Prophylactic treatment is rarely necessary before a patient has had a single attack. (Of course all therapy for epilepsy, except during status epilepticus, is prophylactic.) Treatment with phenytoin or phenobarbitone is necessary after neurosurgery, which may alter the threshold for epilepsy. Depressed fractures, compound fractures, and head injuries with convulsions will always require anticonvulsant therapy, but concussion does not require therapy.

When febrile convulsions in children are recurrent, continuous treatment with phenytoin or phenobarbitone can be given, but if the parents are reliable they can be supplied with the anticonvulsant and an antipyretic, such as aspirin, which can be given as soon as the child develops a pyrexia or illness.⁶

Some women have the majority of their convulsions just before or during the menstrual period. This is probably related to water retention. The anticonvulsants may be increased or a diuretic prescribed. Originally acetazolamide was used, since seizures may be increased by alkalosis and this drug causes a mild acidosis. There is no reason, however, why an oral diuretic such as bendrofluzide should not be used. No relationship has been demonstrated between the frequency of fits in patients with epilepsy and oral contraception.⁷

Over half of all patients developing petit mal will later have grand mal,⁸ usually within five years of the onset of the petit mal. An abnormal background activity on the E.E.G., frequent and prolonged petit mal, an abnormal psychological state, and a poor response to therapy for petit mal are all factors which increase the chances of developing grand mal. If these factors are present it is probably best to give prophylactic treatment against possible grand mal, but in other cases it is better to postpone grand mal therapy until grand mal occurs.

Cessation of Treatment

If any particular drug in full doses is not making any difference to the frequency of the attacks it should be stopped completely and another one substituted. Therapy should never be stopped if the grand mal continues. Usually two to five years of freedom from attacks is advised before treatment can be stopped. The original frequency of the attacks will influence the decision. A person who had all his attacks over a short period could be taken off sooner than someone who had been having one attack every five years. It is often helpful to obtain an E.E.G., since the presence of epileptic discharges and an abnormal background activity would call upon more caution

in stopping the drugs than if the E.E.G. were normal. If focal epilepsy or nocturnal epilepsy continues when daytime grand mal has ceased, treatment should be continued.

For petit mal the situation is slightly different, in that the attacks tend to become gradually less frequent, and an occasional attack should not be a disability. The therapy can be stopped after a year or two of freedom from attacks.

Therapy should always be stopped gradually. Withdrawal should normally be over a period of one year, or longer if the patient has been on treatment for more than five years.

Individual Drugs

It takes several days at a constant drug dosage to achieve a steady blood level, and side-effects may be transient, so that drug dosage should not be altered prematurely before the permanent effects are evident.

The most commonly used drugs⁹ are given in the Table, but some special points are worth making.

Phenobarbitone and primidone have similar actions and side-effects and on the whole should not be given together.

Phenytoin influences folic acid metabolism.¹⁰ A small proportion of patients on phenytoin develop megaloblastic anaemia, which is reversible with folic acid.^{11 12}

For this reason it is important to estimate the haemoglobin of all patients on long-continued phenytoin, and in some the folic acid level in the blood will need to be ascertained. However, treatment with folic acid, though it may help the general condition of the patient, may make the convulsions more frequent. Care should therefore be taken in prescribing routine folic acid (e.g., in pregnancy) for patients on phenytoin.

Sulthiame is useful as an addition to standard phenobarbitone (or primidone) and phenytoin therapy, especially for those with temporal lobe epilepsy. Because of its psychiatric side-effects, which may develop when treatment is started, it is probably best to admit the patient to hospital for initial stabilization.³

Ethosuximide is the drug of choice for patients with petit mal. Tridione is now outmoded as it is no more effective than ethosuximide and more likely to cause leucopenia. It may be tried in severe cases of petit mal not responding to ethosuximide.

Carbamazepine has been advocated for the control of seizures, but this claim has not been adequately supported by clinical trials.^{13 14}

Other Treatments

Children with cerebral palsy may have intellectual and psychiatric abnormalities which require special treatment, and for them amphetamines and chlorpromazine may be helpful.¹⁵

For adults amphetamines may very occasionally be given if the drugs will only control the seizures at doses which produce drowsiness. Because of dependence they should be given only after very careful consideration and with frequent reassessment. If they do not help they should be stopped before withdrawal becomes difficult.

Surgery may be required for the treatment of a primary structural lesion such as a tumour. In only a small proportion of patients with "idiopathic" epilepsy is surgery useful.¹⁶ The chief indications¹⁷ are that the patient has a well-defined epileptic focus, preferably in the anterior portion of the non-dominant temporal lobe, his attacks are not controlled by optimal drug therapy, and the attacks are preventing him leading a reasonable life.

A small group of patients with epilepsy develop paranoid schizophrenia,¹⁸ but the management of their epilepsy does not differ from that of other patients.

Social Services

Patients with epilepsy and their relatives are often frightened not only by the fits themselves but also by the name "epilepsy," and it is very important to help them to come to a proper understanding of the illness, so that they do not allow it to interfere more than necessary with their lives. Only after there is proper understanding by the patient and relatives can one expect teachers and employers to take a reasonable attitude. The patient must be persuaded to take his treatment regularly and not to stop it suddenly. This is made easier by the doctor's interest and sympathetic understanding.

The medical care of patients with epilepsy is provided by the National Health Service, but in addition in England and Wales the Department of Health and Social Security, the Department of Employment and Productivity, the Department of Education and Science, local authorities, and private institutions provide other services and help. In Scotland and Northern Ireland there are similar authorities.

Most children with epilepsy attend ordinary schools, but a few benefit from a period in a special school. Drug dosage must be carefully assessed, as poor academic ability may be a manifestation of too much, or occasionally too little, therapy. Problems often become worse when the child leaves school. Employment is much harder to find than is generally believed.¹⁹ Advice from the youth employment officer should be sought in cases of difficulty. The employment of epileptics is discussed in the pamphlet produced by the Ministry of Labour "Employing Someone with Epilepsy." This was written to tell employers how they can employ patients with epilepsy in suitable jobs. It also deals with the problems, such as accident liability, which may discourage the employment of those with epilepsy. If employment cannot be found by usual means the disablement resettlement officer can give special consideration to the problem and the patient may then register as a disabled person. Occasionally patients may be helped by a course at an industrial rehabilitation centre, and for others a period of inpatient treatment is necessary. There are only two hospitals in the N.H.S. specializing in epilepsy alone—St. David's Hospital, London, and St. Faith's Hospital, Brentwood. In addition, there are about a dozen colonies and special schools in Britain run by the local authorities and private bodies. The patients and their relatives require sympathetic and reasonable advice over a long period about schooling, employment, travel, marriage, and parenthood. This advice is best given by one person, and the general practitioner is ideally situated to preserve the continuity, though he may call upon the help of specialists for some of the answers. The incidence of epilepsy in the children of epileptics depends on many factors, but in favourable circumstances may be as low as 1 in 40.²⁰

The law does not allow anyone suffering from epilepsy to drive, and the doctor has a duty to explain this to the patient. Many local authorities, who issue the driving licences, have insisted that the licensee must have had no convulsions for three years and have discontinued treatment for two years. Most neurologists are against this because it is safer to drive while taking therapy. Theoretically a driver should be maintained on therapy for a longer rather than a shorter period. Fortunately the law may soon be changed. In 1968 the Minister of Transport announced he was proposing to amend the law so that under certification by a doctor a person who had had no attack during the daytime for three years could have a licence whether or not he was receiving treatment.²¹ If a driver was going to be taken off treatment this would be done very slowly and preferably he would stop driving for two to three weeks when he actually ceases treatment.

The British Epilepsy Association (3 Alfred Place, London W.C.1), the Scottish Epilepsy Association (24 St. Vincent Place, Glasgow C.1), and the Irish Epilepsy Association (30 Leeson Park, Dublin) exist to help patients and their relatives and in cases of difficulty will give advice. They are

particularly helpful, as patients and their relatives often feel they need advice independently of the nationalized health services and Government departments.

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ROAD ACCIDENTS AND THE FAMILY DOCTOR

Treatment of Soft Tissue Injuries at the Roadside

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Any person who wants to do something helpful for the victims of a road accident must be prepared first to acquire both the necessary knowledge and the appropriate equipment. A doctor may have two roles in this, one being to inform and equip himself and the other being to help others to do the same. Both roles will be considered in this article.

For all the theoretical value of standard first aid training its full practical value cannot develop without experience of genuine casualties in realistic conditions. First aiders should therefore seek, be encouraged to seek, and should be helped in obtaining practical experience in hospitals, factory surgeries, and other places in which wounds, bleeding, dressings, and the behaviour and management of injured persons can be studied. The difficulties of this are acknowledged but they are not insuperable.

The management of injuries of the soft tissues may be summarized as:

- apply a dressing,
- stop accessible bleeding, and
- try to mitigate the effects of bleeding or burning.

Wounds of the face, chest, and belly need special attention.

Dressings

No first aid kit sold to a motorist is of much use after a road accident, in which wounds are likely to be numerous, with some very large ones—an entire limb may be stripped of its skin and fat. If a doctor makes his own kit up, which is the best way, he cannot look to commercial firms for dressings 40–50 cm. square. Instead he will have to seek the help of an occupational therapy or comparably productive department of a hospital, or a sewing circle, and be prepared to provide them with gamgee or similar tissue to make up into neat bundles with lengths of bandage sewn on. He will also need help with sterilization and protective wrapping.

An alternative worth considering would be unused—and therefore at least clean—plastic bags, which could be used as bags or after being slit and opened out, and then surrounded by firmly bandaged absorbent material that would be kept off the wound and therefore need not be sterile, or even clean. Paper tissue is a satisfactory emergency dressing.

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A dressing that is too small to cover a wound and too small to absorb its blood and remain fairly dry on the surface is of questionable value, however much better the person applying it and the onlookers may feel.

Finding and Treating the Wound

The length to which one should go in diagnosis and treatment of the wound depends to some extent on the condition of the casualty, but perhaps rather more upon the length of time available before the patient is removed to hospital. The weather and the possibility of fire, explosion, subsidence, flooding, and other dangers must also be taken into account. At one extreme, therefore, a patient may be extricated with all possible speed and put straight into a waiting ambulance without any attempt at applying dressings. At the other, there will be a careful search with displacement or even removal of clothing and with covering of all wounds. In practice, many wounds will go undressed, usually without serious disadvantage to the patient.

The best application to any sort of wound at the roadside is a clean, if possible sterile, dry dressing such as gauze. Medicaments and cleansing are not required. The only local treatment that should be undertaken is the removal of any loose foreign bodies and the straightening out of any large and distorted flaps of skin.

For thermal burns a plain dry dressing is all that is required. Chemical burns of all kinds should be irrigated as copiously as possible with the cleanest water that is readily available. A step that may prevent burns is to switch off the car ignition at once.

Covering a wound and absorbing its blood with the aid of a firm, snug dressing is sometimes possible, but it is frequently prevented by the presence of fractures, the situation of the wound, its sheer size, and other reasons for being realistic and not idealistic. In any case, the easiest bandage with which to secure a dressing is a “conforming” one, such as Kling or Crinx, which are cheaper than crêpe and less likely to be put on too tightly. Triangular bandages will hold a dressing on well enough but they are not easy to use for applying pressure. Adhesive 2.5 cm. elastic and 12 mm. inelastic strapping, safety pins, and scissors should be included in the first aid kit.