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NEUROSURGERY

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Epilepsy

Epilepsy is a disorder of the interconnections of the brain, which means people sometimes have seizures. Epilepsy means you are likely to have more than one seizure. Not everyone who has a seizure has epilepsy. The mainstay of epilepsy treatment is medications however there is a small proportion whereby neurosurgical intervention will be beneficial.

CAUSE

People often wonder what causes epilepsy. In about 50% of cases, doctors cannot find a cause- epilepsy just seems to come out of the blue. In the other 50% of the cases, the cause can be identified, just like any other injury or illness to the brain. The structural lesions causing epilepsy include:

- Hippocampal or Mesial Temporal Sclerosis.
- Tumours.
- Glioma.
- Dysembryoplastic Neuroepithelial Tumour.
- Meningioma.
- Cerebrovascular Lesions.
- Cavernous Angioma.
- Arteriovenous Malformation.
- Disorders of Neuronal Migration & Organisation.
- Encephalomalacia.

Epilepsy occurring after a head injury is called post-traumatic epilepsy and may be a result of scarring within the brain substance.

TYPES OF SEIZURES

Tonic-Clonic Seizure

This typically begins with a tonic phase which lasts around 10-15 seconds during which time the patient may lose consciousness and collapse. The patient's body stiffens, teeth clench shut and stop breathing. There may be urinary incontinence and tongue biting at this stage. The clonic phase then begins, characterised by rhythmical muscular contractions involving the whole body. The entire seizure usually lasts 1-3 minutes. A post-ictal state may occur following the seizure whereby the patient is confused and drowsy for a short period of time.

Absence Seizures

This type of seizure normally affects children and lasts only 5-10 seconds. There is a brief loss of consciousness but no collapse or motor twitches/ contractions apart from rapid blinking of the eyes. The patient normally returns to normal abruptly with no recollection of the event following the seizure.

Partial Seizures

These may be simple or complex. Simple partial seizures do not involve changes in conscious state whilst complex partial seizures usually demonstrate impaired conscious states. Complex partial seizures may also begin with an aura such as fear, unusual smells or tastes or a feeling of déjà vu. Partial seizure may progress to a tonic-clonic seizure called a secondarily generalised tonic-clonic seizure.

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INVESTIGATIONS

The diagnosis of epilepsy is through a thorough history and examination of the patient. An eye-witness account of seizures is important in characterising the type of seizure and to this end video monitoring may be used. The pre-operative work-up of an epilepsy surgery patient is complex and involved including several of the following.

Blood tests

There are no specific blood tests to diagnose epilepsy. An FBE, electrolytes and coagulation profile are needed prior to any neurosurgical intervention. Regular drug level checks of anti-epileptic medications will be performed by the neurologist.

Electroencephalogram (EEG)

This is performed to monitor the electrical interconnections of the brain. It can localise abnormal electrical or seizure activity and is used in the immediate post-ictal and inter-ictal period. Video EEG monitoring may be performed in hospital for one day up to one week with seizure stimuli such as sleep deprivation.

Radiological tests

- CT Brain – this is performed to rule out the presence of a structural lesion as the cause of the seizure (e.g. tumour, vascular malformation).
- MRI Brain – this is performed to further delineate any underlying brain abnormalities and also give information with regards to brain volumes.
- SPECT/PET Scans – these are performed in the pre-surgical work-up to localise the specific region of abnormality and side of pathology.

Invasive EEG monitoring

This includes intra-cranial EEG monitoring with subdural grids and bilateral depth electrodes. Further discussion of these are found under operations – Epilepsy surgery.

What type of management is required for people with epilepsy?

Suitable control of seizures with anti-convulsant (medications). Understanding their type of epilepsy, the warning signs, triggering factors and a change of lifestyle to accommodate their condition. Surgical options for the treatment of patients with epilepsy not controlled by medication is increasingly successful. Suitable candidates may be offered surgery.