THE NORTHERN HOSPITAL

NON-CONVULSIVE STATUS EPILEPTICUS

"The Transfiguration" (detail), 1518-1520, Raphael, oil on canvas, Pinacoteca, Vatican City, Rome.

They reached the territory of the of the Gerasenes on the other side of the lake, and when he disembarked, a man with an unclean spirit at once came out from the tombs towards him. The man lived in the tombs and no one could secure him anymore, even with a chain, because he had often been secured with fetters and chains but had snapped the chains and broken the fetters, and no one had the strength to control him. All night and all day among the tombs, and in the mountains he would howl and gash himself with stones. Catching sight of Jesus from a distance, he ran up and fell at his feet and shouted at the top of his voice, "What do you want with me Jesus, son of the Most High God? In God's name do not torture me". For Jesus had been saying to him, "Come out of this man unclean spirit". Then he asked "What is your name". He answered, "My name is legion for we are many".

Mark 5:1-9

In past centuries the true nature of epilepsy was a complete and terrifying enigma. Its manifestations were greatly feared. It could affect the rich and poor alike, the great and the humble, the good and the bad, the beautiful and the ugly, all ages, all races, all creeds. There seemed to be no logical explanation for the affliction other than simply "the hand of god" - or more accurately for such a horrifying entity - the hand of Satan. For those affected, in the words of Thomas Hobbs, life in this state of nature would be, "solitary, poor, nasty, brutish and short". Ancient Biblical and other literary sources make two things very clear about the afflicted - banishment from society, and a belief that the tormented individual had been possessed by a malignant spirit or demon, often times by more than one of them. It the most violent and bizarre forms of epilepsy the soul had appeared to be invaded by a whole legion. Only a host of many demons could explain the varied and bizarre behavior of some, as well as their apparent superhuman energy when seizing that no man or chain could fetter. The worst affected were banished to regions were no other human thought fit to inhabit - the harsh and freezing mountains -the caves that held the tombs of the dead. Agonized souls lived their brief lives in a living hell of constant torment, tearing at their own flesh with sharpened stones in attempts to expel the spirits or bad "humors" that had possessed them. In the course of the middle ages the Church took pity on some of these people. Priests and other holy people were called on to do what they could for them and the ritual of exorcism evolved - seemingly successful in some cases - yet not so in others. The only ultimate cure in these cases was seen as an appeal directly to God, as we see in a detail of the monumental Renaissance work of Raphael's, "Transfiguration". A beautiful noblewoman alerts others to a seizing young boy, while others appeal to God for help.

By the time of the Enlightenment of the Eighteenth century, a more secular and scientific view of epilepsy evolved, and by the late Nineteenth century effective treatments in the form of bromides and later barbiturates became available for the first time in history. In the 21st century we now have an impressive array of magical drugs that can control the symptoms of epilepsy to the point of those with the disease being able to live virtually normal lives - no longer need it be "nasty, brutish and short". On the whole we live in a more enlightened age - we no longer banish those unfortunates to live in the mountains or the cemeteries. Our task as physicians however remains ongoing and the noble quest continues to seek newer and ever more effective drugs to control this most ancient of humanity's afflictions. One of the very latest and most promising of these miraculous new 21st century agents comes to us in the form of Levetiracetam.

NON-CONVULSIVE STATUS EPILEPTICUS

Introduction

Non convulsive status epilepticus is uncommon, and often not recognized.

It is difficult to recognize in part because it is not well defined. Such definitions as there are highly variable.

Little agreement on diagnostic criteria, clinical forms, consequences and treatment.

The main challenge in the ED setting is usually to simply consider the diagnosis in the first place.

Status epilepticus is commonly defined as:

- Continuous seizure activity lasting more than 30 minutes

Or

- Two or more seizures without full recovery of consciousness between the seizures.

Generalized refers to abnormal excessive and widespread cortical electrical activity, while *convulsive* refers to the motor activity of a seizure.

This is in distinction to "**non-convulsive**" **status epilepticus** which includes such conditions as absence status epilepticus, simple partial status epilepticus, complex partial status epilepticus, and other ill defined epileptic "twilight states".

And so not all seizures are associated with major muscular convulsive activity.

It may be generalized (absence status) or partial (complex partial or simple partial status).

The key clinical features will relate to:

- Altered (or bizarre) behaviour

Or

- Altered conscious states

Or

- Minor alterations in motor activity, (which is **not generalized**)

Diagnosis is difficult and can only be made with any certainty by EEG.

Pathophysiology

Non-convulsive Status epilepticus (NCSE) can take several forms.

1. Generalized:
    - **Absence status**, (*consciousness altered*)
2. Partial:
    - **Simple** partial status (*consciousness preserved*)
        - ♥ Focal motor status:
            - ♥♥ Generally minor focal activity.
        - ♥ Focal sensory status:
        - ♥ CNS higher cortical function alterations:
            - ♥♥ e.g. sense of **deja vu** or **jamias vu**
    - **Complex** partial status (*consciousness altered*)

Complications

Prolonged *non-convulsive* status does **not** have the same dire metabolic consequences and prognosis of convulsive status epilepticus; however dehydration and the potential for physical injury still remain significant complications.

The main concern is the underlying cause of NCSE as this will have the greatest influence on the overall prognosis.

Clinical features

Non convulsive status epilepticus is uncommon, and often not recognized.

The main challenge in the ED setting is usually to consider the diagnosis in the first place.

Nonconvulsive status epilepticus may be generalised (absence status) or partial (complex partial or simple partial status).

The key clinical features will relate to:

- Altered (or bizarre) behaviour

Or

- Altered conscious states

Or

- Altered motor activity (*which is not generalized*)

These types of seizures are important causes of alterations in behaviour and/or conscious state.

Non-convulsive status epilepticus may **precede** or **follow convulsive** seizures and may easily create the perception of a cerebral vascular event or of a psychiatric disturbance.

The longest reported episode of absence status is **60 days**!

The longest reported episode of complex partial status is **28 days.**

Specific clinical manifestations include:

Generalized absence status epilepticus:

- **These seizures are caused by a generalized activity affecting the whole brain.**
- They manifest as a stuporous or confusional state where the patient appears expressionless, slow to respond, almost trance like. Patients can appear to be **catatonic.**
- Absence seizures rarely result in complete unresponsiveness and patients may even appear relatively normal to unfamiliar observers.
    - ♥ They may simply appear to be "detached" from their surroundings.
- The confusional state can be very subtle presenting simply with slowed cognition and speech.
- There can be *associated* (but **not generalized**) motor features including myoclonus, blinking or quivering of the lips and face.
    - ♥ Facial and eyelid myoclonus are typical of absence status but not complex partial status.
- Absence status, which may remit and recur through the day, may be terminated by a generalized tonic-clonic seizure.
- It can be precipitated by physiological (illness, medication, metabolic changes) or psychological stress (grief, anxiety).
- Like other forms of status this entity can occur at **any age.**

Simple partial status epilepticus:

- This is a focal sensory or motor status with clonic activity (regular or irregular) or even repetitive dystonic posturing of limbs, trunk, head or neck.
- Simple partial status of the *motor* type with clonic activity is also called **Epilepsia Partialis Continua.**
    - ♥ Motor signs are often subtle and can include, **automatisms, clonic jerks, eye twitching, eye deviation**
- Consciousness is not altered.
    - ♥ The patient is alert and can report what is happening.

Complex partial status epilepticus:

- **These seizures are confined to a small area of the brain, normally the temporal lobes.**
- Complex partial status, like absence status, presents with **altered consciousness** or a **confusional state.**
- There may also be associated motor automatisms such as lip-smacking, rubbing, picking, semi-purposeful movements of upper limbs, dystonia, head or eye version etc)
- There may be **autonomic features** such as sweating, pallor, tachycardia or bradycardia, hypotension or hypertension.
- There may be speech and language disturbances.
- Complex partial status may last for hours or even days, and can fluctuate.
- It may follow a tonic-clonic seizure but is only rarely followed by one.
- This form of non-convulsive status is rare.

Investigations

Investigation in the ED is primarily directed to:

- Ruling out alternative differential diagnoses
- Looking for underlying precipitating factors

The following may need to be considered:

Blood tests

1. FBE
2. CRP
3. U&Es/ **glucose**
4. LFTs
5. Blood cultures (if sepsis is suspected)
6. Blood levels of anticonvulsants
7. Magnesium/ Calcium

CT scan brain

Up to 50% of patients with simple partial seizures have abnormal CT scans. [4]

Following control of seizures, this may also be required to rule out alternative pathologies.

MRI scan brain

This is the best imaging modality, but is more problematic than CT scan in the acute setting.

It may be done once the patient is clinically stabilized.

EEG

EEG is the only definitive investigation.

Generalized convulsive SE is usually diagnosed without an EEG, and treatment begins without it.

An EEG is necessary for the diagnosis of non-convulsive SE, as well as to distinguish the condition from other forms of encephalopathy, although treatment may begin before this based on clinical suspicion.

EEGs are important when a patient does not respond to initial treatment, because it may be impossible to ascertain clinically whether the patient is postictal or whether electrographic status epilepticus is continuing, requiring further aggressive treatment.

Management

The optimum treatment of non-convulsive status epilepticus is less well defined compared to the treatment of convulsive status epilepticus owing to a paucity of data.

Some important considerations can be made however.

Contrary to generalized convulsive status epilepticus, most forms of non-convulsive status epilepticus are not associated with life-threatening systemic dysfunction and are therefore perceived as less of a medical emergency.

First line treatment:

The **initial** treatment of non-convulsive status epilepticus, including focal status epilepticus with dyscognitive features (previously known as **complex partial status epilepticus**), focal status epilepticus without dyscognitive features (previously known as **simple partial status epilepticus**), and **absence status epilepticus**, is similar to generalized convulsive status epilepticus and begins with the **benzodiazepines.**

If seizure activity persists, a repeat dose of benzodiazepines should be considered, followed by a second line anti-epileptic drug.

Second line treatment:

For most forms of non-convulsive status epilepticus that persist after treatment with benzodiazepines and an anti-epileptic drug, additional trials of anti-epileptic drugs are often preferred rather than early escalation to anaesthetic agents.

This strategy is especially relevant in cases of non-convulsive status epilepticus in which consciousness is somewhat preserved and the risks of anaesthetics might outweigh the risks of continued seizure activity.

These **second line** agents can include:

1.. **Levetiracetam** (Keppra):

This agent appears to be particularly effective for partial and non-convulsive forms of epilepsy.

It does not result in prolonged sedation or respiratory compromise and so has advantages over the benzodiazepines in this regard.

- 500 mg - 1 gram (1000 mg) can be given slowly IV over 15 -30 minutes.

  Alternatively 500 mg orally can be given in more stable patients.

  Higher doses may be given on the advice of a neurologist.

2. **Phenytoin:**

- This can be given as an alternative to IV levetiracetam.

Disposition:

Any patient suspected of having NCSE should be discussed with the Neurology Unit.

References

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