First ever epileptic seizures presenting in adults

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Abstract
Epileptic seizures are common, and patients suffering a first seizure are often admitted to hospital as an emergency. Differentiating epileptic seizures from other types of attack can be difficult, and misdiagnosis has potentially serious consequences for the patient. Knowledge of the clinical features of epileptic seizures and what distinguishes them from dissociative (psychogenic) seizures, syncope and panic attacks is essential in guiding appropriate investigation and management. An epileptic seizure may be the first symptom of a life-threatening acute illness, an epilepsy syndrome or an isolated provoked event. On first presentation, patients need an accurate diagnosis, some immediate appropriate investigations, to be referred to the appropriate specialist and to receive correct advice regarding driving and work. This article addresses these aims and is intended to support doctors in training when managing adult patients with acute attacks.

Keywords aura; epilepsy; focal; generalized; idiopathic; provoked; seizure; symptomatic

Epileptic seizures are episodes of abnormal synchronous electrical discharge involving populations of neurones in the cortex of the brain, which give rise to a variety of clinical manifestations. Epilepsy is a chronic neurological condition characterized by recurrent unprovoked epileptic seizures.

Incidence and prevalence vary widely across the world, with higher rates in developing countries. In the industrialized world, the annual incidence of epilepsy is 40–70/100,000, and between 1.5 and 5% of the population will suffer a non-febrile seizure at some point.[1] The largest UK population-based study suggested a prevalence for those with active epilepsy or on anti-epileptic drug treatment of 10.5/1000.[2]

It can be difficult to differentiate between epileptic seizures, syncope, dissociative (psychogenic) attacks and panic attacks. False-positive (misdiagnosing epilepsy) and false-negative diagnoses (missing the diagnosis) both have deleterious effects on the health and lives of patients, and diagnostic errors can frequently be traced back to the very first presentation.

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Was it an epileptic seizure?

Patients with a suspected 'first seizure' commonly present acutely, but not all attacks are epileptic. Much important information can be obtained during this first assessment from the history and baseline investigations, and these records often prove invaluable in confirming a subsequent diagnosis in the first seizure clinic.[3]

A careful history, including a witness description, remains the foundation of an accurate diagnosis. The history of the attack should be broken down into three phases (Table 1):

- Before the attack: much of this will be obtained from the patient, but the witness may have noted unusual behaviour, change in colour or involuntary movements. Epileptic auras (in reality focal seizures) are often difficult to describe. Short duration (seconds to minutes, often less than 60 seconds) and stereotypy (the same every time) are key features.
- During the attack: the witness account is central and will usually be the main source of information. Do not assume, however, that consciousness was lost completely — always ask. The patient may be able to provide a useful subjective account of the attack. Convulsive dissociative (psychogenic) seizures are often confused with epileptic seizures. Dissociative seizures are distinguished by their long duration, waxing and waning course, asymmetry and violence of limb movements, and sometimes preservation of consciousness, which is incompatible with a generalized epileptic seizure. Side-to-side head movement, pelvic thrusting and forceful eye closure are also suggestive of dissociative seizures. Differentiating between the two is, however, often very difficult, even for the specialist. Syncope is another frequent source of diagnostic error; motor manifestations such as stiffening, limb posturing and jerking all occur in syncope, but all are characteristically brief, lasting only a few seconds.[4]
- After the attack: the histories from the patient and the witness often differ greatly. Ask the patient what their first clear memory is; following syncope, patients recover quickly, usually before paramedics arrive, but post-seizure patients usually 'wake up' in the ambulance or emergency department (ED). Urinary/faecal incontinence is not a useful discriminating symptom, but tongue biting, especially if unilateral, is highly specific of generalized tonic–clonic seizure.[5]

Simple tips for identifying the cause of an attack are outlined below.

Vasovagal (reflex) syncope

Always triggered (e.g. pain, illness), typical pre-syncopal symptoms (light-headed, feeling faint, nauseated, dimming of vision, ringing in ears), no post-event confusion, often nauseated/vomit, may feel tired and lethargic for many hours afterwards. Often occurs in doctors' and dental surgeries, restaurants, bathrooms, aeroplanes, cinema/theatres.

Cardiac syncope

Beware loss of consciousness occurring during exercise, or without trigger or warning, with rapid recovery and none of the typical vasovagal symptoms as above.

History of an epileptic attack

Epileptic seizure	Dissociative attack	Syncope	Panic attack
Before the attack: provocation and circumstances			
Sleep deprivation Alcohol withdrawal Recreational drugs — amfetamine, cocaine Strobe lighting Often none	Acute stress Often none	*Vasovagal* Postural change Prolonged standing, warm environment Strong emotional stimulus. Sight of blood Heavy meal Pain Medical/dental procedures Diarrhoea and vomiting micturition (especially at night) *Cardiogenic* Physical exertion	Crowds, social situations, bridges, lifts
Before the attack: warning symptoms			
Stereotyped symptoms such as *déjà vu* Rising epigastric sensation Olfactory/gustatory Focal rhythmic jerking — limb, hemifacial Often nil	Often nil	Light-headedness Nausea Sweating Concentric 'greying' of vision 'Buzzing' tinnitus and loss of hearing +/− Palpitations	Panic Breathlessness/chest tightness Derealization (out of body experience) Distal/perioral paraesthesia
During the attack: the witness description			
Abrupt onset '*Generalized*' Tonic stiffening +/− 'tonic cry', followed by rhythmic, synchronous jerking movements, arms usually flexed, legs extended Eyes open Cyanosis '*Focal*' 'Blank stare' Complex automatisms 9 e.g. lip-smacking, plucking and occasionally walking/running) Relatively short duration: few minutes	Gradual onset No tonic stiffening Large, asymmetric, asynchronous 'flailing' arm movement, 'swim-kick' leg movement, pelvic thrusting, side-to-side head movement, eyes closed Breathing rapid or prolonged motionless unresponsiveness Waxing and waning course Long duration: 10—30 min	Pallor Sweating Motionless unresponsiveness or brief focal or multifocal jerking Arrhythmic Brief stiffening Short duration — usually less than 1 min	Gradual onset Responsive, agitated hyperventilation Carpal spasm Variable duration
After the attack: post-ictal symptoms, injuries and witness account			
Immediate: stertorous breathing (snoring), confusion, unable to recognize family/friends, aggression, amnesia Later: tiredness, headache, limb and axial muscle pain, lateral bite injuries to tongue[5]	Variable Tiredness, tearfulness Carpet burns to prominences, especially face[6]	Any confusion resolves within a minute or two (unless secondary head injury)	Usually nil

Table 1

Dissociative attacks

Patients typically say they can remember nothing of the attack at all, often not even the day it happened. Witness descriptions are often of prolonged, variable attacks.

Generalized tonic—clonic seizures

Can arise from sleep with little/no warning when awake. Ask/look for lateral tongue biting, aching jaw/limbs, and headache. Convulsions typically last 1—2 minutes, although usually