Epilepsy

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BEHAVIORS: // MISTAKEN FOR:
- Aggressive behaviour to self/others, tantrums, outbursts, irritability
- Odd, bizarre behaviours
- Resisting any form of physical contact
- Seeking isolation, withdrawal
- Meaningless recurring body movements, stereotyped behaviours, abnormal repetitive movements of head, hands or body
- Screaming, yelling inappropriately
- Repetitive speech
- Listless, sluggish staring into space, failure to respond/react to instructions, sitting/standing in one position for a long time
- Ictal, postictal, prodromal (pre-ictal) confusion/aggression
- Ictal, postictal, prodromal manifestations
- Ictal, postictal manifestation
- Peri-ictal, prodromal behaviour changes
- Automatisms of partial complex seizure
- Ictal vocalisation
- Partial complex seizure
- Medication toxicity, absence or partial complex seizure

Some Interesting Facts:
- Children with epilepsy & frontal dysfunction or mental retardation may be at higher risk of disruptive behaviours. (Ettinger, 2001)
- Frontal lobe seizures: pelvic thrusting, vocalisations, thrashing movements & minimal postictal recovery times are easily mistaken for non-epileptic events. (Leis et al, 1992; Saygi et al, 1992; Williamson et al, 1985)
- Violent epileptic patients were significantly more likely to be mentally retarded compared to non-violent age- and sex-matched epileptic patients (Mendez et al, 1993)

Some Interesting Facts...
- Mild to severe cognitive deficits, especially in the domains of attention, memory and motor speed, are associated with epilepsy in many patients and may contribute to violent behaviour (Perrine et al, 1999)
- Irritability, poor frustration tolerance, impulsivity, interictal aggression, sociopathic behaviour, sexual deviancy, disinhibition and hyperphagia have been described in frontal lobe epilepsy, temporal lobe epilepsy & generalized seizure disorders. (Dewinsky et al, 1999)

**CAUTION**
*EVERY episode is not necessarily a seizure!*

Other possibilities:
- Cardiac syncope or vasovagal response
- Migraine, vertigo
- Movement disorder, muscle spasm
- Tics, Tourette Syndrome
- Sleep disorders
- Psychiatric problems (PTSD)
- SE of medications

WHAT?
- Seizure: convulsions, brief periods of unconsciousness or altered behavior resulting from excessive and hyper-synchronized neuronal activity in the brain
WHO?
- All races, all ages, even animals
- The incidence of epilepsy in the general population is approximately 1 to 2%, but approximately 35 to 50% in persons with a developmental disability or autism
- The EEG in 40% to 60% of children with autism show epileptiform activity
- It’s not hereditary (in most cases), but recently genetic frontal epilepsies have been identified

WHY?
- Genetic – chromosome 22 (Qc), various others including 2,3,6,8,10,16,19,20 & X
- Lesion – birth injury, infection, CVA, tumour
- Post traumatic - head injury (usually 6 months - 2 years after)
- Idiopathic
- Biochemical imbalance (alcohol/drug overdose, electrolytes)

WHY?
- Sometimes the epilepsy is the cause of the developmental disability (DD):
  - Landau-Kleffner (acquired epileptiform aphasia)*
  - Electrical status epilepticus during sleep (ESES)*
    (AKA: continuous spikes & waves during sleep – CSWS)
  - Lennox-Gastaut*
  - Infantile spasms (IS)*
    (West’s syndrome: DD + IS + specific EEG pattern - hypsarrhythmia)

When?
- ‘CATAMENIAL’ - Menstruation/ovulation
- ‘NOCTURNAL’ – during the night
- Upon awakening: fragile period
- Increased risk with various triggers

Triggers
- Fatigue
- Exercise
- Hypoglycemia
- Stress (emotional)
- Infection
- Alcohol
- Hyperventilation
- Hormonal changes
- Being startled
- Flashing lights

SOME DEFINITIONS:
- TONIC: state of muscle contraction, increased muscle tone and rigidity
- CLONIC: spasms of muscles, rigidity then relaxation
- AURA: ‘warning’ sensation prior to seizure, can be a distorted perception (‘déjà vu’, ‘jamais vu’), sensation (‘pins & needles’, tingling, nausea, ‘butterflies in stomach’), a smell (ex. burnt toast), a taste, a visual pattern or hallucination (lights, a person), unexplained fear, sadness, anger or joy
- ICTAL: seizure attack (PRE-ICTAL = before the seizure (PRODROMAL), POSTICTAL = after, INTERICTAL = in between)
**Classification: Partial Seizures**

**Focal Seizures:** The abnormal electrical activity begins in a specific area of the brain ('focus')
- *By propagation to other portions of the brain, can secondarily generalize*

**Simple Partial**
- **NO LOC**
- Can be an ‘aura’
- Can be localized in one area of the body (arm, leg, face)
- Can spread further
- Can be motor (movement), sensory (tingling or pain) or visual/auditory/olfactory, & can include sudden sweating, flushing/paleness
- Lasts a few seconds to minutes

**Complex Partial**
- **WITH LOC**
- Usually starts with a blank stare, followed by chewing & some type of random activity
- Person may seem dazed & may mumble, or may respond verbally but not appropriately, may repeat the same phrase over & over
- Actions can be clumsy & not directed, or can be inappropriate actions (‘automatisms’: picking at clothing, shuffling papers, or trying to get undressed)

**Complex Partial**
- May wander or run, may appear afraid, may become agitated & struggle or hit if restrained
- Usually same pattern occurs for each seizure
- Usually preceded by an aura
- Lasts 2-5 minutes, but may remain confused & disoriented for ½ hr. or longer

**Complex Partial**
- Person does not remember what happened during the seizure
- Atypical examples:
  - ‘GELASTIC’ - laughing
  - ‘QUIRITARIAN’ – crying
  - ‘CURSIVE’ – running

**Classification**

**Partial Seizures:**
- Focal Seizures: The abnormal electrical activity begins in a specific area of the brain ('focus')
- *By propagation to other portions of the brain, can secondarily generalize*
First Aid

- Remain calm!
- Stay with the person. Do not try to stop the seizure, but let it take its course.
- Gently guide the person away from danger & move dangerous objects out of the way.
- Observe carefully & note different movements or behaviours.
- Partial seizures may spread to other areas of the brain & become generalized.

After all types of seizures...

- Talk gently to the person, be comforting & reassuring as it may take some time for the person to become re-oriented.

Classification

Generalized seizures:

Atonic (‘drop attacks’)
- Loss of muscle tone, person collapses like a rag doll
- Can last from 10 seconds to one minute
- Recovers quickly, person is up and about afterwards

Myoclonic
- Sudden, brief muscle jerks of a body part or whole body

Absence
- Complete loss of awareness, may stare off into space, doesn’t answer, & usually doesn’t fall down
- May be accompanied by rapid blinking or some chewing movements
- Unaware of surroundings during the seizure
- No warning (no aura), short duration (lasts 5 - 30 seconds) & quick recovery (will continue previous activity)

Tonic-clonic
- Loss of consciousness, may cry out, falls down, body has jerking movements, lots of saliva, possibly incontinent, may bite tongue
- Confusion, fatigue & aggression are possible post-ictally
- Can last 2 - 5 minutes
STATUS EPILEPTICUS

- Prolonged seizures or a state of recurring seizures between which consciousness does not return in between the seizure events.
- This is a potentially life-threatening event & demands immediate medical care, as it can lead to severe brain damage and even loss of life.

First Aid

- Remain calm!
- Protect from further injury.
- Do not hold the person down
- Do not insert anything in the person’s mouth
- After the seizure subsides, turn the person on their side (recovery position).
- If > 5 MINUTES or REPEATS without full recovery, SEEK MEDICAL HELP (9-1-1)

Diagnosis?

- Observations from family, witnesses (detailed descriptions)
- Medical antecedents, obstetrical history & childhood development
- Physical & neurological exam
- Blood & urine tests
- Tests : EEG, CT scan, MRI, X-ray, PET scan, angiogram, SPECT
- Neurological evaluations, neuro-psychology, psychiatric evaluations, neuro-ophthalmology

Treatment

- KETOGENIC DIET (produces ketones in urine)
- MEDICATION (antiepileptic medication - AED)
- VAGUS NERVE STIMULATOR
- SURGERY (Craniotomy)

Sz - Meds

- Common AEDs
- Common side effects
- Drug interactions
- Therapeutic levels
- Toxic levels

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Age</th>
<th>Indication</th>
<th>Efficacy</th>
<th>Side Effects</th>
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</thead>
<tbody>
<tr>
<td>AEDs</td>
<td>Children/Adults</td>
<td>Specific AEDs for specific seizure types</td>
<td>64% sz freedom (1)</td>
<td>Vary by AED, typically CNS-and endocrine-related</td>
</tr>
<tr>
<td>Ketogenic Diet</td>
<td>Primary children</td>
<td>All seizure types</td>
<td>54% pts &gt;50% sz reduction at 3 months (2)</td>
<td>Lip disorder, ketosis/acidosis</td>
</tr>
<tr>
<td>Epilepsy Surgery</td>
<td>Children/Adults</td>
<td>Pharamco-resistant or localization-related epilepsy</td>
<td>79% in select patients sz freedom (3)</td>
<td>Cognitive effects, surgery-related risks</td>
</tr>
<tr>
<td>VNS Therapy</td>
<td>12 and older</td>
<td>Pharma-co-resistant epilepsy, partial seizures</td>
<td>43% of pts &gt;50% sz reduction at 2 years (4)</td>
<td>Voice alteration, cough, pharyngitis, dysphasia</td>
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**Classic & Newer AEDS**

**Classic AEDs**
- Phenobarbital (PB)
- Ethosuximide (Zarontin®)
- Clonazepam (Rivotril®)
- Phenytoin (Dilantin®)

**Newer AEDs**
- Primidone (Mysoline®) -> PB
- Clobazam (Frisium®) -> benzo
- Nitrazepam (Mogodoni®) -> benzo
- Carbamazepine (Tegretol®) (CBZ)
- Divalproex (DVA)/Valproate/Valproic Acid (Depakene®/Depakene®) VPA -> GI SE
- Levetiracetam (Keppra®)
- Felbamate (Felbatol®) DIC d/t liver probs
- Vigabatrin (Sabril®)
- Oxcarbazepine (Trileptal®) -> CBZ
- Gabapentin (Neurontin) -> gaba
- Lamotrigine (Lamictal®) -> no P450!
- Topiramate (Topamax®)
- Pregabalin (Lyrica®) -> gaba

**Useful Tools!**
- Scatterplot
- Observation sheets (epilepsy)
- VIDEO of the ‘episodes’

**Key aspects to document:**
- Activity before the seizure?
- Activity during the seizure? Note sequence of events exactly: movements of eyes, head, arms & legs. Does the person respond to you during the episode?
- How did they behave after the seizure?
- Is there a pattern?
- When does it happen, during favorite activities or only those which are disliked?

**Websites**
- Epilepsy Canada: [http://www.epilepsy.ca/](http://www.epilepsy.ca/)
- EFA (Epilepsy Foundation of America): [www.efaf.org](http://www.efaf.org)