

# EPILEPSY

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# What is Epilepsy?

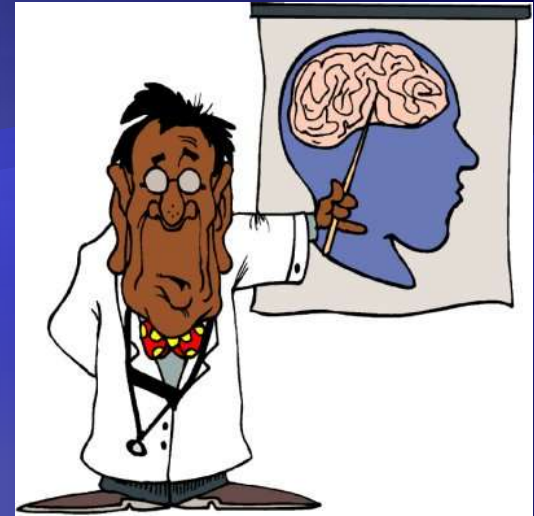
- ◆ Brain disorder
- ◆ Disturbed pattern of electrical brain activity
  - ◆ Sudden, uncontrolled, & excessive
  - ◆ Unusual thoughts, feelings, behavior, convulsions, muscle spasms, & loss of consciousness
  - ◆ Known as epileptic seizure, fit, convulsion, attack, or turn



# What is Epilepsy? (cont.)

- ◆ Neurons fire up to 500 times/sec
  - ◆ Normally 80 times/sec
- ◆ Not affected by gender/ethnicity
- ◆ Occasionally – hundreds times/day
  - ◆ Severity
  - ◆ Part of brain
- ◆ Seizures due to high fever, insulin shock in diabetes, & temporary illness NOT epilepsy

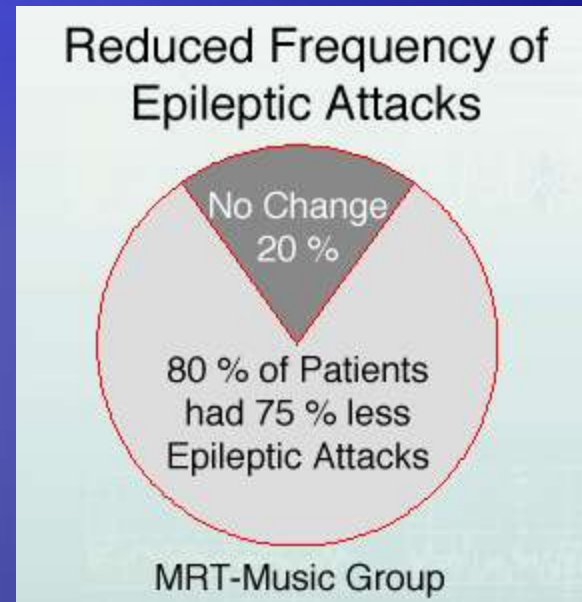
# History



- ◆ One of the first identified brain disorders
  - ◆ Hippocrates, 400 BC
  - ◆ Mentioned in Babylon over 3,000 years ago
- ◆ Derived from Greek, meaning “attack”
- ◆ Visits by demons or gods

# Today

- ◆ 1 in 150 Americans
  - ◆ Total of over 2 million
- ◆ 80% can control seizures
  - ◆ Medication
  - ◆ Surgery
- ◆ 20% intractable
  - ◆ Treatment has no effect



# Diagnosis

- ◆ Usually, 2 or more seizures required
- ◆ Electroencephalogram (EEG)
- ◆ Brain scans

# Types of Seizures

- ◆ Two main types:
  - ◆ Generalized
  - ◆ Partial

# General Seizures

- ◆ Abnormal electrical activity involves both sides of the brain.
- ◆ Can be divided into 6 sub-categories



(Chappell & Crawford, 1999; Huff, 2005; Wishnietsky & Wishnietsky, 1996)

# General Seizures (cont.)

- ◆ Absence seizures
  - ◆ Brief loss of awareness
  - ◆ Eyelids fluttering
  - ◆ Lip-smacking and chewing movements
  - ◆ Several times/day
- ◆ Myoclonic seizures
  - ◆ Sudden shock-like muscular contractions
  - ◆ Arms or legs
  - ◆ Last for up to a second

# General Seizures (cont.)

- ◆ Atonic/astatic seizure
  - ◆ Sudden loss of muscle tone
  - ◆ Fall/head injury
  - ◆ Can be preceded by myoclonic seizure
  - ◆ Last for a few seconds
- ◆ Tonic seizure
  - ◆ Sudden stiffness of limb or whole body
  - ◆ Timberlike fall
  - ◆ 5-10 seconds

# General Seizures (cont.)

- ◆ Clonic seizure
  - ◆ Repeated muscular contractions
  - ◆ Twitches of limbs/whole body
  - ◆ 30 sec – 2 min
- ◆ Tonic-clonic seizure
  - ◆ Consecutive
  - ◆ Known as “grand mal”
  - ◆ 1-3 min (up to 30 min = Status Elipticus)

# Partial Seizures

- ◆ Abnormal electrical activity in one lobe of one hemisphere
- ◆ Divided into 2 sub-categories



(Chappell & Crawford, 1999; Huff, 2005; Wishnietsky & Wishnietsky, 1996)

# Partial Seizures (cont.)

- ◆ Simple
  - ◆ Level of consciousness and awareness unaffected
  - ◆ Change in sensation
    - ◆ Strange smell/taste
    - ◆ Unexplained fear
    - ◆ Déjà vu
    - ◆ Tingling and numbness in face/arm

# Partial Seizures (cont.)

- ◆ Complex
  - ◆ Consciousness and awareness affected
  - ◆ Confusion
  - ◆ Strange behavior

# Seizure Warning Signs

- ◆ Fear/panic
- ◆ Anxiety
- ◆ Ecstasy
- ◆ Visual or auditory hallucinations
- ◆ Epigastric sensations
- ◆ Paraesthesia
- ◆ Gustatory-olfactory sensations
- ◆ Déjà vu

# Syndromes

- ◆ Signs and symptoms occurring together in a non-coincidental manner
- ◆ Identified through 4 steps:
  - ◆ Type of seizure
  - ◆ Age at which seizures started
  - ◆ Development and learning abilities
  - ◆ EEG

# Syndromes (cont.)

- ◆ Only 50-65% identified with clear-cut syndrome
- ◆ Important to identify
  - ◆ Accurate prognosis
  - ◆ Determine medication/surgery

# Lennox-Gastaut Syndrome

- ◆ Very rare & severe
- ◆ 2-6 years of age
- ◆ Variety of seizures
- ◆ Confused, unresponsive, not talking, wandering around
- ◆ Lasting several minutes
- ◆ Learning and behavior difficulties

# Lennox-G Syndrome (cont.)

- ◆ Causes
  - ◆ Abnormal prenatal brain development
  - ◆ Meningitis
  - ◆ Brain damage at birth
  - ◆ West syndrome
    - ◆ Infantile spasms
- ◆ Corpus callosotomy
  - ◆ Reduced frequency/intensity

# Symptoms

- ◆ Rhythmic movement of arms/legs
- ◆ Jerking
- ◆ Stiffness
- ◆ Sounds
- ◆ Heavy breathing following episode
- ◆ Loss of awareness
- ◆ Confusion
- ◆ Urination
- ◆ Sensations
- ◆ Lip smacking
- ◆ Blank stare
- ◆ Repetitive blinking

# Causes

- ◆ Any disturbance of normal brain activity
  - ◆ Illness
  - ◆ Brain damage
  - ◆ Abnormal brain development
  - ◆ Chemical imbalance
  - ◆ Failure to take medication



# Triggers

- ◆ Strobe light
- ◆ Thought
  - ◆ i.e. logical problems
- ◆ Voices
- ◆ Music
- ◆ Alcohol
- ◆ Drugs
- ◆ Emotional stress
- ◆ Sleep deprivation
- ◆ Jet lag

# When a Seizure Occurs

- ◆ Generally not an emergency
- ◆ Let seizure run its course
- ◆ Talk gently and reassure
- ◆ Only attempt physical contact to protect person
  - ◆ Gently move away from danger
- ◆ If necessary, aid breathing
  - ◆ Loosen tight clothing
  - ◆ Recovery position



# When a Seizure Occurs (cont.)

- ◆ Remove hard objects
- ◆ Protect head
- ◆ Do not put anything in the person's mouth
- ◆ Do not leave the person alone until recovered
- ◆ Blueness around mouth due to lack of O<sub>2</sub>

# When to Call an Ambulance

- ◆ Uncertain cause of seizure
- ◆ Injury occurred
- ◆ Seizure lasts longer than usual or 10+ min
- ◆ 2-3 seizures occur without individual regaining consciousness
- ◆ Accompany individual to hospital
  - ◆ Reassure
  - ◆ Share observations with hospital personnel

# Treatment

- ◆ Needs to be initiated as soon as possible following diagnosis.
- ◆ 80% can control seizures through medication or surgery
- ◆ Vagus nerve stimulator

# Prognosis

- ◆ No cure
- ◆ May go away with time
- ◆ 68-92% of idiopathic children become seizure free after 20 years
- ◆ Severe symptoms decrease chance
- ◆ Normally no chronic brain damage



# Prognosis (cont.)

- ◆ Behavioral & emotional problems
  - ◆ Frustration
  - ◆ Embarrassment
  - ◆ Bullying
  - ◆ Teasing
  - ◆ Social avoidance
  - ◆ More common among children

# Prognosis (cont.)

- ◆ Life-threatening:
  - ◆ Status Elipticus
    - ◆ Prolonged seizures
    - ◆ 1/several seizures for total 30 min w/o consciousness
    - ◆ Brain damage
    - ◆ 6% = death

# Prognosis (cont.)

- ◆ Sudden unexpected death in Epilepsy (SUDEP)
  - ◆ Age 20-40
  - ◆ Frequent, uncontrolled seizures
  - ◆ 1 in 200
  - ◆ Risk increases w/o medications
  - ◆ Most common at night

# What We Take for Granted...

- ◆ Independence
- ◆ Pregnancy
- ◆ Alcohol
- ◆ Lights
- ◆ Learning/academics
- ◆ Emotional balance
- ◆ Controlled behavior
- ◆ Social involvement
- ◆ Functional memory
- ◆ Late nights

# Suicide

- ◆ Epilepsy related to increased risk of suicide
  - ◆ Social/medical factors
  - ◆ Co-occurring psychiatric disorders
- ◆ 3 times as likely to commit suicide
  - ◆ 2 times if considering social & psychiatric factors
- ◆ Highest risk first 6 months
- ◆ Know symptoms
- ◆ Involve a professional

# The Future

- ◆ Research to identify gene involvement & neurotransmitters interaction with brain cells.
- ◆ Experimental treatments
  - ◆ Stem cell transplantation
  - ◆ Fetal pig neuron transplantation
  - ◆ Developing devices able to recognize seizures 3-5 min before they begin

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# Questions?

