Seizures

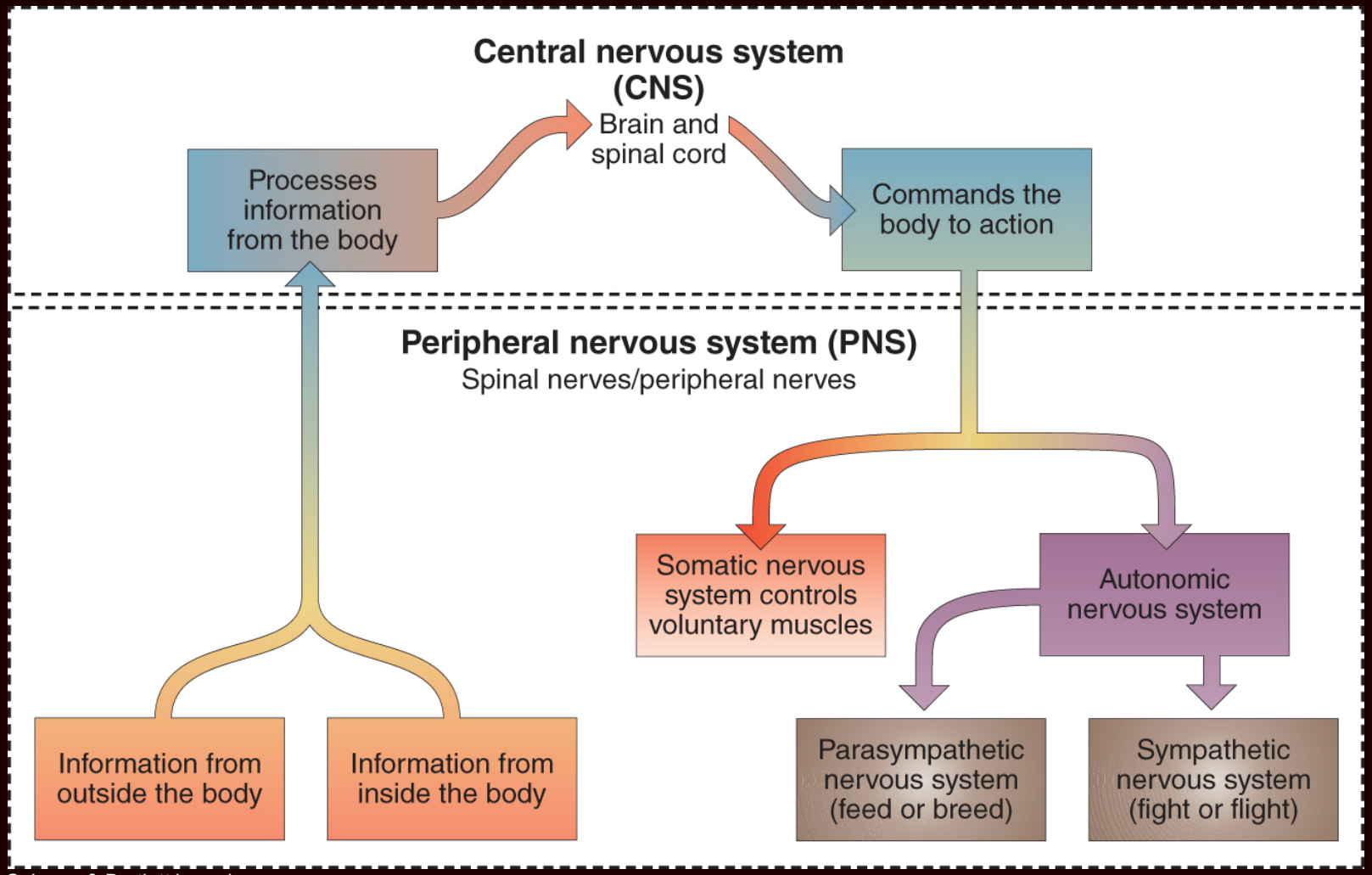
Pea Ridge Fire Department

EMS refresher

Structure of the Nervous System

- Major structure divided into two categories:
  - Central nervous system (CNS)
    - Thought
    - Perception
    - Feeling
    - Autonomic body functions
  - Peripheral nervous system (PNS)
    - Communication between the brain and the body

Structure of the Nervous System



The Brain

- Lobes
  - Occipital lobe: scans through images
  - Temporal lobe: attaches name to image
  - Frontal lobe: controls voluntary motion
  - Parietal lobe: perceives touch and pain

The Brain

- Diencephalon and brainstem
  - Diencephalon
    - Filters out unneeded information
  - Brainstem
    - Midbrain: regulates level of consciousness (LOC)
    - Frees the cerebral cortex for higher activities

The Brain

- Hypothalamus and pituitary gland
  - Limbic system: generates rage and anger
  - Hypothalamus: Controls pleasure, thirst, hunger
  - Prefrontal cortex: mediates all emotions

The Brain

- Cerebellum
  - Located in posterior, inferior area of the skull
  - Manages complex motor activity
  - Learned behaviors transferred from the frontal lobe

Patient Assessment

- Brain is sensitive to change in temperatures and levels of oxygen and glucose.
  - Small alterations can affect its function.
  - Brain is resilient to internal environmental changes.

Patient Assessment

- Perform all the general steps, including:
  - Scene safety
  - Taking standard precautions
  - Considering the mechanism of injury
  - Determining whether medications, alcohol, or other substances were taken
    - How much and when

Patient Assessment

- A good assessment provides the backbone to excellent patient care.
  - Be curious.
  - Be inquisitive.
  - Be adaptable.
  - Avoid tunnel vision.

Scene Size-up

- Take standard precautions.
  - Assessment of physical environment begins at dispatch.
  - The patient's location may place you in a dangerous environmental situation.

Scene Size-up

- Take patient symptoms into account when assessing scene safety.
  - If an entire family is complaining of headaches, consider carbon monoxide poisoning.
- If the nearest stroke center is more than 1 hour away, request air medical transport early.

Primary Survey

- Form a general impression.
  - Where is the patient?
  - In distress or pain?
  - Position?
  - Inside or outside?
  - Obvious injuries?
  - Environment?
  - Drug paraphernalia?
  - Living conditions?
  - Able to walk?
  - Awake and alert?
  - Stable or unstable?

Primary Survey

- Assessing level of consciousness
  - AVPU mnemonic
  - Assessment of orientation
  - Glasgow Coma Scale (GCS)

Primary Survey

- Measuring response to pain
  - Do not cause harm.
  - Methods of painful stimuli include:
    - Pressure to fingernail
    - Pressure to the supraorbital foramen

Courtesy of Chuck Sowerbrower, MED, NREMT-P.

Primary Survey

- Pain response
  - Does patient wake up?
  - Abnormal movement?
    - Decorticate posturing
    - Decerebrate posturing

Courtesy of Chuck Sowerbrower, MED, NREMT-P.

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Primary Survey

- Airway, breathing, and circulation
  - Nerves responsible for airway control include:
    - Trigeminal, glossopharyngeal, vagus, and hypoglossal
  - Allow for:
    - Swallowing
    - Controlling the tongue
    - Slightly contracted muscles in hypopharynx

Primary Survey

- Airway, breathing, and circulation (cont'd)
  - If the patient is unresponsive, assess the airway.
  - A common presentation is trismus (clenched teeth).
  - Trismus may indicate:
    - A seizure in progress
    - Severe head injury
    - Cerebral hypoxia

Primary Survey

- Airway, breathing, and circulation (cont'd)
  - If trismus is noted:
    - Determine if the patient can be ventilated.
    - If ventilation is poor and the patient is breathing on his or her own, attempt a nasotracheal airway.
    - If you are unsuccessful, consider a sedative/paralytic agent.
    - If paralytics are unavailable, transtracheal airway management is the only option.

Primary Survey

- Airway, breathing, and circulation (cont'd)
  - Provide routine hyperventilation only to patients with both:
    - Documented unconsciousness
    - Signs of increased intracranial pressure (ICP)
  - Check rate and rhythm of breathing.

Primary Survey

Table 18-3 Respiratory Patterns

Waveform	Pattern	Description	Causes
	Eupnea	Regular rate and pattern; inspiration and expiration are equal	Normal
	Tachypnea	Increased respiratory rate Regular pattern	Stimulants Exercise Excitement
	Bradypnea	Decreased respiratory rate Regular pattern	Narcotics
	Apnea	Absence of breathing	Severe hypoxia Depressants
	Hyperpnea	Rapid, regular, deep respirations	Stimulants Overdose Exercise
	Cheyne-Stokes respirations	Gradual increases and decreases in respirations with periods of apnea	Pre-death pattern Brainstem injury
	Biot/ataxic respirations	Irregular respirations with periods of apnea; unpredictable	Brainstem injury
	Kussmaul respirations	Extreme tachypnea and hyperpnea	Acidosis Diabetic ketoacidosis
	Apneustic respirations	Prolonged inspiratory phase with shortened expiratory phase and bradypnea	Brainstem injury

Primary Survey

- Circulation
  - Look for signs of increased intracranial pressure
    - Cushing reflex
    - Decorticate posturing
    - Decerebrate posturing
    - Biot respirations
    - Apneustic respirations
    - Cheyne-Stokes respirations
    - Unresponsive and dilated pupils or anisocoria

Primary Survey

- Transport decision
  - Consider how to transport:
    - Complete a rapid, full-body scan *or*
    - Complete a secondary assessment and evaluate only the area of patient complaint.

Primary Survey

- Transport decision (cont'd)
  - A rapid, full-body exam should be performed with:
    - Abnormal assessment
    - Significant MOI/NOI
    - Any patient you suspect may have a major problem
  - A secondary assessment is appropriate if the patient is stable.

History Taking

- If the patient is stable, obtain history.
  - Look for signs and symptoms of altered mental status or seizure.
  - Evaluate the patient's speech.
  - Ask about over-the-counter medications.

History Taking

- If patient has had a seizure:
  - Look for obvious explanations.
- For headache, determine:
  - Patient's level of stress
  - Likelihood of infection
  - History of headaches
- Talk to the patient's family or friends.

History Taking

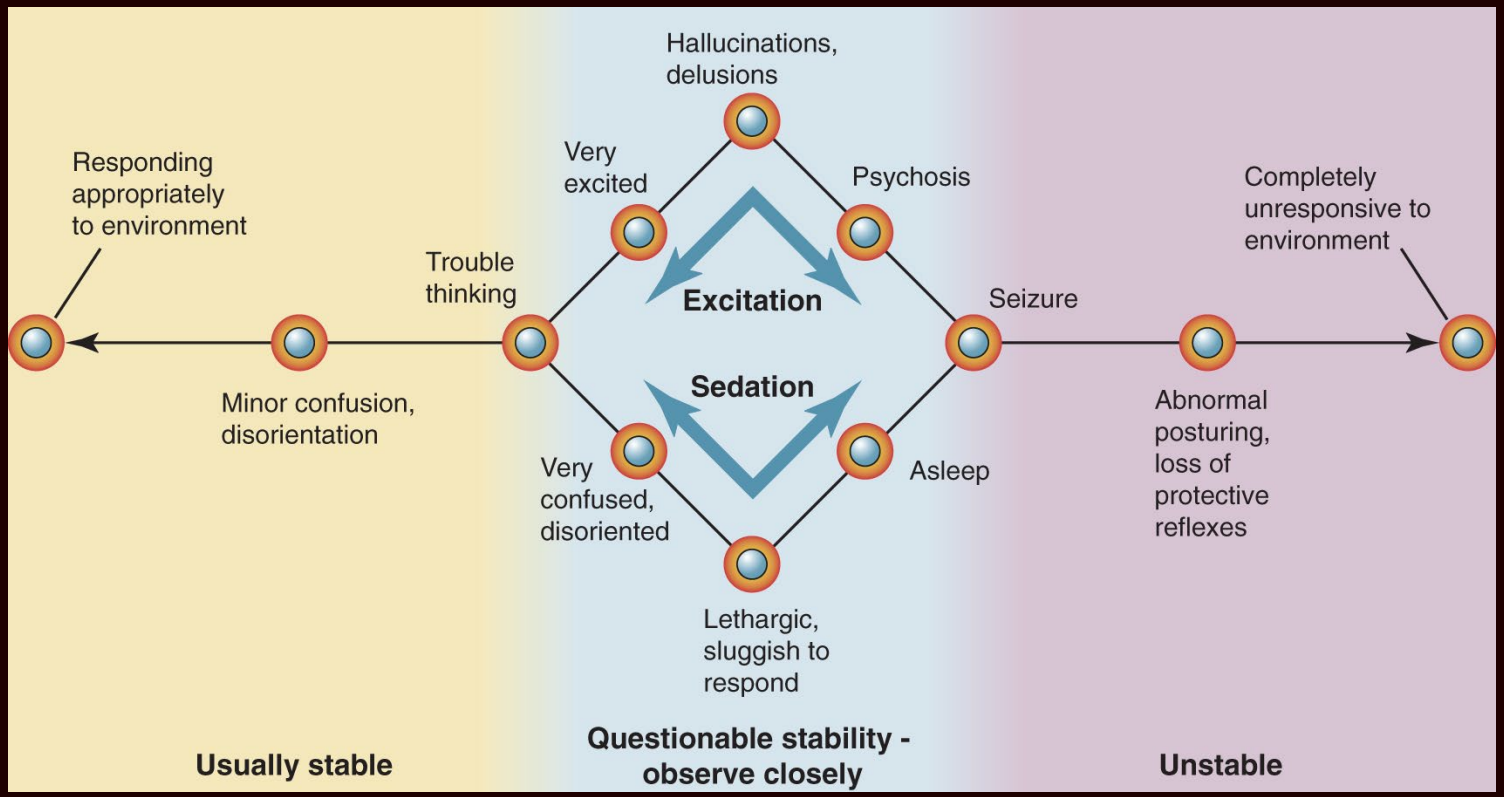
- If the patient is responsive, obtain a SAMPLE history.
  - History of seizures
  - For first seizure:
    - Suspect a grave condition.
    - Determine whether the patient takes medications that lower the blood glucose level.
    - Inquire about drug use and exposure to toxins.

Secondary Assessment

- Notable neurologic exam findings:
  - Nausea and vomiting
  - Urinary and/or fecal incontinence
  - Signs of recent venipuncture marks

Secondary Assessment

- Level of consciousness
  - There can be many variations.



Secondary Assessment

- Common reality
  - Senses determine what is real
  - Hallucinations: Feelings of sound, sight, touch, and taste that are entirely within patient's mind
  - Delusions: Thoughts or perceived abilities that are not based in a common reality

Secondary Assessment

- Common reality (cont'd)
  - Psychosis is an inability to determine what is real and what is inside one's mind.
    - Patients may be unpredictable.
    - Ensure your safety.
  - Medication may be needed to help manage psychosis.

Secondary Assessment

- Changes in mood or tempo of nervous system should alert you to changes in the patient's neurologic system.
  - Ask the patient how he or she feels.
  - Ask the patient how easy it is for him or her to think.

Secondary Assessment

- Corneal reflex
  - This reflex determines intact cough and gag reflexes.
  - Tap between the patient's eyes.
    - Patients with reflexes will blink reflexively.
    - If patient does not blink or twitch, assume cough or gag reflex is not intact.
- Pupillary response
  - Examine for shape, size, and response.

Secondary Assessment

- Blood glucose level
  - Check for all patients with altered LOC.
  - Normal reading is 60 to 120 mg/dL.
  - Below 10 mg/dL is usually fatal.
  - Below 30 mg/dL or above 300 mg/dL will cause confusion.

Secondary Assessment

- Cranial nerve functioning
  - Abnormal functioning may occur with
    - Stroke
    - Trigeminal neuralgia
    - Myasthenia gravis

Secondary Assessment

- Speech
  - Listen to the quality of the patient's speech.
    - Slurring
    - Word choice
    - Ability to recognize objects

Secondary Assessment

- There are three main forms of aphasia.
  - Inability to understand speech with ability to speak clearly
  - Inability to speak clearly with ability to understand speech
  - Inability to follow commands or answer questions
  - Note if the patient speaks clearly but gives you incorrect answers.

Secondary Assessment

- Hemiparesis and hemiplegia
  - Hemiparesis is weakness of one side of the body.
  - Hemiplegia is paralysis of one side of the body.
  - The patient may have weakness on one side of the body and facial droop on the other side.

Secondary Assessment

- Bizarre movement
  - Myoclonus: rapid, jerky muscle contraction that occurs involuntarily
  - Dystonia: a part of the body contracts and remains contracted

Secondary Assessment

- Alterations in smooth motion
  - Rigidity: stiffness of motion
  - Tremors: fine, oscillating movement
    - Rest tremor
    - Intention tremor
    - Postural tremor

Secondary Assessment

- Alterations in smooth motion (cont'd)
  - Seizure: larger, less focused movement
    - Tonic activity
    - Clonic activity

Secondary Assessment

- Vital signs
  - Document:
    - Pulse rate, rhythm, and quality
    - Respiratory rate, rhythm, and quality
    - Blood pressure
    - Skin temperature, color, and condition
    - Pupil size and reactivity

Secondary Assessment

- Vital signs (cont'd)
  - Ensure maintenance of a systolic blood pressure of at least 110 to 120 mm Hg.
  - Ensure adequate respiratory rate and pattern.
  - Ensure effective pulse rate and rhythm.
  - If hypothermia or hyperthermia is suspected, use a thermometer to establish temperature.

Reassessment

- Communication and documentation
  - Notify the receiving facility of:
    - Chief complaint and assessment findings
    - Time the patient was last seen healthy
    - Findings of neurologic examination
    - Anticipated time of arrival at the hospital

Reassessment

- Document:
  - Time of the onset
  - Findings from stroke scale and GCS score
  - Any interventions performed
  - Any change in patient during transport
  - Reason for choice of hospital

Reassessment

- For patients who have had a seizure, document:
  - Description of seizure activity
  - Bystanders' comments
  - Onset and duration
  - Noticing an aura
  - Evidence of trauma
  - Interventions performed
  - History of seizures

Reassessment

- When documenting interventions, include:
  - Time of each intervention
  - How the patient responded
  - What the findings showed

Seizures

- If a seizure continues for a long time:
  - Cerebral glucose and oxygen supplies can be depleted.
  - Serious, long-term effects, including death, can occur.

Seizures

- Try to determine the cause of the seizure.
  - Medication compliance
  - Fever
  - Low blood glucose level in diabetics

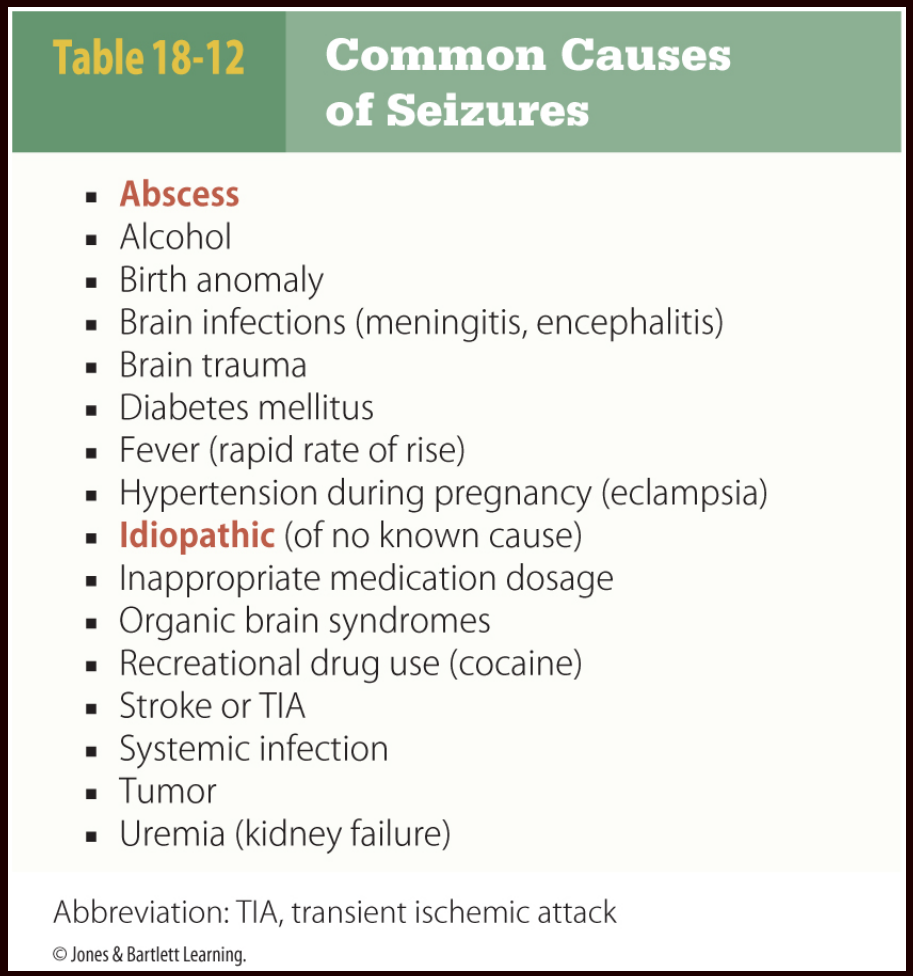


Table 18-12 Common Causes of Seizures

- **Abscess**
- Alcohol
- Birth anomaly
- Brain infections (meningitis, encephalitis)
- Brain trauma
- Diabetes mellitus
- Fever (rapid rate of rise)
- Hypertension during pregnancy (eclampsia)
- **Idiopathic** (of no known cause)
- Inappropriate medication dosage
- Organic brain syndromes
- Recreational drug use (cocaine)
- Stroke or TIA
- Systemic infection
- Tumor
- Uremia (kidney failure)

Abbreviation: TIA, transient ischemic attack

Seizures

- Generalized seizures
  - Tonic-clonic seizures
  - Steps:
    - Loss of consciousness
    - Tonic phase
    - Hypertonic phase
    - Clonic phase
    - Postseizure phase
    - Postictal phase

Seizures

- Pseudoseizures
  - Cause is of psychiatric origin.
  - A pseudoseizure is triggered by an emotional event, stress, lights, or pain.
  - A pseudoseizure occurs with witnesses.
  - Motion is relatively organized.

Seizures

- Absence seizures (petit mal seizures)
  - Typical patient a child
  - Stop and freeze midaction
  - Usually no longer than several seconds

Seizures

- Partial seizures
  - Only a limited part of the brain is involved.
  - Simple partial seizures involve either:
    - Movement of one part of the body (frontal lobe)
    - Sensations in one part of the body (parietal lobe)

Seizures

- Partial seizures (cont'd)
  - Complex partial seizures involve changes in LOC.
  - The patient may experience confusion, loss of alertness, hallucinations, or an inability to speak.
  - Patients typically do not become unresponsive.

Seizures

Table 18-13 Classification of Seizures

Grouping	Type	Presentation
Generalized	Tonic-clonic (formerly grand mal) Absence (formerly petit mal) Pseudoseizures	Full-body, violent jerking movements Freezing or staring Tonic-clonic but caused by a psychiatric mechanism (the patient is not faking the seizure)
Partial	Simple partial	Shaking of one area of the body Sensation in one area of the body
	Complex partial	Subtle alterations in LOC

Abbreviation: LOC, level of consciousness

Seizures

- Assessment
  - Most seizures are self-limiting.
  - Monitor and protect patients from injury to self.
  - Your thorough assessment will help the ED staff determine the cause of the seizure.

Seizures

- Management
  - Begin with the standard care guideline.
  - Determine whether trauma is a concern.
  - Do not restrain the patient.
  - Remain calm.
  - Prevent the patient from becoming injured.
  - Do not place anything in the patient’s mouth.
  - Correct hypoglycemia as needed.

Seizures

- Management (cont'd)
  - Ventilatory assistance may be necessary.
  - Provide emotional support.
  - Administer medications for febrile seizure as needed.
  - Consult protocols for administration of OTC medications.
  - All patients should be transported.

Seizures

- Differentiating seizure from stroke
  - Consider assessment findings and past medical history.
  - Patients with a history have similar seizure patterns over time.
  - The family will know if the current seizure is the typical seizure.

Seizures

- Management (cont'd)
  - If you are concerned about a seizure during transport:
    - Be prepared to administer diazepam, lorazepam, or midazolam.
    - Pad the cot and rails.
    - Ensure the cot straps are not too tight.

Status Epilepticus

- Pathophysiology
  - Seizure that lasts longer than 4 to 5 minutes or consecutive seizures
    - May result in neurons being damaged or killed
  - Goal: stop seizure and ensure adequate ABCs

Status Epilepticus

- Assessment
  - Assessment is the same as for any seizure.
  - Ask if seizure medication was administered before your arrival.

Thank You

Please continue to the next section