Emergency Neurology and Management

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Disclaimer:

- Anything presented to you in this lecture is meant to further educate you in providing medical care. It is not meant to replace your operating protocols within your operating areas.

Shout out to my fellow college providers!

Harpur's Ferry corps members pose in front of an ambulance. Harpur's Ferry won the Advanced Life Support (ALS) skills competition for the second year in a row. The ALS competition is part of the National Collegiate Emergency Medical Services Foundation Conference, which took place in Boston from Feb. 28 to March 2. (Kendall Loh/Photo Editor)

Open Your mind!

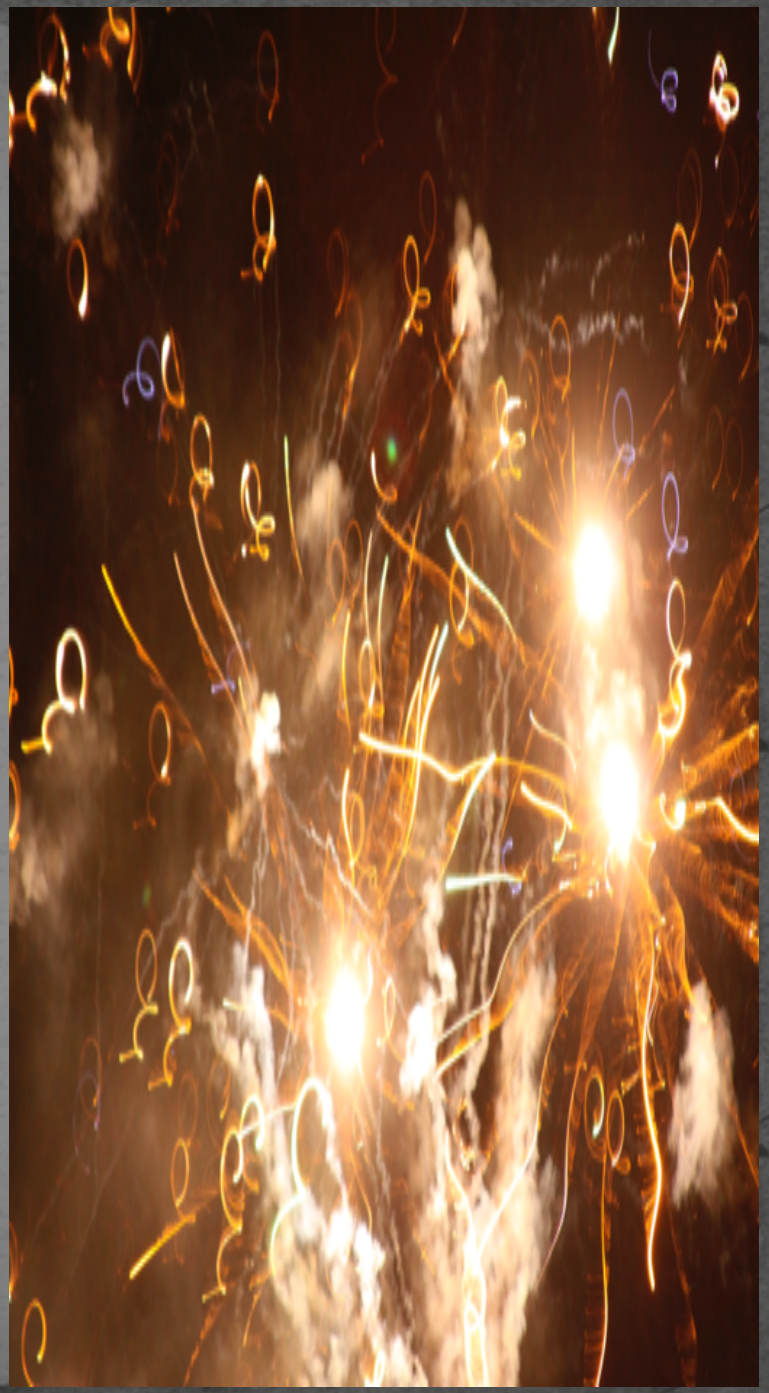
Even if you get lost, stay in the moment..

Introduction

- Prehospital neurological examinations are very brief and often very poor/out of necessity
- Terms and vocabulary are often confounded
- The inability to properly identify certain signs and symptoms, can prove detrimental to patient outcome once the patient has been received by the ER

Overview 1/2

- Neurological Hx Acquisition
  - Appropriate questions/timing
- Neurological Examination
  - Mental Status Exams
  - Cranial Nerve Review
  - Motor System Considerations
  - Sensory System Considerations



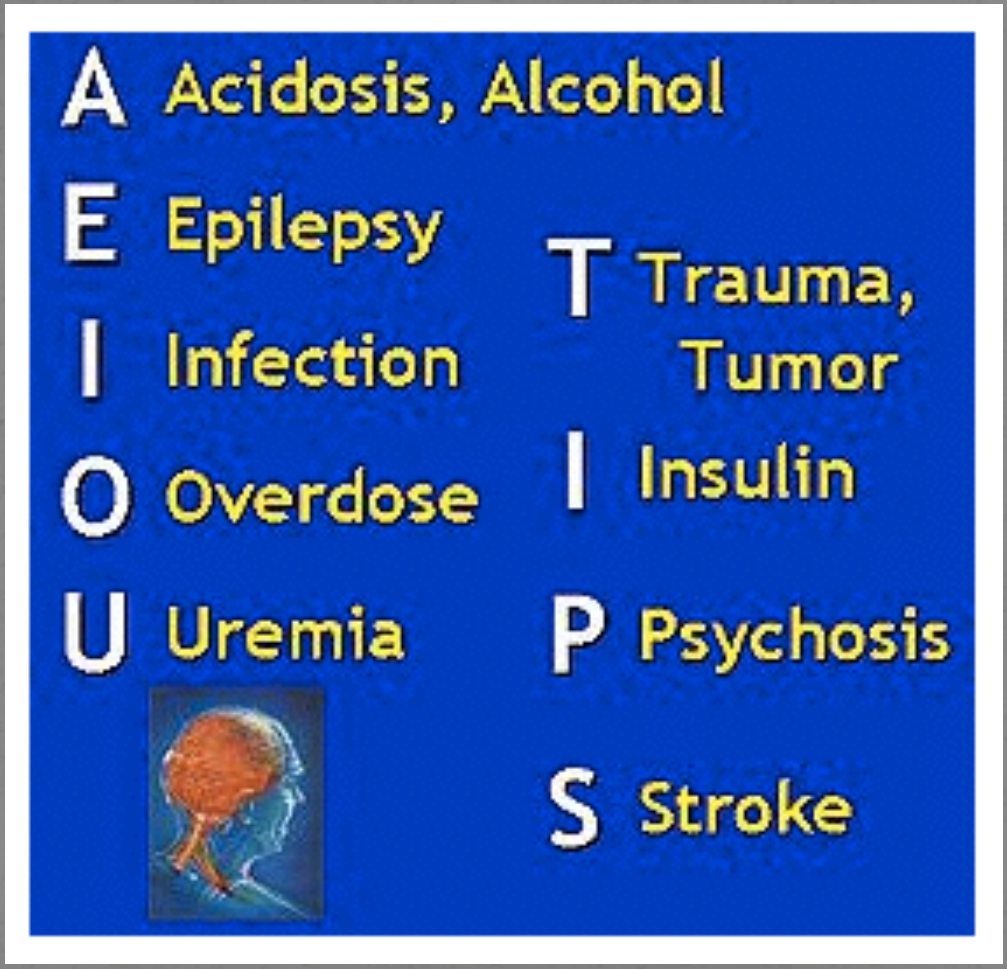
Overview 2/2

- Headache
- Weakness
- Dizziness
- Seizures
- Altered mental status

Obtaining Neuro Hx

- Obtaining a Hx ASAP increases the precision of the providers exam
  - Allows for asking appropriate questions
  - About 75% of neurological diagnoses are made while obtaining Pt Hx
- Prehospital acquisition of Hx can be challenging
  - Get what you can
  - Family is usually reliable
  - Bystanders or friends may not be (bystanders sketchy)

Neurological Hx ???



Neurological Examination

- First it is important to note the patients mental awareness:

- IMPORTANT CONSIDERATION
  - If a patient is altered we immediately know that our neurological Hx may not be reliable and thus we may have challenges during the rest of the exam

Mental Status Examination 1/3

- Initial evaluation of a patient with potential deficits includes:
  - Alertness
    - AVPU
      - Rapid alertness scale
  - Chronic vs. acute
    - Dementia, Alzheimer's
    - Unknown etiology. ACUTE Changes in LOC Require ALS evaluation
  - Characterization of Changes
    - Up – Manic, exuberant
    - Down- Lethargic, stuporus, obtunded
    - Weird / Strange - psychedelic, psychotic break, voices

Mental Status Examination 2/3

- GCS – Glasgow Coma Scale
  - Coma – eyes closed unresponsive state

Reminder

Glasgow Coma Scale

Eyes Opening	Verbal response	Motor response
1 - none	1 - none	1 - none
2 - to pain	2 - incomprehensible sounds	2 - abnormal extension
3 - to voice	3 - inappropriate words	3 - abnormal flexion
4 - spontaneously	4 - confused	4 - withdraws from pain
	5 - orientated	5 - localises to pain
		6 - obeys commands

Mental Status Examination 3/3

- Assessment and Possible causes of altered behavior
  - Comprised of pneumonic AEIOU-TIPS
- A - Alcohol, Anoxia, Arrhythmia, Acidosis, Alzheimers
- E - Epilepsy
- I - Insulin (Hypoglycemia)or Hyperglycemia
- O - Overdose (or Overmedicated)
- U - Underdose, Uremia
- T - Trauma
- I - Infection
- P - Psychotic
- S - Stroke, Shock

Case Study lead In

- You are present with a 19 y/o male patient with a Hx of known opiate use. Pt was found in D.O.C laying on a couch.
- Patient is unresponsive
  - Vitals
    - Bp 110/70
    - Pulse 130
    - RR – Absent
    - Skin diaphoretic and cool to the touch
    - PT GCS 3
    - BG- 115
  - PUPILS – fixed and constricted
    - Miosis
- With high degree of suspicion you Dx the patient with…

Case Study Lead In-Cont'd

- Opiate overdose
- Are there any other exams you wish to perform ?
- Yes I knew you would…
- Under specific conditions coma with certain combinations of ocular findings and breathing patterns can indicate specific neuroanatomical substrates for the coma.
- Vesitbulo-ocular Reflex (VOR) – Dolls Eyes stabilizes images of the retina upon movement of head. Usually indicative of brainstem injury eye movements are opposite of rotary movements.
- ** Rarely ever seen in Overdoses

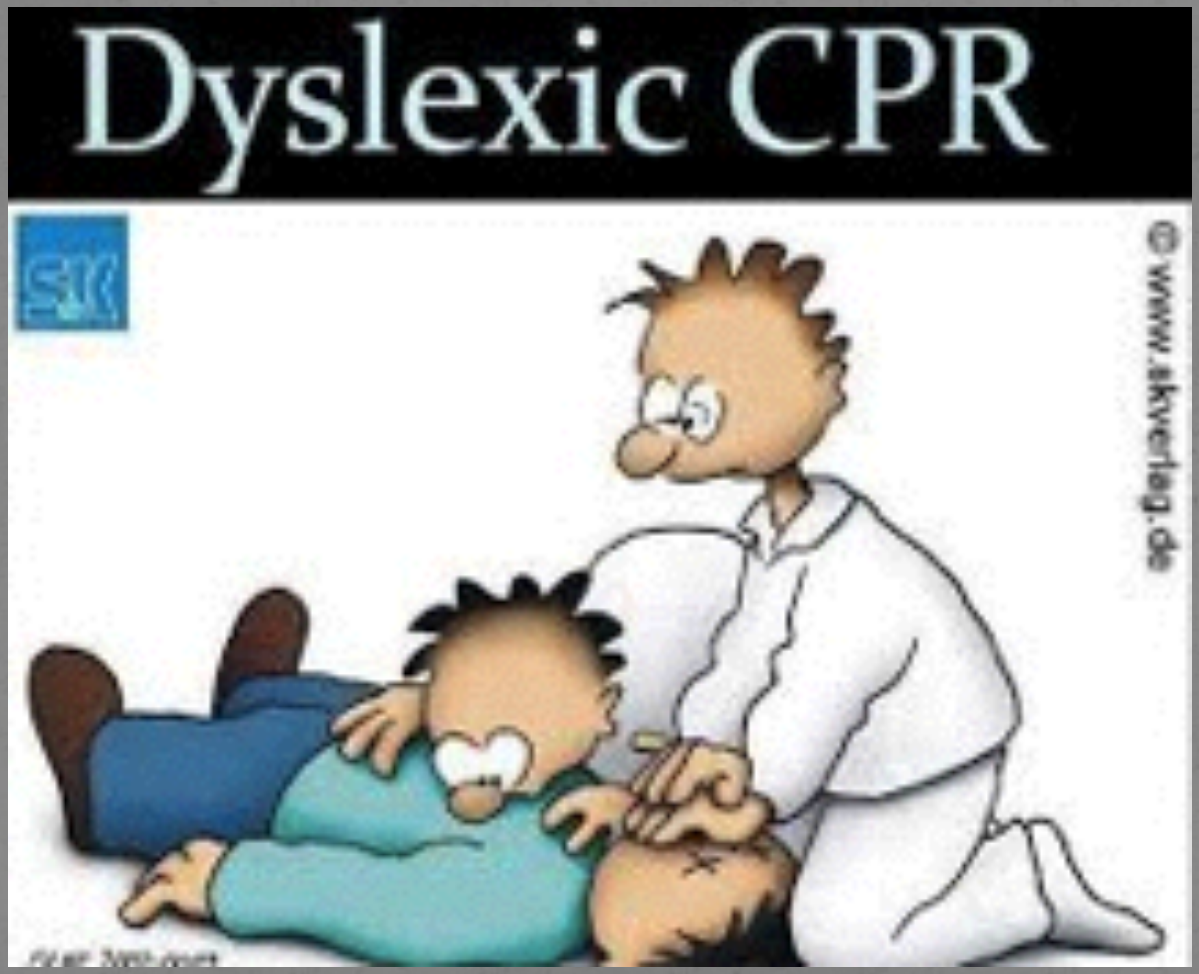
Case study Lead In

- ** Rare for overdose victims to exhibit dolls eyes
- Paralytic agents can produce similar comatose affect however pupil involvement is rare !

Moving Forward to the intimidating Cranial Nerves AHhhhhhhhhhhhhh

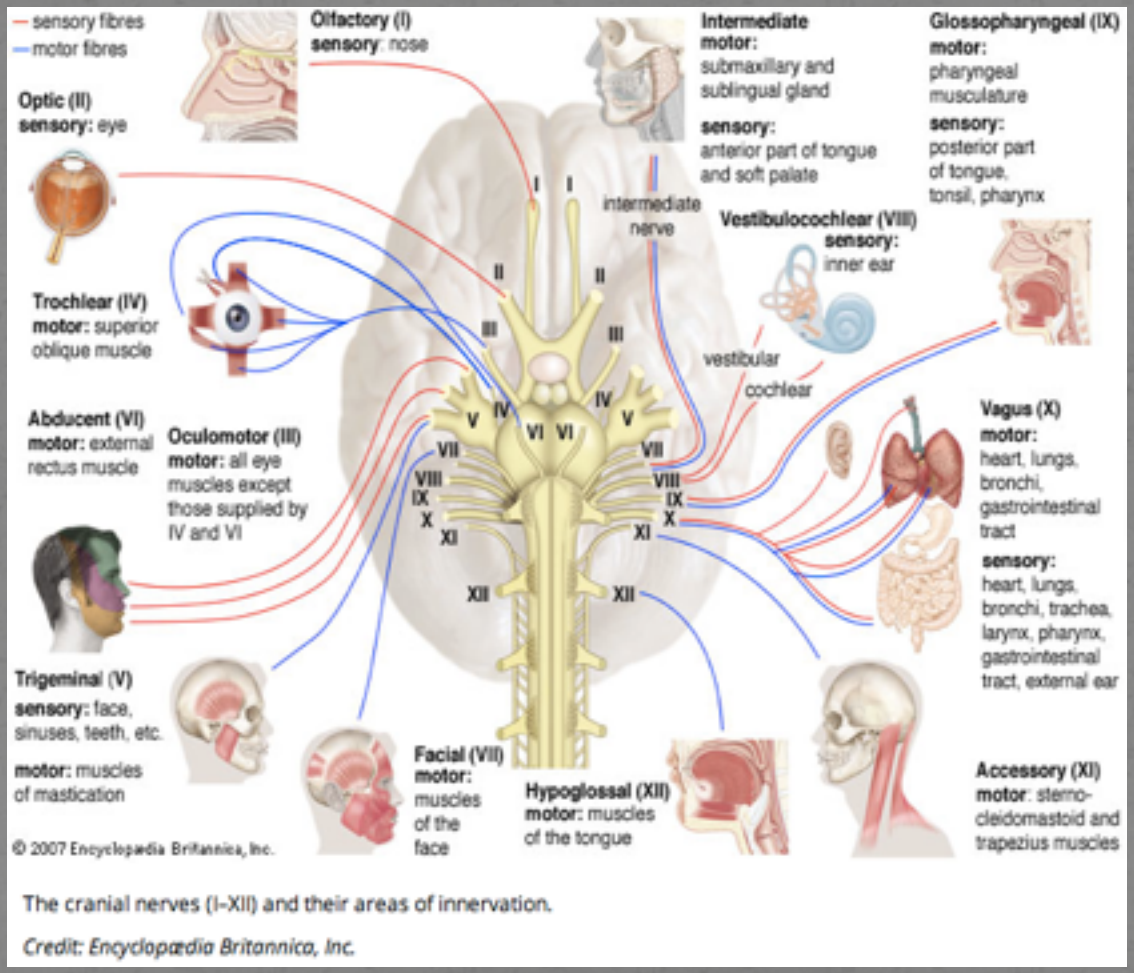
Quick Break

Quick Break



Quick Break

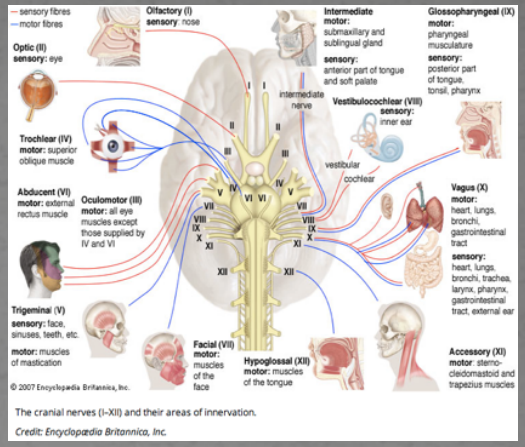
Cranial Nerves



The cranial nerves (I–XII) and their areas of innervation.

Credit: Encyclopædia Britannica, Inc.

Cranial Nerve Review



- CN I – Olfactory
  - Purely sensory
  - Used for detection of pheromones
  - Often skipped unless the patient notes some immediate deficit
- CN II – Optic **
  - Sensory
  - Transmits visual signals from the retina to the brain
  - Utilize PERRLA or PEARRL ←My preference – to examine

Cranial Nerve Review Cont'd

- Cranial Nerves III, IV and VI are cranial nerves that primarily control eye movement
- Dysfunction of specific nerves can be localized by noting the directions of loss
- CN III – Oculomotor
  - Responsible for eye opening
    - Ptosis- drooping eyelid
    - Horner's Syndrome
      - Ptosis
      - Anhydrosis
      - Miosis –Which may be recognized with earlier visual exam
  - Adduction vs. Abduction
    - Adduction is toward the midline
    - Abduction- away from the midline

Cranial Nerve Review 3

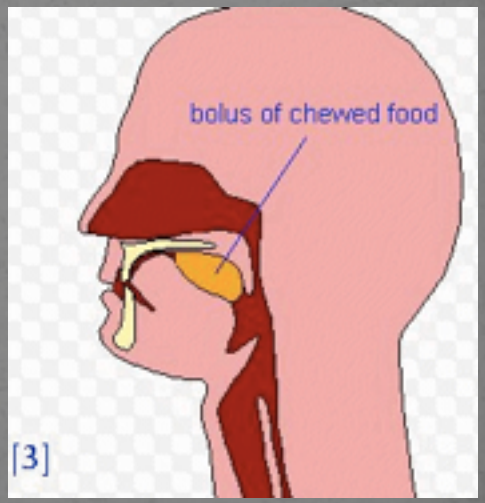
- CN IV – T
  - Motor
  - Rotates
    - Intort
    - Extor
  - Challen sitions respecti V
- CN VI – A
  - Mainly
  - Abduce
    - Wors er
      - Ips

Cranial Nerve Review Cont'd

- CN V- Trigeminal
  - Motor and sensory
    - Controls facial movement and sensation
      - To test- touch patients face with finger or cold pack
- CN VII – Facial
  - Motor and sensory
    - Controls primarily lower aspect of face
    - Can see new onset facial droop
    - Bells Palsy
- CN VIII – Vestibulocochlear
  - Mostly sensory
    - Mediates sound, rotation and gravity
    - Challenging to assess directly
      - Symptoms include:
        - Nausea, vomiting, unsteady gait, vertigo

Cranial Nerve Review Cont'd

- CN IX – Glossopharyngeal
  - Sensory and Motor
    - Responsible primarily for gag reflex
    - Easy to test with an oral airway
- CN X – Vagus
  - Sensory and motor
    - Controls muscles for voice and swallowing
    - Notable in elderly and particular skinny young women syncope while swallowing food
      - Hx is important for these
- CN XI – Accessory
  - Motor
    - Controls sternocleidomastoid and trapezius muscles
      - Patient wont be able to shrug and will demonstrate neck weakness
- CN XII – Hypoglossal
  - Motor
    - Important for swallowing
    - BOLUS formation
    - Speech articulation
      - Diagnose with alterations of speech



The Motor System

- Refers specifically to two qualities when evaluating
  - Tone
    - Can be evaluated by examining a patients fluidity of motion at joints
    - Develop via Extrapyramidal disturbance
      - Parkinsons
  - Power
    - Can be evaluated by grip test or the gas pedal exam
    - Assess for symmetry

Motor System Cont'd

- Coordination
  - Evaluate gait if patient is able to walk
  - Balance when sitting
  - Balances disturbances when the patient is laying
  - Dystonia
    - Video
  - Note any kind of tics
  - Or fidgeting behavior

Sensory System

- In EMS we do a very good job of this already especially in our rapid trauma exams
- Ask lots of questions keep dialogue open for changes in sensation
  - If a patient has calluses on hands or feet consider using a cold or heat pack to check for sensation

Altered Level of Consciousness

- All patients need to be getting a blood glucose test early.
- Easy to fix

Headache

- Prehospital setting we want to assess
  - Blood pressure
    - As long as diastolic pressure is below 140mm/Hg HTN usually wont be treated Prehospitally.
  - Headache itself is not life threatening on its own
  - When it is secondary to underlying conditions it is serious and should be considered ALS
    - Trauma
    - Head injury
    - Hypovolemic shock
- EMS aids greatly in gathering information for the hospital as to CO poisoning and suspected agents of abuse

Headache: Sinuses

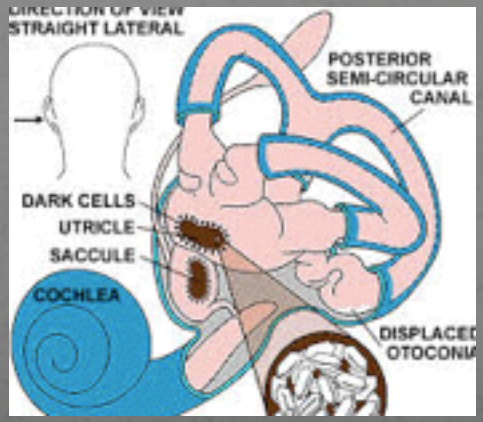
- We have 4 pair of sinuses:
  - Maxillary
  - Frontal
  - Ethmoid
  - Sphenoid
  - What do sinuses do?

Weakness

- Condition where muscles cannot exert normal force
  - Best assessment for this is OPQRSTI
- History is going to be your best aid
- Prehospitally we are unable to truly identify causes of weakness as we do not have advanced capabilities
  - Blood work
  - X-ray
  - CT
  - MRI
- However of you have weakness post trauma the call is Not ALS.

Dizziness

- History is your best bet
- Literally hundreds of causes from medications and health conditions.
  - Due to the potential severity of new onset, with no potential Dx – ALS evaluation
  - Previous medical condition or Hx known from medications Txp decision is at the discretion of the provider



Seizures

- Always ALS due to the potential for advance management of the airway and pharmacologic interventions
- Important to note that we may only be able to acknowledge a seizure
  - Note location and movement
  - Duration
  - Airway
  - Incontinence
- Its always important to note that you should be prepared to bag a patient who is actively seizing

Seizures

I. Partial seizures
   - A. Simple focal seizures (consciousness not impaired)
     1. With motor signs
     2. With somatosensory or special sensory signs
     3. With autonomic signs
     4. With psychic signs
   - B. Complex focal seizures (with impairment of consciousness)
     1. Simple partial onset followed by impairment of consciousness
     2. With impairment of consciousness at onset
   - C. Partial seizures evolving to secondarily generalized seizures
     1. Simple partial seizure evolving to generalized seizures
     2. Complex partial seizure evolving to generalized seizures
     3. Simple partial seizure evolving to complex partial seizures evolving to generalized seizure

II. Generalized Seizures (convulsive or nonconvulsive)
   - A. Absence seizures
   - B. Myoclonic seizures
   - C. Clonic seizures
   - D. Tonic seizures
   - E. Tonic-clonic seizures
   - F. Atonic seizures

III. Unclassified Epileptic Seizures

QUESTIONS?

Moving on to Case Studies