Neurology

Definitions

- **Neuron** – A nerve cell, composed of a: *Soma* (cell body), *Axon* (conducts impulse), *Synaptic Terminals* (communicates with organ or tissue), *Dendrites* (receives input from its surroundings).
- **Meninges** – The membranes that cover and protect the spine and brain; they have three layers: *Dura* (outer most), *Arachnoid* (middle membrane), *Pia* (innermost layer very sensitive)
- **Cerebrospinal Fluid** – A clear watery nutrient rich fluid that bathes the brain and spinal cord, and provides some cushioning for both of them.
- **White Matter** – Axon bundles with their protective myelinated sheaths.
- **Gray Matter** – Is the point of integration for nerve cells, in the cerebrum, and cerebral cortex. AKA **Pia Matter.**
- **Synapse** – The space between two nerve "endings."
- **Efferent Neurons** – Sensory neurons which receive stimulation and impulses. From the PNS to the CNS.
- **Afferent Neurons** – Motor neurons which stimulate effecter organs and muscles. From the CNS to the PNS.
- **Dermatomes** – Areas of the skin that correspond with spinal nerves.
- **31 pair of Spinal nerves**
- **12 pair of Cranial nerves**
- **Reflex Arc** – Is a response where sensory nerves sense dangerous environmental stimuli (touching fire, sharp surfaces, falling and so on) that in turn stimulates a motor response to move the body's appendage or self away from those stimuli without sending the message to the brain first. Brain receives the message after the movement/reflex has taken place.
- **Coma** – A state of unconsciousness in which a patient cannot be stimulated externally. Generally caused by **structural lesions, or toxic/metabolic pathologies.**
- **Peripheral Neuropathy** – Weakness or loss of sensation or impairment of peripheral nerves.
- **Conjugate Gaze** – Deviation of both eyes in the same direction to one side. Suggestive of brain damage.
- **Dysconjugate Gaze** – The eyes deviate to opposite sided. Suggestive of brain stem damage.
- **Syncope** – Transient loss of consciousness due to inadequate blood flow to the brain.

Review of the Brain/Central Nervous System

- **Cerebrum** – Largest portion of the brain, which makes up the frontal and middle areas of the cranium and has two sides, left and right. Responsible for higher thought, learning, memory, language and so on.
- **Pons** – Connects the brain to the spinal cord.
- **RAS** (Reticular Activating System)- Responsible for consciousness/sleep & wake cycles.
- **Ventricles** – Located in the cerebrum, stores and produce CSF.
- **Cerebral Cortex** – Is the outer most layer of the cerebrum.
- **Diencephalon** – "Inner brain." It's composed of the: *Thalamus, Pituitary, and Limbic systems.* It regulates temperature, stress, and emotions.
- **Mesencephalon** – "Midbrain" located between the pons and thalamus.
- **Medulla Oblongata** – Is between the pons and spinal cord. Control's respirations and cardiac activity.

- **Cerebellum** – Is the posterior most portion of the brain, which controls: motor, movement, posture, and muscle tone.
- **Circle of Willis** – Is a redundant arterial system in the brain composed of the, carotid arteries and vertebrobasilar system that join together to provide blood to the brain.
- **Decorticate Posture** – Presents as arms flexed, clenched fist, and legs extended. **(very bad)**
- **Decerebrate Posture** – Presents as extended neck/chin and extremities which will be rigid.

Assessment of Neuro

- Use **Babinski Reflex** for determination of peripheral damage.
- Glasgow Coma Scale measures level of conciseness.
- Guide assessment with A.E.I.O.U.T.I.P.S. for altered levels in patients.
- **A** – Alcohol/Acidosis
- **E** – Epilepsy
- **I** – Infection
- **O** – Overdose
- **U** – Under dose/Uremia (kidney failure)
- **T** – Toxins, Trauma
- **I** – Insulin
- **P** – Psychosis/poison
- **S** – Stroke/Seizure

Cincinnati Prehospital Stroke Scale

- **Facial Droop** – Unequal drooping of one side of the face when a patient smiles.
- **Arm Drift** –On the affected side, the patient's arm will drift down when asked to hold it out level in front of them (with their eyes closed).
- **Slurred Speech** – Self explanatory.

Los Angeles Prehospital Stroke Screen

- Categorizes risk factors like: age, sex, past medical history, etc..
- Still uses physical findings as explained in the Cincinnati Stroke Scale provided above.
- Known to be incredibly accurate but more time consuming.

Neurological Conditions

- **Wernicke's Syndrome** – Is associated with loss of memory and disorientation from chronic alcohol abuse and results from a deficiency of thiamine in the body.

Strokes

- Stroke is a "brain attack," described as a brain infarction or hemorrhage. Otherwise known as *Cerebrovascular Accident*, where blood supply has been interrupted to an area of the brain.
- **Occlusive Stroke** – A cerebral artery is blocked or clogged by a blood clot or foreign emboli which results in ischemic brain tissue.
- **Embolic Stroke** – An embolus of foreign material or gas carried to a small arterial site and then occluding blood flow to that portion of the brain. This is also known as ischemic stroke.
- **Hemorrhagic Stroke** – A bleed in the brain which creates pressure on that area and deprives the brain of oxygen rich blood. Can be intra–cerebral or subarachnoid.
- **Transient Ischemic Attack (TIA)** – Is a mini stroke where the occlusion was incomplete or temporary. Symptoms usually last hours, but generally resolves within 24 hrs. Symptoms can be the same as a full blown stroke. TIAs suggest that a actual stroke is pending if no treatment is rendered.

- **Symptoms of strokes** – Headache, dizziness, facial droop, loss of gross motor movement on affected side, vision disturbance, difficulty speaking, confusion and irritability just to name a few.