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Subject: Anatomy-IV

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DPT 4th Semester

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Total marks 20.

Attempt the following questions. Add diagrams where needed.

Each question carries 10 marks.

Q1: Write a comprehensive note on the blood supply of brain.

Ans: Blood supply of brain:

Blood is supplied from two pairs of vessels which are vertebral and internal carotid arteries. These are interconnected in the cranial cavity to produce and arterial circle.

Internal Carotid Artery:

1. Perforates base of skull

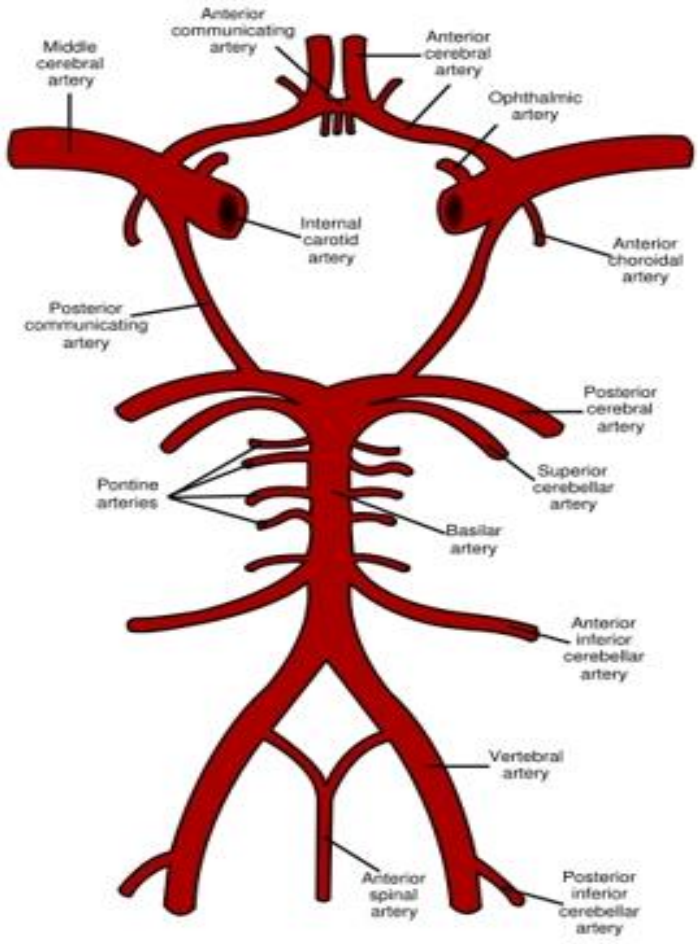
2. Enters middle cranial fossa beside dorsum sellae
3. It emerge out medial side of Ant clinoid process perforates dura and arachnoid mater enters subarachnoid space
4. Turns posteriorly below optic nerve
5. Turns upward lateral to optic chiasma

Vertebral Artery:

1. Passes foramen transvesarium c6 – c1
2. Enters through foramen magnum perforates dura and arachnoid mater enters subarachnoid space
3. Turns upward ,forward, medially – medulla oblongata
4. Lower border of pons joins opposite side basilar artery.

Circle of willis:

Vertebral	Internal carotid
Basilar	Middle cerebral
Posterior cerebral artery	Anterior cerebral
	Anterior communicating artery
	Posterior communicating artery



Anterior cerebral artery:

Anterior cerebral artery is passed through two lobes. The frontal and parietal lobes. In frontal lobe it supply to the motor neurons which control lower limb and perineum precentral lobule. Parietal lobe it supply to sensory neurons which controls lower limb and perineum paracentral lobule

Middle cerebral artery:

It supply to the frontal, parietal and temporal lobes. In frontal the motor neurons except paracentral lobule. Parietal to the sensory neurons except paracentral lobule. Temporal to the auditory.

Posterior cerebral artery:

It supply to occipital lobe for visual and temporal for the olfactory neurons.

Vein of specific areas:

Midbrain	Basal, great cerebral
Pons	Basal, cerebellar
Medulla oblongata	Anterior and posterior spinal
Cerebellum	Great cerebral

Cavernous sinus:

1. Lateral to body of sphenoid bone
2. Connected to opposite intercavernous S
3. Receives blood from middle cerebral V
4. Drains into internal jugular V via inferior petrosal sinus. Transverse S via superior petrosal S

Q2: Which type of stroke is common? Write a complete note on ischemic stroke.

Ans: The most common type of stroke is ischemic stroke. It is caused by the blood clot.

Ischemic stroke:

An Ischemic Stroke occurs when a clot or a mass clogs a blood vessel, cutting off the blood flow to brain cells. The underlying condition for this type of obstruction is the development of fatty deposits lining the vessel walls. This condition is called atherosclerosis.

Symptoms:

1. Vision problems
2. Weakness or paralysis
3. Dizziness and vertigo
4. Confusion
5. Loss of coordination
6. Drooping of face on one side

Causes:

It occurs when an artery that supply blood to the brain is blocked by a blood clot. Clot usually starts in the heart and travel through the circulatory system. Ischemic stroke caused by a fatty buildup happens when plaque breaks off from an

artery and travels to the brain. Plaque can also build up in the arteries that supply blood to the brain and narrow those arteries enough to cause ischemic stroke.

Risk factors:

1. High blood pressure
2. Atherosclerosis
3. High cholesterol
4. Atrial fibrillation
5. Prior heart attack
6. Sickle cell anemia
7. Clotting disorders
8. Congenital heart defects
9. Smoking

How it is diagnosed:

A doctor first use a physical examination and family history to diagnose ischemic stroke. Based on your symptoms, they can also get an idea of where the blockage is located.

If you have symptoms such as confusion and slurred speech, doctor might perform a blood sugar test. That because confusion and slurred speech are also symptoms of severe low blood sugar.

Treatment:

1. Restore breathing
2. Restore heart rate
3. Restore blood pressure

Q3: What do you know about the thalamic nuclei of brain?

Ans: In the center of the brain there is located thalamus which is paired structure. Each side can divide in to three groups of thalamic nuclei. In addition to grouping by anatomic location, the thalamic nuclei can be categorized by function as well. There are three categories:

1. Relay nuclei (lateral nuclear group, medial nuclear group, anterior nuclear group)
2. Reticular nucleus
3. Intralaminar nuclei

Relay nuclei

1. Lateral nuclear group
    - Ventral posterolateral nucleus (VPL)
    - Ventral posteromedial nucleus (VPM)
    - Lateral geniculate nucleus (LGN)
    - Medial geniculate nucleus (MGN)
    - Ventral lateral nucleus (VL)
    - Ventral anterior nucleus (VA)

- Pulvinar
- Lateral dorsal nucleus
- Lateral posterior nucleus
- Ventral medial nucleus

2. Medial nuclear group
    - Mediodorsal nucleus (MD)
3. Anterior nuclear group
    - Anterior nucleus
4. Midline thalamic nuclei
    - Paraventricular
    - Parataenial
    - Interanteromedial
    - Intermediodorsal
    - Rhomboid
    - Medial ventral

Reticular nucleus

Intralaminar nuclei

1. Rostral intralaminar nuclei
    - Central medial nucleus
    - Paracentral nucleus

- Central lateral nucleus

2. Caudal intralaminar nuclei
    - Centromedian nucleus
    - Parafascicular nucleus

Q4: Write note on the descending tracts of spinal cord.

Ans: descending tracts are the pathways by which motor signals are sent from the brain to lower motor neurons.

Pyramidal tracts:

These tracts originate in the cerebral cortex, carrying motor fibers to the spinal cord and brain stem. They are responsible for the voluntary control of the musculature of the body and face.

Extrapyramidal tracts:

These tracts originate in the brain stem, carrying motor fibers to the spinal cord. They are responsible for the involuntary and automatic control of all musculature, such as muscle tone, balance, posture and locomotion

There are no synapses within the descending pathways. At the termination of the descending tracts, the neurons synapse with a lower motor neuron. Thus, all the neurons within the descending motor system are classed as upper motor neurons.

Their cell bodies are found in the cerebral cortex or the brain stem, with their axons remaining within the CNS

Corticospinal Tracts

The corticospinal tracts begin in the cerebral cortex, from which they receive a range of inputs:

Primary motor cortex

Premotor cortex

Supplementary motor area

They also receive nerve fibers from the somatosensory area**,** which play a role in regulating the activity of the ascending tracts.

Extrapyramidal Tracts:

The extrapyramidal tracts originate in the brainstem, carrying motor fibers to the spinal cord. They are responsible for the involuntary and automatic control of all musculature, such as muscle tone, balance, posture and locomotion.

There are four tracts in total. The **vestibulospinal** and **reticulospinal** tracts do not decussate, providing ipsilateral innervation. The **rubrospinal** and **tectospinal** tracts do decussate, and therefore provide contralateral innervation

Vestibulospinal Tracts:

There are two vestibulospinal pathways; medial and lateral. They arise from the vestibular nuclei, which receive input from the organs of balance. The tracts convey this balance information to the spinal cord, where it remains ipsilateral.

Fibers in this pathway control balance and posture by innervating the 'anti-gravity' muscles (flexors of the arm, and extensors of the leg), via lower motor neurons.

Reticulospinal Tracts:

The two recticulospinal tracts have differing functions:

- The medial reticulospinal tract arises from the pons**.** It facilitates voluntary movements, and increases muscle tone.
- The lateral reticulospinal tract arises from the medulla**.** It inhibits voluntary movements, and reduces muscle tone.

Rubrospinal Tracts:

The rubrospinal tract originates from the red nucleus, a midbrain structure. As the fibers emerge, they decussate (cross over to the other side of the CNS), and descend into the spinal cord. Thus, they have a contralateral innervation.

Its exact function is unclear, but it is thought to play a role in the fine control of hand movements

Tectospinal Tracts:

This pathway begins at the superior colliculus of the midbrain. The superior colliculus is a structure that receives input from the optic nerves. The neurons then quickly decussate, and enter the spinal cord. They terminate at the cervical levels of the spinal cord.

Q5: Write a note on the autonomic system. Differentiate between sympathetic and parasympathetic nervous system.

Ans: The autonomic nervous system controls specific body processes such as circulation of blood digestion, breathing, urination, heart beat etc. the autonomic nervous system is named so because it works autonomously i.e without a persons conscious effort. The primary function of the autonomic system is hemostasis. Apart from maintain the body's internal environment it is also involved in controlling and maintaining the following life activities involved in the fight or flight response. The sympathetic system prepares the body for any potential danger sympathetic system has shorter neurons pathways hence a faster response time. Increases heartbeat muscle tense up. The pupil dilates to let in more light saliva secretion is inhibited.

Parasympathetic:

Involved in maintain homeostasis and also permits the rest and digest response the parasympathetic system aims to bring the body to a state calm. Comparatively longer pathways hence a slower response time. Reduces heartbeat muscle relaxes. The pupil contact saliva secretion increases digestion increases.