GIDADO JENNIFER BUSAYO
18/MHS01/166
NURSING
ANA 214

1. Describe the importance of vasculature in relation to immune system and outbreak of pandemic COVID -19 on the human body
Vasculature is the the blood vessels or arrangement of blood vessels in an organ or part. Blood vessels provide the ideal network for immune system surveillance and distribution. The interaction between tumor cells and the microenvironment in which they exist is increasingly recognized as a key player in the development and progression of cancer. The microenvironment of a tumor includes the blood and lymphatic vasculatures, stroma, nerves, and cells of the immune system, which may be resident in the involved tissue or recruited from the periphery. The hallmarks of cancer include features of the tumor cells themselves, such as replicative immortality and resistance to cell death, as well as features relating to the microenvironment, such as induction of angiogenesis and evasion of the immune response. Numerous white blood cells circulate around the body, sensing for infection or injury. Once an injury is detected, they rapidly leave the circulatory system by passing through gaps in vessel walls to reach the affected area while signalling for a larger targeted immune response. For an effective host immune response, the tumor must be recognized as foreign and the immune effector cells must be able to access the tumor to destroy it. It is well established that tumors are antigenic and able to induce a systemic, tumor-specific immune response. Unstable tumor genomes contain many mutations that generate altered protein products, which have the potential to be recognized as foreign by the host immune system during surveillance. The tumors must therefore develop mechanisms of evading this immune response in order to establish, grow, and eventually metastasize. For example, circulating T cells specific to tumor antigens can be demonstrated in patients with metastatic melanoma, yet the tumor progresses. Since the vascular changes alone are unlikely to explain the inhibition of tumor growth by thalidomide, the immune response of tumors through vascular normalization is probably involved. The vascular system ensures the delivery of immune cells to all organs and tissues. Therefore abnormal tumor vasculature creates a hypoxic microenvironment that polarizes immune cells toward immune suppression. Simultaneously, hypoxia alters various metabolic pathways in cancer cells leading to the accumulation of immunosuppressive metabolites. Hence, treatments resulting in vascular normalization may be an effective modality to potentiate immunomodulatory effectsThe structural abnormalities of the tumor vasculature impede immune cell infiltration into tumors and create a hypoxic and acidic tumor microenvironment that upregulates dendritic cells; increases the accumulation of regulatory T cells (Tregs) and polarizes tumor-associated macrophages (TAMs) to the immune inhibitory M2-like phenotype. Vascular normalization is characterized by the attenuation of hyperpermeability, increased vascular pericyte coverage, a more normal basement membrane, and a resultant reduction in tumor hypoxia and interstitial fluid, facilitating the infiltration of immune cells while reducing the accumulation of myeloid-derived suppressor cells (MDSCs) and Tregs. Blood vessels are the highways that transport our immune cells to sites of inflammation. Our laboratory uses the zebrafish model organism to understand how the behaviour of blood vessels (including growth (angiogenesis) and leakiness (vascular permeability)) affects the function of the immune system. This work will lead to the novel treatments for inflammatory diseases including atherosclerosis, tuberculosis, and meningitis.Our immune system fight diseases ,infections and toxins. In relation to COVID-19, there are a lot of importance of out immune system due to the fact that there is no specific antiviral treatment, the blood vessels would play an important role to make sure our immune system is stable to fight against the COVID-19

1. Subsatorial canal is an important area in the lower limb, discuss

The subsatorial canal is also called adductor or hunter's canal is a narrow conical tunnel located in the thigh.It is approximately 15cm long, extending from the apex of the femoral triangle to the adductor hiatus of the adductor magnus. The canal serves as a passageway from structures moving between the anterior thigh and posterior leg. It transmits the femoral artery, femoral vein (posterior to the artery), nerve to the vastus medialis and the saphenous nerve – the largest cutaneous branch of the femoral nerve. As the femoral artery and vein exit the canal, they are called the popliteal artery and vein respectively. The adductor canal is an aponeurotic tunnel in the middle third of the thigh, extending from the apex of the femoral triangle to the opening in the adductor magnus, the adductor hiatus. In the adductor canal block, local anaesthetic is administrered in the adductor canal to block the saphenous nerve in isolation, or together with the nerve to the vastus medialis. The Sartorius and the femoral artery are used as anatomical landmarks to locate sephanous nerve.

BORDERS: The adductor canal is triangular in cross section. Its boundaries are as follows:

- Anterolateral wall: – It's created by vastus medialis.
- Posterior (floor): – It's created by adductor longus above and adductor magnus below.
- Medial (roof): – It if created by a powerful fibrous membrane stretching across the anterolateral and posterior borders. – The roofing is overlapped by the sartorius muscle.
- The apex of the adductor canal is marked by the adductor hiatus – a gap between the adductor and hamstring attachments of the adductor magnus.

3. Describe the extraocular and intraocular muscle with their nerve supply.

Extraocular muscle

The extraocular muscles are the six muscles that control the movements of the eyes. For reasons we don't fully understand, these muscles can be particularly affected by myasthenia. Usually, our eye movements are synchronised but when these muscles become fatigued, sometimes they don't move in accord with each other leading to double vision. The extraocular muscles are located within the orbit, but are extrinsic and separate from the eyeball itself. They act to control the movements of the eyeball and the superior eyelid.

There are seven extraocular muscles –

- the levator palpebrae superioris
- superior rectus
- inferior rectus
- medial rectus
- ateral rectus
- inferior oblique
- superior oblique.

The levator palpebrae Superioris:

- Origin: sphenoid bone
- Innervations: occulomotor nerve
- Insertion: tarsal plate of upper lid
- Primary action: elevation/ retraction of the upper lid

superior rectus

- Origin: annulus of zinn
- Innervations: occulomotor nerve(superior branch)
- Insertion: eye (anterior, superior surface)
- Primary action: elevation
- Secondary action: incyclotorsion
- Tertiary action: adduction

inferior rectus

- Origin: annulus of zinn
- Innervations: occulomotor nerve(inferior branch)
- Insertion: eye (anterior, inferior surface)
- Primary action: depression
- Secondary action: excyclotorsion

Tertiary action: adduction

- medial rectus
- Origin: annulus of zinn
- Innervations: occulomotor nerve(inferior branch)
- Insertion: eye (anterior, medial surface)
- Primary action: adduction

lateral rectus

- Origin: adducens nerve
- Innervations: occulomotor nerve
- Insertion: eye(anterior, lateral nerve)
- Primary action: adduction

inferior oblique:

- Origin: occulomotor nerve(inferior branch)
- Innervations: maxillary bone
- Insertion: eye (posterior,lateral and infeerior surface)
- Primary action: excyclotorsion
- Secondary action: elevation
- Tertiary action: adduction

superior oblique

- Origin: trochlear nerve
- Innervations: sphenoid bone via the trochlea
- Insertion: eye (posterior,lateral and superior surface)
- Primary action: incyclotorsion
- Secondary action: depression
- Tertiary action: adduction

They are generally divided into two groups:

- Recti and oblique muscle :responsible for eye movement
- Levator palpebrae superioris: responsible for superior eyelid movement

Nerve supply :

The nuclei or bodies of these nerves are found in the brain stem. The nuclei of the abducens and oculomotor nerves are connected. This is important in coordinating the motion of the lateral rectus in one eye and the medial action on the other. In one eye, in two antagonistic muscles, like the lateral and medial recti, contraction of one leads to inhibition of the other. Muscles show small degrees of activity even when resting, keeping the muscles taut. This tonic activity is brought on by discharges of the motor nerve to the muscle.

Intraocular muscle

The intraocular muscles include the ciliary muscle, the sphincter pupillae, and the dilator pupillae. The ciliary muscle is a smooth muscle ring that controls accommodation by altering the shape of the lens, as well as controlling the flow of aqueous humor into Schlemm's canal. The ciliary muscle is attached to the zonular fibers which suspend the lens. Upon contraction of the ciliary muscle, the tension on the lens is lessened which causes it to adopt a more spherical shape to focus on near objects. Relaxation of the ciliary muscle has the opposite effect, optimising distant focus.

The sphincter pupillae and dilator pupillae are also composed of smooth muscle. The sphincter pupillae encircles the pupil and is responsible for the constriction of its diameter

The dilator muscle is arranged radially and increases the pupillary diameter.

There are three primary axes of ocular movements: vertical, transverse, and anteroposterior.

- Rotation around the vertical axis results in either adduction (medial movement) or abduction (lateral movement) of the eye.
- Rotation around the transverse axis causes elevation (superior motion) or depression (inferior motion).
- The anteroposterior axis enables movement of the superior pole of the eye medially (intorsion) or laterally (extorsion). The rotations around the anteroposterior axis allow the eye to adjust to tilting of the head.

There are 6 intraocular muscles

- The medial rectus muscle: responsible for medial rotation around the vertical axis,
- The lateral rectus:responsible lateral rotation.
- The superior rectus muscle primarily: elevates the eye and contributes to adduction and intorsion.
- The inferior rectus depresses and laterally : rotates the eye and contributes to adduction and extorsion.
- The superior oblique : abducts, depresses, and medially rotates the eye,
- The inferior oblique : abducts, elevates, and laterally rotates the eye.

Nerve Supply:

The extraocular muscles are innervated by nerves that enter the orbit through the superior orbital fissure. The oculomotor nerve divides into superior and inferior branches and innervates the superior, medial, and inferior recti, the levator palpebrae superioris, and the inferior oblique. It also carries presynaptic parasympathetic fibers to the ciliary ganglion. Sympathetic fibers contribute to upper eyelid retraction by innervation of the superior tarsal muscle . The trochlear nerve innervates the superior oblique, and the lateral rectus is innervated by the abducens nerve. The orbicularis oculi is innervated by the temporal and zygomatic branches of the facial nerve.