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MEDICINE AND SURGERY

18/MHS01/193

PHYSIOLOGY

ASSIGNMENT

1. Discuss long term regulation of mean arterial blood pressure

Mean arterial blood pressure is the average pressure existing in the arteries. It is not the arithmetic mean of systolic and diastolic pressures. It is the diastolic pressure plus one third of pulse pressure. To determine the mean pressure, diastolic pressure is considered than the systolic pressure. It is because; the diastolic period of cardiac cycle is longer than the systolic period.

2. Short notes on the following:

- **Pulmonary circulation:**

Pulmonary circulation is also called lesser circulation. Blood is pumped from the right ventricle to the lungs through the pulmonary artery. Exchange of gases occurs between blood and alveoli of the lungs at pulmonary capillaries. Oxygenated blood returns to left atrium through the pulmonary veins. Therefore, the left side of the heart contains oxygenated or arterial blood and the right side of the heart contains deoxygenated or venous blood.

- **Circle of Willis:**

The circle of Willis is a junction of several important arteries at the bottom part of the brain. It helps blood flow from both the front and back sections of the brain.

- **Splanchnic circulation:**

Splanchnic or visceral circulation constitutes three portions:

1. Mesenteric circulation supplying blood to GI tract
2. Splenic circulation supplying blood to spleen
3. Hepatic circulation supplying blood to liver.

Unique feature of splanchnic circulation is that the blood from mesenteric bed and spleen forms a major amount of blood flowing to liver. Blood flows to liver from GI tract and spleen through portal system.

- **Coronary circulation:**

Heart muscle is supplied by two coronary arteries, namely right and left coronary arteries, which are the first branches of aorta. Arteries encircle the heart in the manner of a crown, hence the name coronary arteries.

Right coronary artery supplies whole of the right ventricle and posterior portion of left ventricle. Left coronary artery supplies mainly the anterior and lateral parts of left ventricle.

- **Cutaneous circulation:**

Cutaneous blood flow is regulated mainly by body temperature. Hypothalamus plays an important role in regulating cutaneous blood flow. When body temperature increases, the hypothalamus is activated. Hypothalamus in turn causes cutaneous vasodilatation by acting through medullary vasomotor center. Now, blood flow increases in skin. Increase in cutaneous blood flow causes the loss of heat from the body through sweat. When body temperature is low, vasoconstriction occurs in the skin. Therefore, the blood flow to skin decreases and prevents the heat loss from skin.

3. Discuss the cardiovascular adjustment that occurs during exercise

- **ON BLOOD**

Mild hypoxia developed during exercise stimulates the juxtaglomerular apparatus to secrete erythropoietin. It stimulates the bone marrow and causes release of red blood cells. Increased carbon dioxide content in blood decreases the pH of blood.

- **ON BLOOD VOLUME**

More heat is produced during exercise and the thermoregulatory system is activated. This in turn, causes secretion of large amount of sweat leading to;

- i. Fluid loss

- ii. Reduced blood volume
- iii. Hemoconcentration
- iv. Sometimes, severe exercise leads to even dehydration

- **ON BLOOD PRESSURE**

During moderate isotonic exercise, the systolic pressure is increased. It is due to increase in heart rate and stroke volume. Diastolic pressure is not altered because peripheral resistance is not affected during moderate isotonic exercise.

- **ON VENOUS RETURN**

Venous return increases remarkably during exercise because of muscle pump, respiratory pump and splanchnic vasoconstriction.S