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MATRIC NUMBER: 18/MHS01/115

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ASSIGNMENT

Question 1

Long term regulation of mean arterial blood pressure

Mean arterial pressure is the average pressure throughout one cardiac cycle, systole or diastole. It is influenced by cardiac output and systemic vascular resistance.

It mainly involves the regulation of extracellular fluid volume by pressure natriuresis mechanisms residing in the Kidney and by widespread angiotensin. Several physiological mechanisms are involved in this process, notably, the renin-angiotensin-aldosterone system [RAAS]. Renin and antidiuretic hormones are released. Natriuretic factors can also affect the long-term regulation of blood pressure.

It involves the balance in the intake and output of fluid and electrolytes. The kidney also plays a significant role here. The long-term-mean arterial pressure is stabilized to regulate oxygen and carbon dioxide levels. The baroreflex would then stabilize the instantaneous pressure value to prevent carotid pressure.

Changes in blood volume affects the arterial pressure by changing cardiac output. An increase in blood volume increases central venous pressure.

Clinical Significance

Hypertension, which is the increase in blood pressure and hypotension, which is the decrease in blood pressure.

Question 2

PULMONARY CIRCULATION

It is a system of transport in the circulatory system that involves the transportation of deoxygenated blood from the heart via the right ventricle to the lungs to become re-saturated with oxygen and returns oxygenated blood to the left atrium and ventricle of the heart. It begins at the right ventricle and ends in the left atrium. It gives way for the systemic circulation. It

begins at the pulmonary valve and extends to the orifice of the pulmonary veins in the wall of the left atrium.

SPLANCHNIC CIRCULATION

It consists of the blood supply to the gastrointestinal tract, liver, spleen, and pancreas. It consists of two large capillary beds partially in series. Small splanchnic arterial branches supply the capillary beds and efferent venous blood flows into the PV. It influences the systemic arterial pressure.

CORONARY CIRCULATION

It is the part of the systemic circulation that involves the circulation of blood in the blood vessels in the myocardium of the heart muscle. The coronary arteries arise from the aorta below the semilunar valves and supply oxygenated blood to the heart muscle and cardiac veins drain away the blood once it has been deoxygenated. It is the vascular system of the heart which supplies blood to it.

CUTANEOUS CIRCULATION

It is the circulation and blood supply of the skin. It helps in the control of systemic blood pressure, homeostasis and nutritive functions. It is controlled via the sympathetic nervous system. Some of the circulating blood volumes will flow through the arteriovenous anastomoses instead of capillaries. The arteriovenous anastomoses help in temperature regulation and are not involved in the transport of nutrients in tissues. It has no capillary section and is between the small arteries and small veins that supplies and drains the skin.

Circle of Willis

It is part of the cerebral circulation which is formed from the joining of several arteries at the inferior side of the brain. It helps blood flow from both the front and back sections of the brain. The internal carotid arteries branch into the smaller arteries that supply the oxygenated blood to over 80% of the cerebrum.

CARDIOVASCULAR ADJUSTMENTS DURING EXERCISE

It provides a link between the pulmonary ventilation and oxygen at the cellular level. During exercise, more blood is sent to the active skeletal muscles and increase in body temperature causes skin dilation and more blood is sent to the skin.

One of the major adjustments which occur in the cardiovascular system during exercise is an increase in cardiac output or the pumping capacity of the heart, designed to enhance the delivery of oxygen and fuel to the working muscles. Increase in cardiac output is due to an increase in stroke volume and heart rate which are regulated by the sympathetic nervous system and circulating epinephrine.

During exercise, muscles need blood and they grow more blood vessels by expanding capillaries. In addition, reduction in parasympathetic nervous system activity, increase in sympathetic nervous system activity and increase in circulating epinephrine.

Furthermore, there will be decreased blood flow to the liver, kidneys and gut. The flow of blood is redirected to the working muscles.