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MBBS.

1. Discuss the long term regulation of mean arterial blood pressure.

The kidneys play an important role in the long-term arterial blood pressure. When there ' s an alteration in blood pressure in days, the nervous mechanism adapts to the altered pressure and looses the sensitivity for the changes. It can not regulate the pressure any more. In such conditions, the renal mechanisms operates efficiently to regulate the BP. Therefore, it is called long term regulation.

Kidneys regulate arteries by two ways

1.by regulation of ECF volume

2.through renin-angiotensin mechanisms.

2. Write short notes on the following.

A. Pulmonary circulation

Pulmonary circulation is the system of transportation that shunts de-oxygenated blood from the heart to the lungs to be re-saturated with oxygen before being dispersed into systemic circulation. Deoxygenated blood from the lower half of the body enters the heart from the inferior vena cava while deoxygenated blood from the upper body is delivered to the heart via the superior vena cava. Both the superior vena cava and inferior vena cava empty blood into the right atrium. Blood flows through the tricuspid valve into the right ventricle. It then flows through the pulmonic valve into the pulmonary artery before being delivered to the lungs. While in the lungs, blood diverges into the numerous pulmonary capillaries where it releases carbon dioxide and is replenished with oxygen.

B. Circle of Willis

The blood supply to the brain divides into an anterior and posterior circulation. The anterior circulation derives blood from the bilateral internal carotid arteries (ICA) and supplies blood to the majority of the cerebral hemispheres, including the frontal lobes, parietal lobes, lateral temporal lobes and anterior part of deep cerebral hemispheres. The posterior circulation derives blood from the bilateral vertebral arteries (VA). It supplies the brainstem, cerebellum, occipital lobes, medial temporal lobes and posterior part of the deep hemisphere, mainly the thalamus. The circle of Willis (CoW) is an anatomical structure that provides an anastomotic connection between the anterior and posterior circulations, providing collateral flow to affected brain regions in the event of arterial incompetency.

C. Splanchnic circulation

The splanchnic circulation is composed of the blood flow originating from the celiac, superior mesenteric, and inferior mesenteric arteries and is distributed to all abdominal viscera. The splanchnic circulation receives over 25% of the cardiac output and contains a similar percentage of the total blood volume under normal conditions. Thus, the splanchnic circulation can act as a site of regulation of distribution of cardiac output and also as a blood reservoir.

D. Coronary circulation

Coronary circulation is the circulation of blood in the blood vessels that supply the heart muscle (myocardium). Coronary arteries supply oxygenated blood to the heart muscle, and cardiac veins drain away the blood once it has been deoxygenated. Because the rest of the body, and most especially the brain, needs a steady supply of oxygenated blood that is free of all but the slightest interruptions, the heart is required to function continuously.

E. Cutaneous circulation

The cutaneous circulation is the circulation and blood supply of the skin. The skin is not a very metabolically active tissue and has relatively small energy requirements, so its blood supply is different to that of other tissues.

Some of the circulating blood volume in the skin will flow through will flow through arteriovenous anastomoses (AVAs) instead of capillaries. AVAs serve a role in temperature regulation. In this article we shall consider the different adaptations of the cutaneous circulation, and its role in body temperature control.

3. Discuss the cardiovascular adjustment that occurs during exercise.

It is widely accepted that regular physical activity is beneficial for cardiovascular health. Frequent exercise is robustly associated with a decrease in cardiovascular mortality as well as the risk of developing cardiovascular disease. Physically active individuals have lower blood pressure, higher insulin sensitivity, and a more favorable plasma lipoprotein profile. Animal models of exercise show that repeated physical activity suppresses atherogenesis and increases the availability of vasodilatory mediators such as nitric oxide. Exercise has also been found to have beneficial effects on the heart. Acutely, exercise increases cardiac output and blood pressure, but individuals adapted to exercise show lower resting heart rate and cardiac hypertrophy. Both cardiac and vascular changes have been linked to a variety of changes in tissue metabolism and signaling, although our understanding of the contribution of the underlying mechanisms remains incomplete. Even though moderate levels of exercise have been found to be consistently associated with a reduction in cardiovascular disease risk, there is evidence to suggest that continuously high levels of exercise (e.g., marathon running) could have detrimental effects on cardiovascular health. Nevertheless, a specific dose response relationship between the extent and duration of exercise and the reduction in cardiovascular disease risk and mortality remains unclear. Further studies are needed to identify the mechanisms that impart cardiovascular benefits of exercise in order to develop more effective exercise regimens, test the interaction of exercise with diet, and develop pharmacological interventions for those unwilling or unable to exercise.