JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 02, February 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

PHYSIOLOGICAL STRESS

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Abstract: Physiological stress, aging, and cardiovascular health play crucial roles in maintaining homeostasis within the human body. Physiological stress occurs in two phases: the ebb phase, characterized by decreased circulation and metabolic activity, and the flow phase, marked by increased metabolic responses. Aging affects cardiovascular efficiency, often leading to conditions such as atherosclerosis, hypertension, and heart failure. The cardiovascular system is vital for homeostasis, as it ensures oxygen and nutrient delivery while removing metabolic waste. Cardiovascular diseases, including strokes, heart attacks, and aneurysms, are commonly associated with hypertension and atherosclerosis. Understanding these processes and conditions is essential for improving healthcare interventions and treatments.

Key words: Physiological stress, ebb phase, flow phase, aging, cardiovascular system, homeostasis, atherosclerosis, hypertension, stroke, heart attack, aneurysm.

Physiological stress can be any kind of injury from burns, to broken bones; the body's response to stress is categorized in two phases the ebb phase (early phase) begins immediately after the injury. And the second phase is about 36 to 48 hours after injury is called the flow phase. In the ebb (shock) phase there is Inadequate circulation, decreased insulin level, decreased oxygen consumption, hypothermia (low body temperature), hypovolemia (low blood volume), and hypotension (low blood pressure). In the flow phase there is increased levels of catecholamine, glucocorticoids, and glucagons, normal or elevated insulin levels, catabolic (breakdown), hyperglycemic (high blood sugar), increased oxygen consumption/respiratory rate, hyperthermia (high body temperature) fever sets in, hypermetabolism, increased insulin resistance, increased cardiac output.

Aging

The heart muscle becomes less efficient with age, and there is a decrease in both maximum cardiac output and heart rate, although resting levels may be more than adequate. The health of the myocardium depends on its blood supply, and with age there is greater likelihood that atherosclerosis will narrow the coronary arteries. Atherosclerosis is the deposition of cholesterol on and in the walls of the arteries, which decreases blood flow and forms rough surfaces that may cause intravascular clot formation High blood pressure (hypertension) causes the left ventricle to work harder. It may enlarge and outgrow its blood supply, thus becoming weaker. A weak ventricle is not an efficient pump, and may progress to congestive heart failure. This process may be slow or rapid. The heart valves may become thickened by fibrosis, leading to heart murmurs and less efficient pumping. Arrhythmias are also more common with age, as the cells of the conduction pathway become less efficient.

Homeostasis

Homeostasis in the body is only possible if the cardiovascular system is working properly. This means that the system needs to deliver oxygen and nutrients to the tissue fluid that surrounds the cells and also take away the metabolic waste. The heart is composed of arteries that take blood

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from the heart, and vessels that return blood to the heart. Blood is pumped by the heart into two circuits: the pulmonary and systemic circuits. The pulmonary circuit carries blood through the lungs where gas exchange occurs and the systemic system transports blood to all parts of the body where exchange with tissue fluid takes place. The cardiovascular system works together with all other systems to maintain homeostasis.

Stroke, Heart Attack, and Aneurysm

Stroke, heart attack, and aneurysm are associated with hypertension and atherosclerosis. A cerebrovascular accident (CVA), also called a stroke, often results when a small cranial arteriole bursts or is blocked by an embolus. Lack of oxygen causes a portion of the brain to die, and paralysis or death can result. A person is sometimes forewarned of a stroke by a feeling of numbness in the hands or the face, difficulty in speaking, or temporary blindness in one eye. A myocardial infarction (MI), also called a heart attack, occurs when a portion of the heart muscle dies due to lack of oxygen. If a coronary artery becomes partially blocked, the individual may then suffer from angina pectoris. Characteristic symptoms of angina pectoris include a feeling of pressure, squeezing, or pain in the chest. Pressure and pain can extend to the left arm, neck, jaw, shoulder, or back. Nausea and vomiting, anxiety, dizziness, and shortness of breath may accompany the chest discomfort. Nitroglycerin or related drugs dilate blood vessels and help relieve the pain. When a coronary artery is completely blocked, perhaps because of a thromboembolism, a heart attack occurs. An aneurysm is a ballooning of a blood vessel, most often the abdominal artery or the arteries leading to the brain. Atherosclerosis and hypertension can weaken the wall of an artery to the point that an aneurysm develops. If a major vessel such as the aorta bursts, death is likely. It is possible to replace a damaged or diseased portion of a vessel, such as an artery, with a plastic tube. Cardiovascular function is preserved because exchange with tissue cells can still take place at the capillaries. In the future, it may be possible to use vessels made in the laboratory by injecting a patient's cells inside an inert mold.

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