Anatomy and Physiology

Cardiovascular System

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Blood Pressure

Definition: Blood pressure is the pressure of circulating blood against the walls of blood vessels. Most of this pressure results from the heart pumping blood through the circulatory system.

Blood pressure is traditionally measured using auscultation with a **mercury-tube sphygmomanometer**. It is measured in **mmHg**(millimeters of mercury) and

Blood Pressure is expressed in terms of systolic pressure over diastolic pressure.

Systolic pressure refers to the maximum pressure within the large arteries when the heart muscle contracts to propel blood through the body.

Diastolic pressure describes the lowest pressure within the large arteries during heart muscle relaxation between beating.

Blood pressure is one of the most commonly measured clinical parameters and blood pressure values are major determinants of therapeutic decisions.[2]

Blood pressure directly proposal to Cardiac output, Peripheral vascular resistance

Maintaining blood pressure within normal limits is essential.

	SYSTOLIC	DIASTOLIC
NORMAL	90-129	60-79
STAGE 1	130-139	80-89
STAGE 2	140-179	90-109
CRITICAL	OVER 180	OVER 110

Hypertension is blood pressure between above 140/90.

Hypotension is a blood pressure less than 90/60 mmHg.

Mechanism of maintaining normal Blood Pressure.

1. **Baroreceptor Reflex- SHORT TERM CONTROL**

In response to acute changes in blood pressure, the body responds through the baroreceptors located within blood vessels. Baroreceptors are a form of mechanoreceptor that become activated by the stretching of the vessel. This sensory information is conveyed to the central nervous system and used to influence peripheral vascular resistance and cardiac output.

2. **Antidiuretic Hormone**

Antidiuretic hormone (ADH) is a hormone synthesized in the hypothalamus. ADH is synthesized and released in response to multiple triggers.

Low blood volume causes a decreased stretch in the low-pressure baroreceptors, leading to the production of ADH

Decreased blood pressure causes decreased stretch in the high-pressure baroreceptors, also leading to the production of ADH

3. **Angiotensin II**

ADH mainly functions to increase free water reabsorption in the collecting duct of the nephrons within the kidney, causing an increase in plasma volume and arterial pressure. ADH in high concentrations also causes moderate vasoconstriction, increasing peripheral resistance, and arterial pressure.

4. **Renin-Angiotensin-Aldosterone System (RAAS)-LONG TERM CONTROL**

The renin-angiotensin-aldosterone system (RAAS) is a critical regulator of blood volume and systemic vascular resistance.

It does this by increasing sodium reabsorption, water reabsorption, and vascular tone.

It is composed of three major compounds: renin, angiotensin II, and aldosterone.

Hypertension

Hypertension ranks among the most common chronic medical conditions, characterized by a persistent elevation in the arterial pressure.

Raised blood pressure is a major risk factor for chronic heart disease, stroke, and coronary heart disease. Elevated BP is positively correlated to the risk of stroke and coronary heart disease. Other complications include heart failure, peripheral vascular disease, renal impairment, retinal hemorrhage, and visual impairment.

Most cases of hypertension are idiopathic which is also known as essential hypertension.

An increase in salt intake increases the risk of developing hypertension.

Hypotension

Hypotension is a decrease in systemic blood pressure below accepted low values.

While there is not an accepted standard hypotensive value, pressures less than 90/60 are recognized as hypotensive.

Hypotension is a relatively benign condition that is under-recognized mainly because it is typically asymptomatic.