Heart output (CO) is a measurement of the amount of blood pumped by each ventricle in one minute. The main factors influencing cardiac output are heart rate and stroke volume, both of which are also variables. Cardiac Output (CO), also known as heart output, is a term used in cardiac physiology that describes the volume of blood pumped by the heart, left and right ventricles per unit, i.e. the amount of heartbeats per minute (bpm), and the volume of stroke (SV), which is the volume of blood pumped from the ventricle to the arteries; SO CO and HR and SV. Heart output values are usually labeled in L/min. For a healthy person weighing 70 kg, the cardiac output at rest is on average about 5 L/min, provided that the heart rate is 70 beats per minute, the volume of stroke will be about 70 ml. Since the heart output is associated with the amount of blood supplied to different parts of the body, it is an important component of how effectively the heart can meet the body's needs in maintaining adequate tissue perfusion. Bodily tissues require continuous oxygen delivery, which requires the steady transport of oxygen to the tissue by systemic circulation of oxygenated blood at adequate pressure from the left ventricle of the heart through the aorta and arteries. Oxygen delivery (DO2) is the product of cardiac output (CO) and the oxygen content in the blood (CaO2). Mathematically it is calculated as follows: Oxygen delivery = cardiac output × oxygen content in the blood = CO × CaO2. When resting heart rate is 5 liters/min, normal oxygen delivery is about 457.5 ml/min. The amount (percentage) of oxygen consumed (VO2) per minute through metabolism varies depending on the level of activity, but otherwise is about 25% of DO2. Exercise requires a higher level...
Intravenous methods of measuring intravascular pressure include the balloon-tipped catheter (B) and the fluid-filled catheter (C). The balloon-tipped catheter contains a balloon that can be inflated, allowing it to be positioned at a specific depth in the vasculature. The fluid-filled catheter uses a fluid to transmit pressure changes from the arterial wall to a transducer. Both methods require an arterial line and can be performed under local anesthesia.

Invasive measurement of CO: There are several invasive methods for measuring CO, each with its own advantages and disadvantages. These methods include the esophageal Doppler monitor (ODM), transthoracic aortic Doppler, transpulmonary thermodilution, and direct measurement of cardiac output using a cardiac output catheter.

1. ODM: Uses Doppler to measure blood flow in the aorta, which is then used to estimate CO. This method requires an ODM probe, which is inserted into the esophagus, and is non-invasive.

2. Transaortic Doppler: Uses a high-frequency Doppler probe to measure blood flow in the ascending aorta. This method requires an arterial line and is invasive.

3. Transpulmonary thermodilution: Uses a cold saline solution to measure the temperature difference between the right and left heart. This method requires an arterial line and is invasive.

4. Cardiac output catheter: Measures CO directly by recording the pressure drop across the aortic valve. This method requires an arterial line and is invasive.

The choice of method depends on the specific clinical situation and the patient's condition. For example, the ODM is a non-invasive method that can be used to estimate CO in critically ill patients. The transaortic Doppler is an invasive method that can be used to measure CO directly. The transpulmonary thermodilution is an invasive method that can be used to measure CO directly. The cardiac output catheter is an invasive method that can be used to measure CO directly.

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