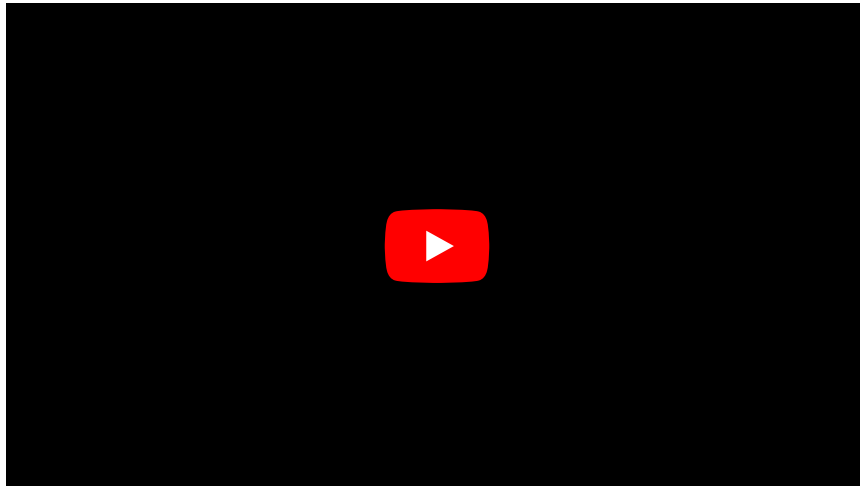


# Central venous pressure

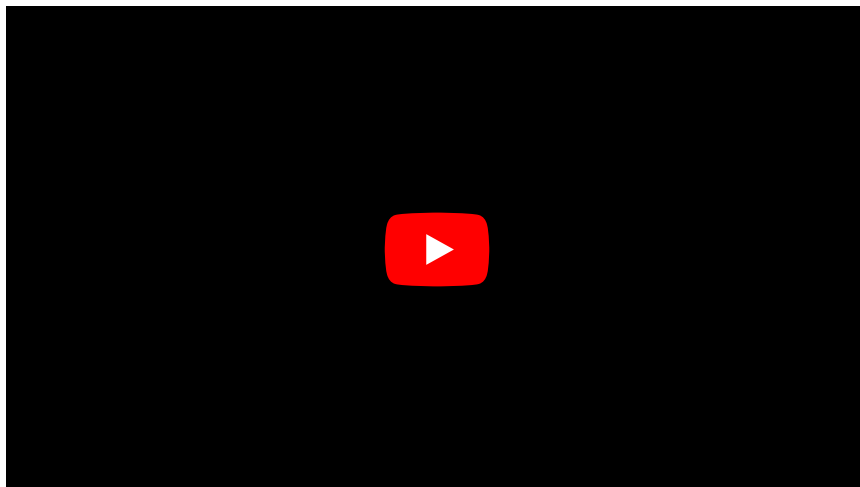
náhled|150 px|Pacient s městnavým srdečním selháním s mimořádně zvýšeným ČŽT – šipka ukazuje na venu jugularis externu, se zvýšenou náplní

**Central venous pressure** (CVP) is the pressure of blood in large veins near their entrance to the right atrium. CVP fluctuates slightly depending on the respiratory and cardiac cycle. The dependence on the heart cycle, the so-called "venous pulse", is shown by a curve called a phlebogram. From a disgnositc point of view, the value of CVP indirectly informs us about the level of hydration and the size of venous return.

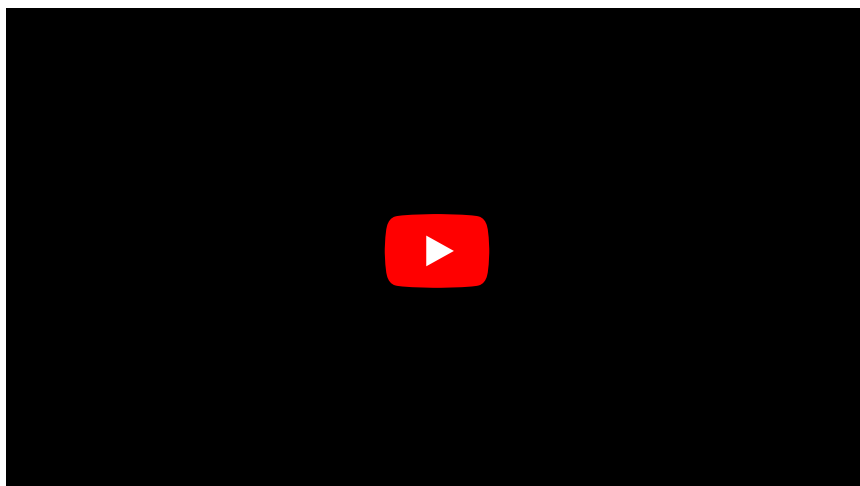
**JVP:**



**CVP:**



**PCWP:**



The specific values depend on the measuring point. Physiologically, the pressure decreases from 10-15 mm Hg in the small vessels to the pressure in the right atrium, which is physiologically slightly above zero, which allows blood to flow along the pressure gradient. Reference values for measuring pressure in large vessels vary according to the source and method used. The "shoemaker?" states a range of **0-8 mm Hg** when using the catheter-sensor system [1].

## Physiology venous pressure

Central venous pressure is determined by two components - the filling of the veins and the compliance of the walls of these vessels. Due to the high compliance, CVP is low despite the fact that the veins contain most of the blood volume (approximately 60%). The blood flow towards the center depends on the pressure gradient, the pressure in the venules is physiologically approximately 10-15 mm Hg. The walls of the small veins contain smooth muscle fibers innervated by the sympathetic. Increasing their tone will therefore increase the pressure gradient and consequently the venous return. Pressure conditions are also fundamentally influenced by gravity and thus also the position of the body, the flow of blood from the lower limbs against gravity is physiologically facilitated by valves and a venous pump. [2]

Physiologically, central pressure increases decreased cardiac output, increased venous filling, venous constriction, dilation of arterioles, increased intrathoracic pressure (exhalation during spontaneous ventilation, inhalation during UPV over pressure or, in extreme cases, Valsalvovým maneuver) and contraction of abdominal and lower limb muscles [3].

## Phlebogram

300px|náhled|Jugulární flebogram v souvislosti se srdeční revolucí.

The phlebogram is a record of a venous pulse. This usually means **recording the jugular venous pulse**, as shown on the right.

On the curve, we gradually describe the following waves::

1. **a**: atrial contraction,
2. **c**: closure of the tricuspid valves and arching into the atrium,
3. **x**: atrial systolic blood pressure drop relaxes the walls of the atria and decreases the tricuspid ring at the beginning of systole,
4. **v**: filling of the atrium with venous inflow with the tricuspid valve closed,
5. **y**: diastolic pressure after tricuspid valve opening (early filling).

## Indications for monitoring CVP

The clinical significance of CVP measurements is the subject of discussions; another additional parameter may also be the measurement of wedge pressure (PCWP) using a Swan-Ganzova catheter. It assesses the heart function better because, despite the correlation of right and left heart pressures in young and healthy individuals, the relationship between PCWP and CVP in critically ill patients is completely unpredictable [1].

The main reason for monitoring CVP is the **evaluation of the function of the right ventricle and intravascular filling**.

## Measuring CVP

náhled|300 px|Orientační výpočet centrálního žilního tlaku

We **approximately** determine CVP according to the **venous filling in the jugular veins**. In a lying patient, with a supported head, we find the place in the neck where the filling reaches the jugular vein, above which the veins collapse. At this point, the venous pressure is reduced by gravity and is equal to zero. CVP (cm H<sub>2</sub>O) is then calculated by subtracting the assumed height of the mitral valve and the measured value of vein collapse from the substrate (see figure).

Done **invasively** with a central venous catheter. It is introduced through the *subclavian vein*, or the *internal jugular vein* to measure the pressure in the superior vena cava. To measure CVP in the inferior vena cava, the catheter is introduced through the **femoral vein**. Optimal placement of the catheter tip is required for proper evaluation. The farther the catheter tip is from the right atrium, the higher the pressure will be.

## Evaluation

When evaluating the results of CT measurements, changes in the average value and changes in the shape of the phlebogram must be taken into account.

## Changes in the average value of CVP

- **Reduced CVP**
  - Hypovolemia (reduced blood volume).
- **Increased CVP**
  - Hypervolemia (increased blood volume),
  - right ventricular failure,
  - pulmonary embolism,
  - chest pressure,
  - pressure pneumothorax,
  - artificial lung ventilation (should be measured at the end of expiration),
  - valve defects (tricuspid regurgitation and stenosis).

## Phlebogram shape changes

For evaluation, it should be noted that the curve shows the pressure, not the volume changes in the right atrium. Possible changes include:

- absence of wave and atrial fibrillation and simultaneous enhancement of the wave due to more blood in the absence of atrial contraction;
- wide and high wave c during tricuspid stenosis (systolic PK pressure is transmitted to the atrium);
- prominent wave a and indistinct wave y in tricuspid stenosis (higher importance of atrial systole and insufficient diastolic flow),
- various changes may also be present in right ventricular ischemia (accented wave and higher atrial function or symptoms of tricuspid regurgitation).

## Links

### Related articles

- Blood pressure monitoring
- Central venous catheter

### Referances

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- 
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### Reference

- 1.
- 2.
- 3.

Kategorie:Fyziologie Kategorie:Slovník fyziologie Kategorie:Kardiologie Kategorie:Významně pozměněné zkontrolované články