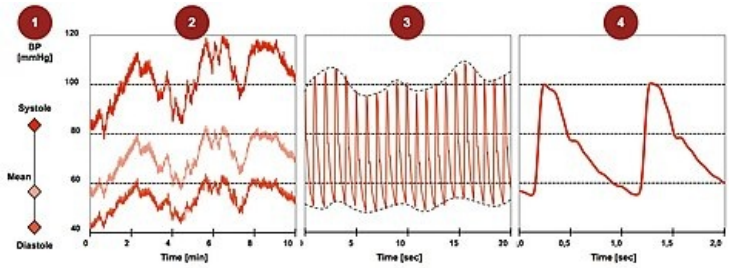
Mean arterial pressure

Mean arterial pressure is the average value of blood pressure during one heart cycle.

Calculation of mean arterial pressure

The mean arterial pressure value cannot be calculated as the arithmetic mean of the systolic and diastolic pressure values. The main reason for the difficulty of such a calculation is the duration of diastole, which is about twice as long as the duration of systole. For this reason, the mean arterial pressure value is **closer to the diastolic pressure value**.



Comparison of mean pressure (orange) with systolic and diastolic

In **physiological blood pressure** values (120/80 mmHg) the mean arterial pressure value is **93,3 mmHg**.

For an accurate calculation, it would be necessary to know the **detailed course of arterial pressure values** during the entire cardiac cycle. This condition is partially only met during **invasive measurements**. For this reason, relations using the fact that SAT depends significantly on the value of systolic and diastolic pressure are used to estimate mean arterial pressure:

*The mean arterial pressure **(SAT)** can be calculated as the sum of one-third of the systolic pressure **(ST)** and two-thirds of the diastolic pressure **(DT)**.*

$$SAT = \frac{1}{3}ST + \frac{2}{3}DT$$

*Another calculation for mean arterial pressure is the sum of diastolic pressure **(DT)** and one-third pulse pressure **(PT)**.*

$$SAT = DT + \frac{1}{3}PT$$

*The pulse pressure value can be calculated as the **difference** between systolic and diastolic pressure.*

$$PT = ST - DT$$

In practice, it should be borne in mind that these calculations are **valid** in situations where the pressure curve has a **physiological course**. If blood pressure values are significantly modified by a pathological process (affecting, for example, a vessel wall or blood viscosity), the actual mean arterial pressure value may differ from the value calculated using the above relations.

References

Related articles

- Blood pressure
- Pulse pressure
- Systolic pressure
- Diastolic pressure

Source

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- KITTNAR, Otomar, et al. *Lékařská fyziologie.* 1. edition. Praha : Grada, 2003. 790 pp. ISBN 978-80-247-3068-4.
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