Tonometer

This article has been translated from WikiSkripta; ready for the **editor's review**.

Tonometer is a device that measures blood pressure using the so-called indirect method . We usually measure the blood pressure of the brachial artery (at the site of the nearest branch above the site where the cuff is applied). The arm should be at heart level so that the hydrostatic blood pressure does not affect the measurement.

Blood pressure

Blood pressure is the lateral pressure of flowing blood through which a blood column acts on a vessel wall. It fluctuates in the arteries, in the capillaries and veins it is constant and almost zero. So we are talking more about **arterial** pressure .

- the ventricular systole pressure value and the diastole blood pressure value are recorded (eg 120/80 mmHg)
- optimal values:
  - systolic blood pressure 105 mmHg to 140 mmHg,
  - diastolic blood pressure 60 mmHg to 90 mmHg,
- hypotension : pressure less than 105/60 mmHg,
- hypertension : pressure exceeds 140/90 mmHg.

Stephen Hales , an English theologian, physicist and physiologist of plants, was the first to measure blood pressure in 1738. He measured and compared the pressures of plant fluids and the blood of horses and dogs.

Types of tonometers

Mercury tonometer

The mercury tonometer (sphygmomanometer) consists of a manometer and an inflation system (balloon with a discharge valve).

We wind a cuff on the subject's arm, put on a stethoscope and hold the listening part of the stethoscope on the elbow hole (under the cuff). By squeezing the balloon, we increase the pressure to approximately 140 mmHg (the pressure values are shown by the mercury column of the manometer). This will stop the blood flow through the artery. Then we gradually release the air from the cuff through the balloon valve.

- Systolic pressure value: the moment we hear the first sounds of flowing blood (so-called Korotkov sounds).
- Diastolic pressure value: the moment Korotkov's sounds disappear.

Korotkov's sounds are created by the vibration of an artery due to the swirling blood flow. As the pressure in the cuff decreases, the vortex gradually ceases.

The stethoscope is used to transmit sound from the examined area so that the volume of the transmitted sound is reduced as little as possible.

Mercury tonometer

Aneroid tonometer (spring)

Sometimes a nine-volt battery speaker - Korotkov's sounds come from the speaker, mercury column replaced by resistance spring, the pressure values on the scale are indicated by the hand, possible influence of the external environment on the properties of the spring.

Wrist digital automatic oscillometric instruments

Artery oscillation detection (pressure values at the largest pressure changes), determination of the value of the so-called mean arterial pressure, the limits are calculated by the software of the device, possible inaccurate values (principle of operation + less elasticity of the arteries at an older age).

There is a certain measurement **deviation** for each measuring instrument .

In practice

People should see a GP regularly and not rely solely on home measurements. The doctor measures the pressure more accurately, usually with a mercury pressure gauge.

There is currently talk of **replacing** mercury pressure gauges in medical surgeries with digital pressure gauges, where mercury is replaced by an electronic chip. These instruments have an accuracy quite comparable to mercury pressure gauges, measuring faster and easier to use.

Links

Related articles

- Blood pressure
- Systolic blood pressure
- Diastolic blood pressure
- Blood pressure measurement
- Heart revolution
- Home blood pressure monitoring

Source

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