Patient monitoring during anesthesia

Definition

Monitoring of the patient's general condition and vital signs during anesthesia.

Importance

The operation and the anesthesia itself affect the overall condition of the patient, his internal environment, cardiovascular and respiratory systems. Careful monitoring makes it possible to prevent or timely treat disorders of the operated patient's physiological state and thus prevent subsequent postoperative complications or even the death of the patient.

Basic rules

- The anesthesiologist should be present during the entire course of anesthesia.
- Monitoring of the patient must begin before induction of anesthesia and must be completed only after the patient is safely removed from anesthesia.
- Standard monitoring should always be performed regardless of whether general or general anesthesia is involved.
- The course of anesthesia and vital signs should be recorded at regular intervals.
- The monitoring devices must be checked before surgery and the anesthetist should be adequately trained in the use of these systems.

Types of patient monitoring during anesthesia:

Standard monitoring
: It is used for every patient, regardless of the state of health, age or type of operation, the method of conducting anesthesia (regional or general anesthesia). If necessary, this standard monitoring is extended.

Advanced monitoring
: Use depending on the patient's condition or if the difficulty of the operation requires it.

- Despite instrumental measurements, let's not underestimate clinical monitoring and changes in the patient:
- - listening to breathing with a stethoscope,
  - color ,temperature and blood circulation of the skin,
  - perspiration,
  - the condition of the patient's pupils.

Standard monitoring

- **Electrocardiography** ECG.
  - limb leads - all CA - 3 leads
  - preferential lead II detects most arrhythmias and ischemia of the inferior wall
  - in patients with a risk of perioperative acute infarction of modification II/V5, anterior wall ischemia is also monitored
- **Non-invasive blood pressure measurement**:
  - at regular intervals we monitor the value of systolic, diastolic and mean pressure;
  - principle: oscillometrically;
  - measurement method: with a cuff of the appropriate width, we put it on the arm (measured automatically);
  - mean pressure should not fall significantly below 70 mmHg.
- **Pulse oximetry:**
  - principle: the difference in light absorption between oxygenated and reduced hemoglobin;
  - physiological values 94–100%;
  - method of measurement: pulse oximeter, most often on the fingers of the upper limb.
- **Respiratory parameters :**
  - current tidal volume (6 ml/kg of ideal body weight);
  - respiratory rate;
  - minute ventilation (determines CO2 elimination; ((6ml/kg *12/min = 72ml/kg/min, for newborns 6ml/kg *30/min = 180ml/kg/min.)));
  - inspiratory pressures;
    - maximum inspiratory pressure (between 15–20 mbar – higher pressures can cause pulmonary barotrauma);
    - mean inspiratory pressure;
    - PEEP (Positive End-Expiratory Pressure) excess pressure at the end of expiration.
- **Capnometry and capnography :** measuring the partial pressure of CO_2 in exhaled air.
- **Inspiratory and expiratory oxygen concentration .**
- **Monitoring of anesthetic gases :** expiratory and inspiratory concentrations of anesthetic gases.

Advanced monitoring

Relaxometry
: Sensing the strength of the muscle response to an electrical stimulus.

Diuresis
: After the introduction of the urethra, we measure the amount of excreted urine (approx. 1 ml/kg/h).

Body temperature
: We measure with a thermometer, the probe is most often inserted orally.

Measurement of central venous pressure

- using an indwelling central venous catheter,
- possibility to follow the central venous pressure curve,
- physiological value 0–8 mmHg.
- Invasive measurement of blood pressure using an indwelling arterial catheter.

Catheterization of the pulmonary artery will allow measurement

- pressure in the pulmonary artery,
- cardiac output,
- system resistance,
- pulmonary vascular resistance,
- stroke volume.

Transesophageal echocardiography
: Sonographic image of the heart using a probe inserted into the esophagus.

Electroencephalography (EEG)

- sensing the sum of excitatory and inhibitory potentials,
- it is used to measure the depth of anesthesia.

Transcranial Doppler sonography.

Links

References

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