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CARDIOGENIC SHOCK: CLINIC, EMERGENCY CARE.

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ANNOTATION
Cardiogenic shock is a life-threatening condition of critical organ hypoperfusion (lack of blood supply), due to a decrease in cardiac output, which is characterized by: 1. A decrease in SBP <90 mmHg . for more than 30 minutes, mean blood pressure less than 65 mm Hg . for more than 30 minutes, or the need to use vasopressors to maintain SBP≥90 mmHg .
KEYWORDS
cardiogenic shock, heart failure, congestive heart failure, acute heart failure, cardiac failure

Cardiogenic shock is a life-threatening condition of critical organ hypoperfusion (lack of blood supply), due to a decrease in cardiac output, which is characterized by: 1. **A decrease in SBP <90 mmHg** . for *more than 30 minutes, mean blood pressure less than 65* mm Hg . for more than 30 minutes, or the need to use vasopressors to maintain SBP≥90 mmHg ; 2. **Signs of pulmonary congestion or increased** filling pressure of the left ventricle; 3. Signs of **organ hypoperfusion** , at least the presence of one of the following criteria: impaired consciousness; •cold, damp skin;• oliguria ; •increase in plasma serum lactate > 2 mmol/l.

There are 3 main clinical variants of cardiogenic shock :

- **arrhythmic shock** due to a drop in minute blood volume during tachycardia/ tachyarrhythmia or bradycardia/ bradyarrhythmia . After stopping the arrhythmia, hemodynamics are restored quite quickly;
- **reflex shock** (pain collapse), which develops as a reaction to pain; characterized by a rapid response to analgesic therapy;
- **true cardiogenic shock** is characterized by a detailed picture of shock that is resistant to therapy.

Family doctor strategy: effective pain relief, preparation for urgent evacuation by intensive care unit to a specialized hospital.

CLINIC : symptoms of ACS are possible (detailed in the relevant protocols) or signs of non-ischemic heart damage , along with the appearance of signs of acute hemodynamic failure and hypoperfusion : severe general weakness, dizziness, “fog before the eyes”, palpitations, a feeling of interruptions in the heart, suffocation . *gray cyanosis or pale cyanotic, “marbled”, moist skin* ; acrocyanosis ; collapsed veins; cold hands and feet; nail bed test for more than 2 s. (decreased peripheral blood flow velocity). Impaired consciousness: lethargy, confusion, less often - agitation. Oliguria (decrease in urine output less than <0.5 ml/kg/h). Decrease in systolic blood pressure less than 90 mmHg ; decrease in pulse arterial
pressure up to 20 mm Hg . and below., decrease in average blood pressure less than 65 mm Hg (formula for calculating average blood pressure = (2DBP + SBP) / 3).

Family doctor tactics:

- the patient must be given a horizontal position with slightly elevated lower limbs (in the absence of signs of left ventricular failure);
- oxygen therapy with a mask or through nasal catheters;

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- effective pain relief as in myocardial infarction, relief of rhythm disturbances;
- in case of reflex shock, when the effect of pain relief is insufficient, *a mezatone solution can be administered slowly intravenously* (0.5 ml of the drug in 20 ml of isotonic sodium chloride solution or 5% glucose solution);
- if it is not possible to immediately hospitalize the patient (and if the necessary medications are available), a test bolus injection of 100 ml of rheopolyglucin is carried out with repeated administration of 50 ml every 5 minutes until a systolic blood pressure of 100 mm Hg is achieved. Art. (a single dose of rheopolyglucin should not exceed 400 ml), and/or dopamine (200 mg of the drug is dissolved in 125 ml of 5% glucose solution and administered intravenously , starting with a dose of 3-5 mcg/(kg•min), gradually increasing until the effect is achieved, or the maximum dose – 25 mcg/(kg•min) – if complications develop). Instead of dopamine , dobutrex or norepinephrine can be used ;
- in the absence of contraindications, in order to correct microcirculatory disorders, heparin is prescribed at a dose of 10,000-15,000 IU intravenously , with continued therapy in the hospital.
- infusion (NaCl or Ringer's solution >200ml/15–30min) recommended as first-line therapy in the absence of signs hypervolemia .
- For inotropic purposes (to increase cardiac output) they are used dobutamine and levosimendan (the use of levosimendan is especially indicated for development of CABG in patients with CHF taking β- blockers). Infusion dobutamine is administered at a dose of 2–20 mg/kg/min. Levosimendan can be administered in a dose

12 mcg/kg over 10 minutes, then infusion of 0.1 mg/kg/min, reducing the dose to 0.05 or increasing if ineffective to 0.2 mg/kg/min. At the same time, it is important so that the heart rate does not exceed 100 beats/min. If tachycardia or disturbances develop heart rate, the dose of inotropes should be reduced if possible.

- Vasopressors should be used only when it is impossible to achieve target SBP values and elimination of hypoperfusion symptoms during therapy infusion solutions and dobutamine / levosimendan . The vasopressor of choice should be norepinephrine. Norepinephrine is administered at a dose of 0.2–1.0 mg/kg/min.
- Loop diuretics - used cautiously when combined clinically cardiogenic shock with acute left ventricular failure, only on background of normalization of blood pressure numbers.

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