Topic 1.10 part 2. «Safety provision for the first aid»

Basic cardiopulmonary resuscitation

Clinical death – is the period from cardiac arrest till irreversible changes in brain-cortex onset. Duration of clinical death is about 3-5 minutes (it depends on some external factors and initial health of the organism).

Resuscitation is a complex of emergency measures taken to revive and restore vital functions of the organism.

Basic cardiopulmonary resuscitation (CPR) includes artificial pulmonary ventilation and external chest compression.

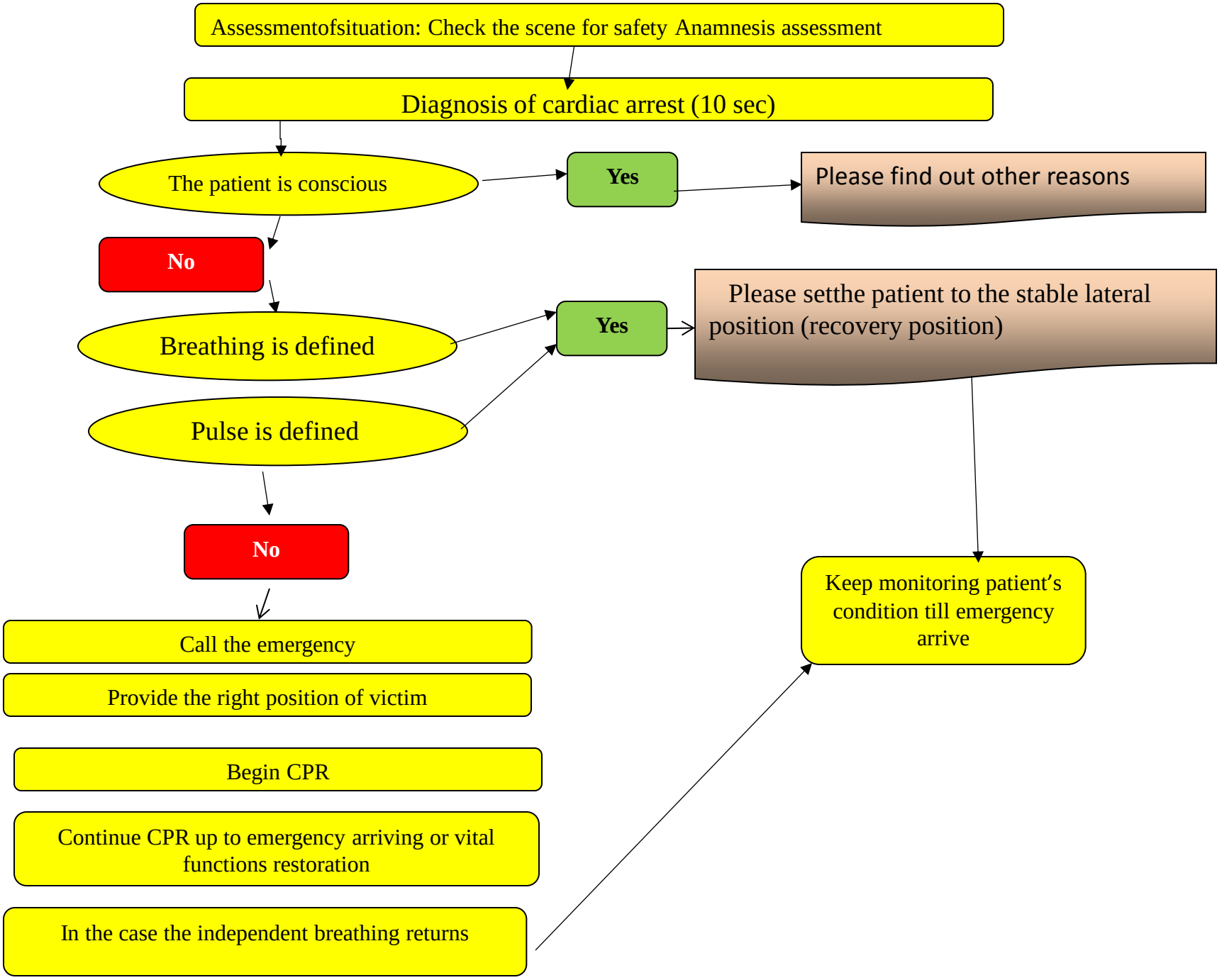
Basic CPR is performed without any special equipment and drugs.

Traditional and long-time existing algorithm of CPR is A-B-C scheme (alphabet of CPR), offered by Peter Safar.

A – airways open – restoration of airway patency;
B – breath for victim – artificial lung ventilation (rescue breathing);
C – circulation of blood – circulation maintenance;
D – drugs and fluids – drugs administration;
E - electrocardiography diagnosis;
F - fibrillation treatment ;
G - gauging – patient assessment and identification heart arrest causes;
H - human mentation – consciousness recovery management;
I - intensive care.

Main points of up-to-date CPR:

- **Immediate beginning of all CPR arrangements;**
- **Early using of fibrillatory in the case of fibrillation and ventricular tachycardia without pulse;**
- **The priority of indirect cardiac massage than lung ventilation;**
- **Minimization of pauses during indirect cardiac massage;**
- **Inadmissibility of hyperventilation;**


Assessmentofsituation: Check the scene for safety Anamnesis assessment
Diagnosis of cardiac arrest (10 sec)
The patient is conscious
Yes
Please find out other reasons
No
Breathing is defined
Yes
Please setthe patient to the stable lateral position (recovery position)
Pulse is defined
No
Keep monitoring patient's condition till emergency arrive
Call the emergency
Provide the right position of victim
Begin CPR
Continue CPR up to emergency arriving or vital functions restoration
In the case the independent breathing returns

Diagnosis of cardiac arrest

The main symptoms of cardiac arrest are:

- **The absence of consciousness;**
- **The absence of breathing or pathology breathing without adequate pulmonary ventilation;**
- **The absence of carotid pulse.**

Additional symptoms of cardiac arrest:

- **Pupillary dilatation without response to light;**
- **Skin color changing (pallor, cyanosis);**
- **The absence of blood pressure;**
- **The absence of heart tones.**

Assessment of consciousness

•Ask the casualty: “What happened? Are you okay?”;
•Give a little shake to the patient holding him for the shoulders;
•If there is no answer - patient is unconsciousness.

Assessment of independent breathing (I hear-I see-I feel)

•Put your ear above patient’s nose and mouth, place your hand on patient’s sternum (lower part);
•Assess chest excursion: inhalation and exhalation movements (I see) and assess sound of exhaled gas (I hear) and assess feelings of chest excursion under your palm (I feel);
•Restore airways patency if there is such need;
•Try to spend not more than 10 sec on breathing and circulation assessment.
In case there is no breathing or there is a pathology breathing or sharp bradypnea it is necessary to start resuscitation immediately.

Assessment of blood circulation

Define pulse on carotid artery (put your fingers in the fossa between thyroid cartilage and muscle roll of sternocleidomastiodeus).
Carry out pulse assessment no longer than 10 sec.
In case there is no pulse on carotid artery begin CPR.

Before performing CPR, it is necessary to maintain conditions for successful results:

Lay down the patient on hard and smooth surface, straight his arms along the body.
Turn the victim as “a whole”, try not to allow displacements of different parts of the body.
Undo the belt and unfasten upper garments.
If there are no contraindications lift patient’s legs.

External chest compressions (close cardiac massage)

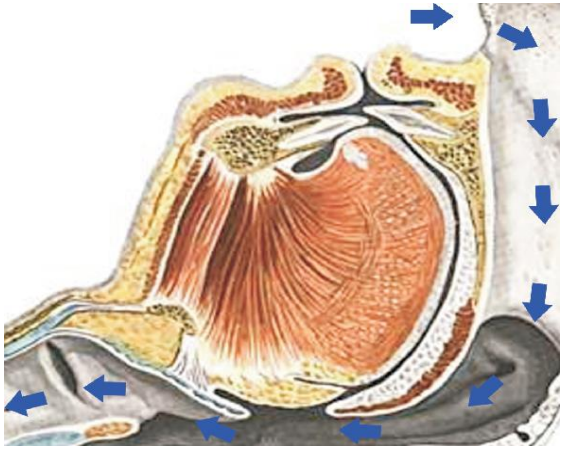
In case there is no circulation it is necessary to start external chest compressions.

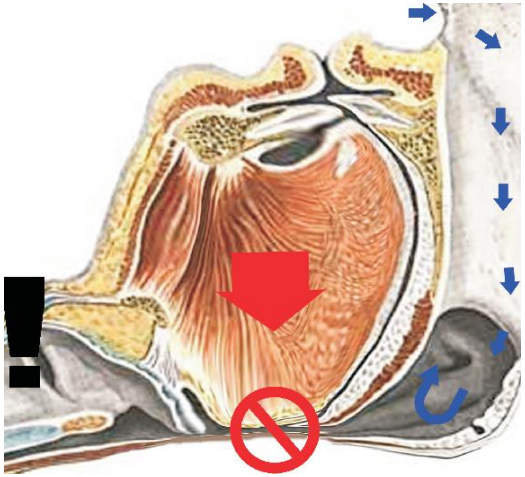
•Point the heel of your hand at the border of lower and middle parts of sternum right in the midline. Put the heel of your other hand on top of the first. You may interlock your fingers.
•Shoulders and forearms of rescuer are strictly perpendicular to casualty's corpus. Keep your elbows straight all the time.
•Depth of pushing the sternum shouldn't be less than 5 sm., but not more than 6 cm.
•Use your weight and the strength of your back muscles during compressions.
•Thoracic cage must completely straighten after each compression. Don't lift your hands while decompressions!
•Duration of compressions and decompressions of thoracic cage should be equal.
•Frequency of compressions should be no less than 100 per minute and no more than 120 per minute.

External chest compression (close cardiac massage) for infants and children.

•Frequency of compressions should be the same as for adults (100-120 per minute) independently of their age.
•Newborn to 1 year: use to 2 fingers(second and third or two thumbs) for compression, position – on the center of infant's breastbone just below the nipple line.
•Depth of compressions – 4 cm.
•Age from 1 till 8: use the heel of your one hand.
•Depth of compressions: 5-6 cm.

Restoration of upper airway patency





Patency of airways

Airways obstruction (Falling back of the tongue)

The most common reason of airways obstruction is falling back of the tongue. Other possible reasons: foreign bodies or obstruction with vomiting matters.

Algorithm of the head tilt-chin lift maneuver:

•Tilt the head and open the airway.

•Press down on the forehead with one hand and lift the chin up with the index and middle fingers of the other hand (be careful if cervical injury is suspected).

•Open the victim's mouth and look for the objects, if you see something in the mouth remove it with a finger sweep, if you do not see the object do not perform a blind finger sweep.

•If you suspect a cervical spine issue use Safar maneuver – a jaw thrust. Use this method when you want to immobilize the patient's head still opening the airway so they can ventilate.

•Stabilize the patient's head with your hands, thrust the jaw putting your fingers on mandibular angles, and open patient's mouth using your thumbs.

Artificial lung ventilation

It includes the following techniques "mouth to mouth", "mouth to nose", "mouth to mouth and nose".

Duration of each artificial inhale is 1 sec., use minimal respiratory volume and minimal pressure to see chest excursion. Required respiratory volume is 500-600 ml.

•Make sure the airway is open and pinch the nose so it closes.

•Gently raise the chin upwards with two fingers of your other hand.

•Take a deep breathand exhale into the patient's airway.

•You should see the chest rise and fall.

•To get another breath, lift your head and breathe in deeply. Performsteps 1, 2, 3, and 4 again.

Exhalation should be full and passive!

If there is no visible chest lifting and you feel resistance, the airway patency isn't enough or there is a respiratory obstruction with foreign body. In this case you should recover airway patency using "head tilt-chin lift" or "jaw thrust" maneuverers.
If it is impossible to carry out "mouth to mouth" rescue breathing (e.g. little infant or severe jaw injury), it is necessary to carry out "mouth to nose" rescue breathing: tilt victim's head with one hand and use the other hand to lift up chin and close mouth. Blow the air into casualty's nostrils tightly catch them with your lips.
NB!
It is necessary to blow the air into carefully and not very fast (during 1 sec.) or it will cause the opening of the esophagus with the air getting into the stomach. In this case don't press the abdomen to prevent the gastric materials entrance to the mouth and aspiration with gastric contents.
NB!
You can hear fast or vice versa rear and loud inspirations after cardiac arrest. This is a pathology breathing, so don't muddle it with normal breathing. If there is a doubt begin CPR, considering this breathing as the absence of breathing.
If it is possible use protective means during rescue breathing, e.g. a piece of gauze or handkerchief.
Artificial lung breathing for infants
For infants from 0 till 1-year use method "mouth to nose". Remember that respiratory volume of newborns is about 30 ml, so use only the volume of your cheeks providing rescue breathing for them
For infants from 1 year and elder use "mouth to mouth" method.