

MEDICOLEGAL EXAMINATION OF MECHANICAL ASPHYXIA

Hypoxia is a pathological condition in which the body as a whole (generalized hypoxia) or a region of the body (tissue hypoxia) is deprived of adequate oxygen supply.

Types of hypoxia:

- 1) acute hypoxia which develops and leads to death during a few seconds or minutes;
- 2) subacute hypoxia which develops and leads to death during a few hours;
- 3) chronic hypoxia which develops and leads to death during a few months and even years.

Mechanical asphyxia is an acute anoxaemia and rapid accumulation of carbonic acid, which occurs as a result of external mechanical obstacle for the entering of air in respiratory tracts.

Classification of mechanical asphyxia:

I Compression of neck organs.

1. Strangulation mechanical asphyxia: a) hanging; b) strangulation by ligature.
2. Manual strangulation.

II Obturational mechanical asphyxia:

closing of respiratory tracts by extraneous bodies.

III Aspirational mechanical asphyxia:

drowning.

IV Compressional mechanical asphyxia:

clench of thorax and stomach.

In lifetime motion of asphyxia we distinguish 4 stages:

1st stage of shortness of breath with cramps; 2nd stage of rest; 3rd stage of the terminal breathing; 4th stage of stopping of breathing with the gradual fading of cardiac activity. Each of the above-mentioned stages lasts from 1 to 5 minutes.

General signs of mechanical asphyxia:

- 1) cyanosis of skin of face and neck. This sign can be met almost constantly, but can quickly disappear as a result of draining of liquid blood in the lower parts of body;
- 2) general, poured, intensively painted blue-purple or purple-violet death spots which can be seen in 30-60 minutes after death.
- 3) punctulate hemorrhages in the connective membranes of eyes which can be vividly seen on the front folds of conjunctiva (subconjunctive ecchymoses). They appear in the phase of stuffiness at the sharp increase of arterial and venous blood pressure that. This sign is considered to be the most important for determination of mechanical asphyxia;
- 4) spontaneous defecation, urine and sperm excretion, extrusion of mucous impaction from the cervix of uterus is not a permanent sign and it is related to weakening of sphincters and cramps;
- 5) dark liquid blood in heart and large venous vessels;
- 6) overfilling with blood of the right half of heart;
- 7) venous plethora of inner organs;
- 8) subpleural and subepicardial hemorrhages (Tardieu spots). They are clearly limited, small, 2-3 mm in diameter, of rich crimson color, numeral, located under a pleura and under the external shell of heart.

Hanging is the type of mechanical asphyxia which occurs as a result of clench of organs of neck by a loop under the influence of own body mass or his parts. In most cases hanging is suicide.

Hanging can be: 1) complete, free, when a body does not have a foothold; 2) incomplete, with a foothold (in position on knees, sitting)

According to the type and material loops can be: 1) hard; 2) semi-hard; 3) soft; 4) sliding; 5) immobile.

In a loop distinguish: 1) loop itself; 2) knot; 3) free end.

Depending on position of knot we distinguish:

- 1) typical hanging, when a knot is situated in the area of the back of head;
- 2) atypical hanging:
 - a) front, when a knot is disposed in the area of chin;
 - b) sidelong, when a knot is disposed on a lateral surface.

Specific signs of hanging:

1. Strangulation fissure.
2. Often there is falling out of a tongue.
3. Of corpses spots are localized lower departments of extremities.
4. Sign of Walter - hemorrhages in soft tissues of neck and breast-clavicle-mammiform muscle.
5. Sign of Amjus - cross-section tears of internal shells of carotid in the place of its branching.

A strangulation fissure (imprint, mark) is the negative imprint of loop imposed on a neck.

While examining of strangulation fissure (imprint, mark) we pay attention to such signs:

1) direction; 2) degree of display; 3) location; 4) number of turns; 5) closing; 6) width; 7) depth; 8) relief.

Strangulation by ligature is the type of mechanical asphyxia as a result of neck organs clench by a loop, which is tighten by hands or under the action of outside force.

Specific signs of suffocation by a loop:

1) a strangulation mark has horizontal direction, evenly expressed, closed and located it is comparatively low. A mark is usually localized at the level of lower edge of thyroid cartilage or below – at the level of cricoid cartilage. Not depending on the part where the knot of loop is disposed, its pressure is equal, that is why degree of display of mark is also equally even;

2) the put out tongue squeezed between teeth;

3) cut injuries under strangulation mark.

Manual strangulation is such type of mechanical asphyxia, when a neck is compressed by hands, and the fingers of hands engulf the area of throat, which leads to the considerable clench of vessels of neck, nervous trunks, larynx, as a result the clearance of respiratory tracts is closed, there are the displays of asphyxia, and then death comes.

Suffocation by hands is always murder when there can be no signs of fight and self-defense.

Basic specific signs of suffocation by hands:

1) scratches and bruises on front and lateral areas of neck with hemorrhages in soft tissues from the clench of neck by the fingers of hands. The imprints of nails are thus fixed; they look like half moon or linear scratches;

2) at suffocation by hands there are often breaks of cartilages of larynx, and sometimes hyoid too with hemorrhages in soft tissues of neck.

Compressional mechanical asphyxia:

When thorax is clenched respiratory motions are difficult, and then become impossible.

Clench of breasts and stomach, more often is a result of accident. Small children can die of an asphyxia which is a result of imposition on the breasts of tight compress.

Specific signs of death from the clench of breasts and stomach:

1) numerous point-like hemorrhages appear on the skin of face, neck, on a breast as a result of sharp by blood overfilling of capillaries of skin higher from the place of clench (ecchymosed mask);

2) the imprints of relief and folds of clothes fabrics appear at external research of dead body;

3) the carmine edema of lungs appear at internal research of dead body (lungs have a carmine-red color as a result of saturation of blood by oxygen);

4) possible damage of inner organs, and also breaks of ribs. In such cases the question is not about an asphyxia, but about the damage of inner organs which caused traumatic shock or sharp bleeding.

Drowning is one of the types of mechanical asphyxia, when any liquid which gets in respiratory tracts is a mechanical factor. For a man to die of drowning, it is not necessary the immersion of body in a large reservoir.

During the long staying of man under water, when air ends a man begins to breathe in water – the period of shortness of breath comes. During breath water enters throat, as a result a mucous tunic gets irritated and there is a cough. Thus from mixing of water, air and mucus in the respiratory tracts full of small bubbles foam is formed, which is gradually expelled from respiratory. After that stopping of breathing comes, then the finite breathing, which lasts for 5-6 minutes, appears. Breathing stops, and in 10-15 minutes death comes. Dead body stays under water till the development of putrid processes.

Signs of stay of body in water:

● wet clothes, wet, sticky hair,

● goose pimples,

● wrinkled nipples,

● round nipples circles and scrotum,

● red color of livores mortis,

● skin maceration,

● plankton in lungs and stomach (passive diffusion).

To the specific signs of sinking belong:

● full of small bubbles white foam in respiratory tracts (sign of Krushevsky);

● reddening and edema of mucous tunic of respiratory tracts, increasing and emphysema of lungs, pale, dim hemorrhages on their surface (spots of Rasskazov-Lukomsky (A. Paltauf));

● presence of water in a small intestine and abdominal cavity (sign of Morrow);

● increasing of liver in size and presence of plankton in inner organs;

● presence of liquid of drowning environment in the sinus of sphenoid (sign of Sveshnikov).