STATE UNIVERSITY OF MEDICINE AND PHARMACY
NICOLAE TESTEMITANU

Andrei PĂDURE Anatolii BONDAREV

Infanticide. Neonaticide. Medico-legal examination of newborn cadavers

(*guideline*)

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The guideline *Infanticide. Neonaticide. Medico-legal examination of newborn cadavers* is informational support for seminars on the same theme, which are held within *Forensic medicine* course for foreign students. It contains aims and tasks which are obtained at seminars, fundamentals, case studies, self-assessment questions and tests of control. The guideline is useful for both professors and students, the last ones will find out principles of neonaticide medico-legal investigation and importance of forensic expertise in the crime demonstrating. A short glossary is also attached.

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Glossary

Caput succedaneum (labour tumor) – edema and bleeding in the soft tissues of the scalp, which appears physiologically during the birth process.

Cephalhematoma – bleeding under the periosteum of skull bones; it appears in cases of obstetrical traumas or instrumental delivery.

Child care after birth – involves washing, dressing and feeding a newborn.

Filicide – killing of a child by a parent.

Flotation (hydrostatic) test (docimasy or hydrostasy) – is used to differentiate stillborn lungs from those of infants who had breathed; it involves placing the lungs and/or gastrointestinal tract in water.

Infanticide – deliberate killing of a child in the first year of life by either act or omission.

Maturity – degree of a newborn physical development at birth in physiological term

Neonaticide – killing of a newborn child, committed during the birth or immediately after it by his mother, who was in a state of physical or mental disorder with discernment decrease caused by birth.

Newborn – a child, who lived not more than 24 hours after birth (medico-legal point of view).

Stillborn – a case of fetus death in the uterus.

Vernix caseosa – waxy white substance that is normally adherent to the skin of a fetus.

Viability – potential ability of an infant to independent existence without any special medical care.

Methodical support

Seminar objective

To know the reasons and principles of medico-legal examination of new-born cadavers. To realize the importance of forensic expertise in provision evidence of infanticide crime.

Task obtained in the study

At the level of knowledge and understanding:

- the differences between infanticide, neonaticide and homicide
- the reasons of newborn cadavers examination
- specific issues during newborn cadavers expertise and their solving
- causes of fetus and newborn death
- features of medico-legal examination of newborn cadavers

At the level of application:

- to identify signs of a newborn
- to assess maturity of a fetus and newborn
- to calculate fetal (gestational) age
- to identify signs of extrauterine life and to assess its duration
- to determine fetal viability
- to identify causes of newborn death

Didactic materials

- guideline
- case studies (text, pictures)
- control tests

Medico-legal and judicial issues of neonaticide

Infanticide (and, particularly, neonaticide) as a negative medical and social phenomenon has impressed people all over the world for centuries. In ancient times this crime was punished as severe as a homicide, by burning at the stake. Newborn murders were made without any limit during the barbaric period. In some cultures babies were sacrificed to appease gods. In ancient Greece and Rome, debilitated children were at the discretion of parents who could kill them by throwing into abyss and in the Tiber River.

Generally, according to different countries law, *infanticide* refers to the killing of a young child under the age of 12 months, and the term neonaticide being reserved for murders where the victims are under 24 hours of age. The Criminal (Penal) Code of the Republic of Moldova stipulates *neonaticide* as a crime against person's life and health. Thus, article 147 defines neonaticide as "a newborn child killing, committed during the birth or immediately after it by his mother who was in a state of physical or mental disorder with discernment decrease caused by birth", providing punishment with up to 5 years of jail.

In legal medicine *newborn baby* is considered a child, who lived not more than 24 hours after birth. Legal aspects of neonaticide distinguish active and passive subjects of this crime. The *active subject* of neonaticide could be only the mother who kills her newborn baby (*passive subject*).

The main reason of medico-legal examination of newborns is investigating such cadavers, when the mother is not known. Sometimes newborn cadavers are examined because his mother affirms that he died quickly after birth or is stillborn. The issue of medico-legal expertise of newborn body has the following objectives:

1. Making medico-legal investigation and expertise in cases of neonaticide through examination of a newborn cadaver;

2. Establishing causes of sudden intrauterine, intranatal and neonatal death;

3. Obstetrical incidents and accidents research;

4. Examination of violent death as a consequence of perinatal incidents and accidents.

Key issues solved within expertise of newborn cadavers

During medico-legal examination of a newborn cadaver, several specific issues are solved, which differ from those resolved during adult cadavers expertise. These specific questions result from both the necessity to ascertain causes and circumstances of newborn death and the legal assessment of persons responsible for their death. For these reasons, the medico-legal expertise of the newborn cadaver should identify the following:

1. Positive diagnosis of newborn
2. Assessment of fetal maturity
3. Calculation of fetal (gestational) age
4. Assessment of extrauterine life
5. Assessment of fetal viability
6. Assessment of extrauterine lifetime
7. Rating of child care after birth
8. Death cause identification

Fig. 1. **General aspect of a newborn cadaver.**

Fig. 2. **Fresh umbilical cord, without a ring of reddening.**

1. ***Positive diagnosis of newborn*** is confirmed by the presence of:

- the umbilical cord, which is fresh, without a ring of reddening;
- the placenta, which is not separated, weights about 500 grams;
- the caput succedaneum (edema and bleeding in the soft tissues of the scalp), or analogous bleeding and edema on breech (buttocks) in case of breech presentation;

- dark-green colored meconium, situated in the large intestine and perianal region;
- the vernix caseosa (waxy white substance), coating the skin of newborn, predominant in natural folds;
- maternal blood on fetal body, without any injuries.

2. ***Assessment of fetal maturity***. Fetal maturity is the degree of its physical development at birth in physiological term. The full-term newborn is considered to be 280 days of gestation or 10 obstetrical months (40 weeks). The mature fetus is characterized by:

- crown-heel length between 48 and 54 cm, the minimum length of mature fetus is 45-47cm;
- weight between 2800 and 3500 g, the minimum weight of mature fetus is 2600 g;
- pale-greyish skin, with well-developed subcutaneous fat layer and slight prominent mammary glands;
- head hair up to 2-3 cm long;
- lanugo absent or present only over shoulders, around the ears, along the spine and in the frontal region;
- head circumference of 32 cm;
- ear and nose cartilages are elastic;
- hand nails slightly exceed the distal ends of the fingers, on the legs the nails reach distal ends of the fingers;
- testes are palpable in scrotum/vulvar labia close the vaginal opening;
- ossification centers are present: in the distal end of the femur (Béclard center), its diameter is 0.5-0.7 cm, in the proximal epiphysis of the tibia (Tapon centre) and in the calcaneus.

3. ***Assessment of gestational age***. Gestational age is calculated by investigation and correlation of anthropometric indices (length, weight, fronto-occipital and biparietal diameter, head circumference, chest circumference, etc.). The length of the fetus usually varies a little, so it allows to calculate gestational age using special formulas. Haase's rule of thumb: in case when the crown-heel length is up to 25 cm, the age in obstetric months is the square root of the length (e.g.: $\sqrt{16}$ cm = 4 obstetric months). In case when the crown-heel length is over 25 cm, it is divided by 5 (e.g.: 35 cm ÷ 5 = 7 obstetric months). The other method is

the Balthazard-Darvieux formula: crown-heel length in centimeters should be multiplied by the coefficient 5.6 (e.g.: 50 cm × 5.6 = 280 days).

4. ***Assessment of extrauterine life***. A child can be born both alive and dead. Death of a viable fetus could occur before, during or after birth. A stillbirth is considered when fetus death occurs in the uterus.

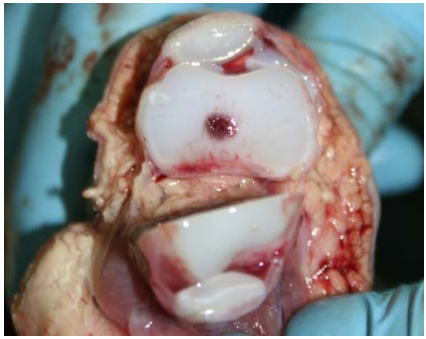

Fig. 3. **Béclard ossification center.**

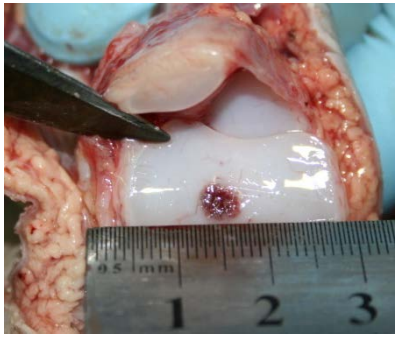

Fig. 4. **Béclard ossification center.**

Extrauterine breathing after birth causes very obvious *macroscopic lung changes*, which can be observed at a fresh cadaver after a short period of survival. Unrespired lung is small, not expanded, it occupies 1/3 of the thoracic cavity and is situated into costovertebral sinuses. It has a smooth, dark-red or reddish-brown colored surface. The texture of an unrespired lung is rubbery, uniform, liver-like, with no crepitate areas. On slicing it has the same rubbery and uniform aspect, on squeezing a small quantity of reddish liquid without bubbles drips. A respired lung is expanded, fills almost entirely the pleural cavity, the medial edges overlapping the mediastinum and a part of the pericardium. It is white-rose colored, with mottled, doughy irregular surface. The lung is spongy, elastic, crepitates on palpation. On slicing spontaneously a reddish sparkling liquid with air bubbles drips.

Magnified macroscopic examination of a respired lung discovers air bubbles situated under the visceral pleura, having silver sectors aspect (Haberda's test).

In medico-legal practice the test, known as „docimasy" or „hydrostasy" is used to differentiate stillborn lungs from those of infants who breathed.

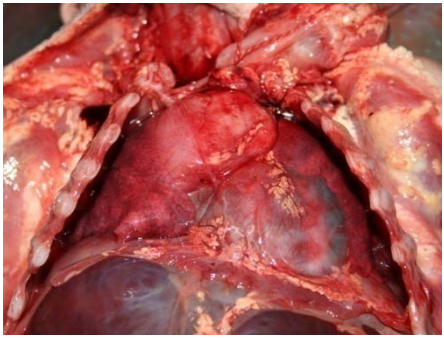

Fig. 5. **Pleural cavities filled by expanded lungs.**

Fig. 6. **Macroscopic aspect of a respired lung with Tardieu spots.**

Hydrostatic pulmonary docimasy (Galen's test). The esophagus and trachea are separated and a ligature is applied. After extraction of the oral-cervical-thoracic complex, it is placed in a vessel filled with water. Then the separated lungs are placed one by one in the water. After this, small fragments of the parenchyma from different areas of the lungs are immersed into the water. The test is considered positive when the lung fragments or lungs float on the surface. An unrespired lung could give a false positive result (floating) in case of frozen cadavers, massive vernix caseosa aspiration (floating because of fat content), after artificial respiration and, of course, in cases of putrefaction due to gas accumulation. Putrefaction gas bubbles on the surface of the lungs are of different sizes and irregular distribution. Lung fragments squeezed into water evacuate putrefaction gases, but do not eliminate residual air, so this test can serve for differential diagnosis between positive and false-positive tests. In resuscitation maneuvers artificial respiration produces unequal distension and/or partial aeration, so flotation test is uncertain, a part of small fragments float, other sink. The respired lungs may give negative result (false negative test) in cases of pneumonia, aspiration of amniotic fluid, partial atelectasis in immature and premature newborns, by inefficient respiration and in secondary atelectasis due to air resorption.

Hydrostatic gastrointestinal docimasy (Breslau's test) highlights air penetration into the digestive tract after birth due to respiration and swallowing. Several ligatures are applied on the entrance to the stomach and pylorus, loops of the small and large intestines and rectum before

the extraction of oral-cervical-thoracic-abdominal complex. The sample is considered positive if the piece floats. In cases of stillborn hydrostatic test may be false-positive due to gaseous putrefaction and artificial respiration.

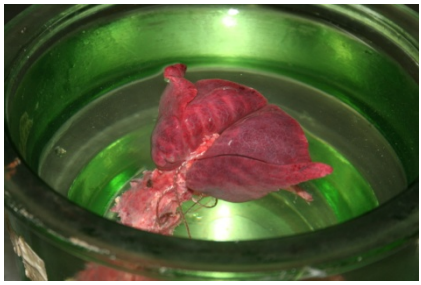

Fig. 7. **Positive Galen's hydrostatic test.**

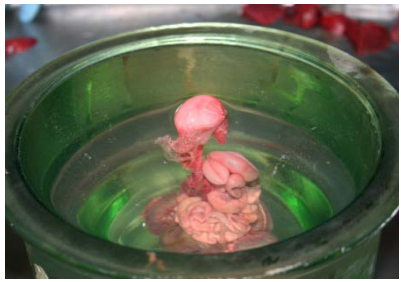

Fig. 8. **Positive Breslau's hydrostatic test.**

Microscopic aspect of the lung tissue allows differentiation between unrespired and aerated lung. In order to perform lung histology and to observe physiological progressive aeration four fragments from each lung should be taken: from the apex, periphery, paravertebral and basal regions. An unrespired lung has a compact aspect, alveoli are collapsed with no lumen, the thickened walls are covered with cubic cells with round nucleus. The capillaries have small lumen and do not contain any blood cells. The bronchi have folds at walls, irregular and small stellate lumen. The elastic fibers in the alveolar walls are wavy. A respired lung has expanded alveoli; their cells are flattened, have oval nucleus. The capillaries have widened lumen and contain blood cells. The bronchi are expanded; their walls are covered with cylindrical ciliated epithelium. Elastic fibers are stretched, arranged in semicircled or circled bundles. Partially respired lung has the appearance of both respired and unrespired lung. The artificial lung aeration due to resuscitation maneuvers leads to uneven air distribution, therefore both the areas of distended alveoli and those of collapsed alveoli are present; alveolar cells can be both cubic and flattened; elastic fibers usually remain wavy.

In infants born alive *radiological examination of the lungs and gastrointestinal tract (*Dillon's test) will highlight pulmonary vascular network and air into gastrointestinal tract.

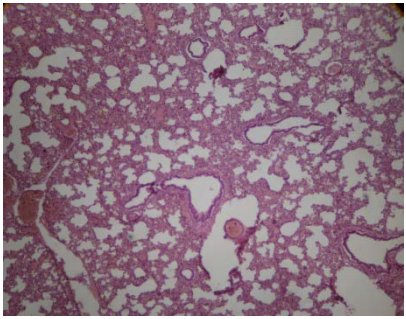

Fig. 9. **Expanded lung (microscopic) magnified ×100.**

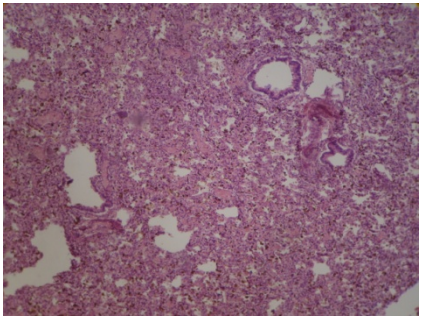

Fig. 10. **Unrespired lung (microscopic) magnified ×100.**

5. ***Assessment of viability***. A viable newborn means a newborn able to exist independently, separate from his mother's organism, without any special medical care. From the medico-legal point of view, a newborn is considered viable if he is satisfactorily developed, is born in 8 obstetric months (32 weeks) of pregnancy, has the weight of over 1500-1600 g and the crown-heel length is more than 40 cm. A fetus can be considered nonviable when one of the mentioned parameters is less than the mentioned ones or any congenital malformations incompatible with life are present.

6. ***Assessment of extrauterine lifetime*** is made basing on some principles:

- skin changes – beginning with the second day of separate existence, the vernix caseosa dries and falls. Physiological erythema appeared immediately after birth disappears in a few days. Peeling of the skin horny layer (stratum corneum) begins in 24 hours after birth and reaches its peak in 3-5 days.
- umbilical cord changes – at birth the cord is soft, moist, gelatinous, shiny, thick 1.5-2.0 cm. Its mummification and separation processes begin after birth and last 2-6 days. At the level of the amnio-skin line the process of aseptic necrosis begins, a ring of reddening appears (it has a demarcation role), which becomes visible macroscopically in 24 hours after the birth. Microscopically rich white blood cells infiltration is revealed, which leads to sectioning of the umbilical arteries, vein and surrounding tissues,

followed by umbilical stump falling off between the 5-th and 10-th day. Cicatrization will be complete in 3-4 weeks.

- caput succedaneum changes – the caput succedaneum is reabsorbed during 2-3 days.
- respiratory changes – the presence of large areas of physiological pulmonary atelectasis in the basal and paravertebral regions indicate up to one day survival. Persistence of physiological atelectasis is explained by gradual progressive aeration, which initially appears in the apical and peripheral regions. The areas of atelectasis reduce quickly after the first day of life, so they are not detected in 3 days of life.
- cardiovascular changes – atrial septal defect closes in 2 weeks after the birth; the ductus arteriosus – in 3-4 weeks; the thickness of the left ventricle exceeds that of the right one in 2 weeks.
- changes in the gastrointestinal tract – level of air penetration in the gastrointestinal tract indicates extrauterine lifetime of a newborn. Thus, in 5-10 minutes of separate existence air enters the stomach, in the following 15-20 minutes it enters the jejunum and no later than in 6 hours it fills the whole small intestine. The next 6 hours air enters the colon, and in about 24 hours it fills the whole colon. Complete air elimination from the gastrointestinal tract occurs in 48 hours. Complete elimination of meconium from the gastrointestinal tract occurs within 2-3 days.

7. ***Rating of child care after birth.*** Child care after birth, especially in acts of omissive infanticide, involves washing, dressing and feeding the newborn. Children usually die due to hypothermia without such a care. Hypothermia at the level of 32ºC during 24 hours can be fatal, so an undressed newborn, shows lack of care even in warm season. Lack of care can be established in case of the presence of blood on the body, vernix caseosa in envelopes, ruptured or cut non-ligatured umbilical cord, lack of food in the stomach.

8. ***Death cause identification***. Death of a newborn could happen before the birth (in utero), during it or after partum. It can be violent or non-violent.

Causes of antenatal death:

a) maternal – infectious diseases (syphilis, malaria, pneumonia, etc.); severe toxemias of pregnancy; acute or chronic heart diseases; maternal trauma; acute or chronic intoxications etc.
b) fetal – malformations and congenital infections; neoplasms; hemolytic disease etc.
c) membranous – abnormal placental development and positioning; umbilical cord torsion; hydramnios etc.

Causes of intranatal death:

a) maternal – small pelvis, insufficiency of uterine contractions (primary and secondary), eclampsia, uterine rupture, malformations of the uterus and vagina etc.
b) fetal – abnormal positions of the fetus, breech presentation, erythroblastosis, macrosomic fetuses, fetal malformations, spontaneous intranatal trauma, fetal extraction with forceps etc.
c) membranous – early elimination of amniotic fluid, hydramnios, abruptio placentae, mechanical asphyxia due to strangulation with umbilical cord, short umbilical cord, cord knotting etc.

Causes of postnatal death:

a) pathological – malformations incompatible with life, hemolytic disease, pulmonary atelectasis etc.
b) accidental – obstetrical cranial trauma, fetal asphyxia etc.
c) violent – active infanticide (commissive) and passive (omissive).

Results of scientific research show that in 70% of cases infanticide is active, the most frequent cause of death is mechanical asphyxia (suffocation, strangulation by hands, blockage of airway by foreign bodies, drowning) and blunt trauma. Passive infanticide is produced by abandonment and lack of care. Newborn cadavers are often left in city dumps, thrown or buried in green areas, found in the street, in toilets, basements, manholes and constructions.

Features of medico-legal examination of newborn cadavers

Medico-legal examination of newborn cadavers includes both external and internal examination; investigation of placenta is mandatory, in case of its existence. External examination begins with examining of objects presented with the cadaver or in which it was wrapped. During the description its type, size, color should be mentioned; it is important to note the presence of any stamps, notes, addresses etc. This information may allow the prosecution to identify the mother. Putrefaction is not an impediment for forensic autopsy. Color of the skin, the presence of vernix caseosa and its location, the presence of blood stains, natural orifices state and caput succedaneum changes must be described. Cadaveric lividities (livor mortis) in newborn cadavers could be weakly manifested, but should be studied too. In newborns rigidity (rigor mortis) appears quite early (sometimes in 20-30 min), but in 3 hours it could be observed in all muscle groups. All anthropometric measurements (body weight; crown-heel length; head circumference, chest circumference, abdomen circumference, arm circumference, thigh circumference; humeral and trochanter diameters; umbilical cord position relative to the xiphoid appendix and pubis) must be taken. Signs of fetal maturity should be established: head hair length, lanugo presence and location, state of cartilages and nails, genital development, presence of Béclard and Tapon ossification centers). Examination of the umbilical cord includes: its length and thickness measurement, its condition (wet or dry) description, ring of reddening presence, possible ligatures, free end state (it is cut or torn). In case when placenta is presented for the examination, its shape, weight, dimensions (diameter, thickness and circumference), fetal surface (fetal membranes presence), uterine surface (cotyledons presence), umbilical cord insertion place should be described. Lack of cotyledons on the uterine surface of placenta is noticed and must be reported to the police officer, because the rest of the placenta remains in mother's uterus and could cause metrorrhagia or infectious complications that would force women to seek medical care and so could allow her identification.

After scalp section, skull shape, fontanels state and size, skullcap and skull base bones state, its mobility, presence of caput succedaneum, cephalhematoma and lesions must be studied. Skullcap sectioning is

made with scissors beginning with the lambdoid suture, parallel to the sagittal suture and 2 cm laterally till the frontal bone; then the section extends horizontally, across the frontal bone, temporal bone, parietal bone to the occipital one. This method allows brain and meninges examination *in situ*, keeping the sagittal sinus and cerebellar tentorium intact. Such manipulation allows the differentiation between possible intranatal cranio-cerebral trauma due to unassisted delivery and the one produced in the postnatal period.

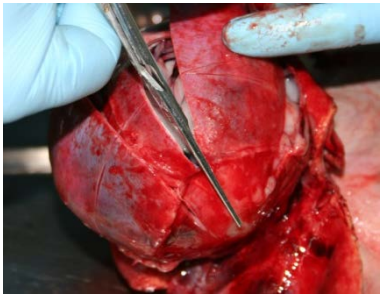

Fig. 11. **Skull bones cutting.**

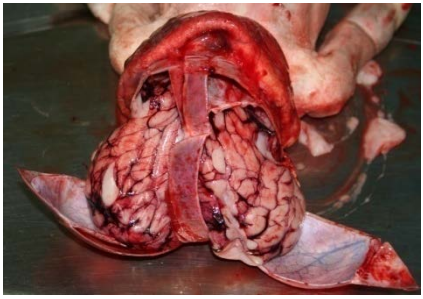

Fig.12. **Opened skull.**

Skin sectioning is made along the midline, beginning with the lower lip, the mandibula is cut too. Two cm upper the umbilical ring the incision splits in two branches, oriented towards the middles of the inguinal ligaments: such a form allows a detailed study of the umbilical vessels. Soft tissues of the neck, chest and abdomen are examined thoroughly. The thymus is measured. The oral-cervical-thoracic-abdominal complex is extracted for hydrostatic pulmonary (Galen) and gastrointestinal (Breslau) docimasy. During cardiovascular system examination the interatrial septum (to detect its defect) and pulmonary artery (to assess the Botalo ductus arteriosus state) should be examined. The spine (especially its cervical segment) is examined: the spinal canal is opened, the spinal cord with its meninges are examined.

It is mandatory to collect fragments of umbilical cord, ring of reddening (amnio-cutaneous), placenta, caput succedaneum region and organs for histological examination. Blood samples should be collected for biological examination.

Fig. 13. **Body sectioning.**

Fig. 14. **Access to the distal epiphysis of the femur.**

Case studies

Case study Nr. 1

Answer the following questions and draw the proper conclusion:

1. Are there any signs of newborn cadaver, name them.
2. Is the newborn mature or not? Why?
3. Assess the gestational age.
4. Was the child born alive or not? Why?
5. Is the newborn viable or not? Why?
6. Are there any signs of the newborn care?
7. What is the cause of death in this case?

Case report:

The cadaver of a newborn wrapped in a white cloth was found at a dump on September 14, at about 8:00.

External examination:

The cadaver is wrapped in a white cloth, with blood spots. It is a male newborn cadaver with crown-heel length – 53 cm, weight – 3400 gr, head circumference – 34 cm. There are marks of dry blood on the face and chest, sebum is found out in the axillary and inguinal folds. The length of head hair is about 2 cm. The face is cyanotic. The eyes are closed. The cornea and conjunctives are with pin-point hemorrhages. On the lateral right surface of the neck, in the medium third, there are 3 bruises, which are round-shaped, bluish colored, with dimensions of 1×1; 1×0.7 and 1.2×1.5 cm, localized one by one. At the same level, on the posterior surface of the neck, an oval-shaped bruise is situated; its color is purplish, dimensions – 2×2 cm, associated with a crescent reddish abrasion, 1.0×0.2 cm in size, its surface is located below the adjacent skin. The umbilical cord is fresh, wet, it begins from the center of abdomen and its peripheral end is not regular. In the anal region the skin is covered with green colored meconium. During the examination of the distal epiphysis of femoral bone the diameter of ossification center is 0.6 cm.

Internal examination:

The soft tissue of the head in the frontal-temporal region is dark-red, gelatinous, 6×5 cm in size. Skull bones are intact. The brain and its membranes are plethoric, without hemorrhages. In neck muscles, on the

right lateral surface, in the middle region, dark-red hemorrhages, 3×1.5 cm in size, are revealed. The fracture of the big horn of the hyoid bone is revealed, it is associated with hemorrhages into adjacent muscles. The lungs are pale-red, elastic. They cover partially the heart and the thymus. Pin-point hemorrhages are found under the pleura. Pulmonary and gastro-intestinal hydrostatic tests are positive. Malformations are not observed.

Histological examination of the lungs:

Most of the alveoli are opened and have the aspect of airy cavities; the alveolar walls are covered with flattened epithelium.

Case study Nr. 2

Answer the following questions and draw the proper conclusion:

1. Are there any signs of newborn cadaver, name them.
2. Is the newborn mature or not? Why?
3. Assess the gestational age.
4. Was the child born alive or not? Why?
5. Is the newborn viable or not? Why?
6. Are there any signs of the newborn care?
7. What is the cause of death in this case?

Case report:

The cadaver of a newborn wrapped in old newspapers was found in a building under construction.

External examination:

The cadaver is a male infant with crown-heel length – 52 cm, weight – 3100 gr, head circumference – 36 cm. A waxy yellowish-grey substance is found in natural folds and over the head. The length of head hair is about 2.5 cm. The face is pronouncedly cyanotic. The conjunctives are with pin-point hemorrhages. Two loops of umbilical cord wind round the neck. A pale ligature mark is revealed under the cord. The umbilical cord begins from the center of the abdomen, its length is 80 cm, the placenta is not detached and is partially present. The amnio-cutaneous region is without any changes. On the buttocks and thighs there are marks of dark-green meconium. Ossification centers are found out during the examination of the distal epiphyses of the femoral bones, they are pale-red in color, their diameter is 0.5 cm.

Internal examination:

The soft tissue of the head is without hemorrhages. The skull bones are intact. The brain and its membranes are plethoric, without malformations. The upper airways are not blocked. The lungs are rubbery and do not occupy the whole pleural cavities. Pin-point hemorrhages are revealed under the pleura. Both the whole lung and its fragments, being placed into water, sink. The stomach and small intestine sink, air bubbles do not appear on its opening under water. Malformations of internal organs are not observed.

Histological examination of the lungs:

Opened alveoli are not found in the lung tissue. The alveolar epithelium is of cubic form, elastic fibers in the alveolar walls are wavy. The fibers of the connective tissue are marked.

Case study Nr. 3

Answer the following questions and draw the proper conclusion:

1. Are there any signs of newborn cadaver, name them.
2. Is the newborn mature or not? Why?
3. Assess the gestational age.
4. Was the child born alive or not? Why?
5. Is the newborn viable or not? Why?
6. Are there any signs of the newborn care?
7. What is the cause of death in this case?
8. What are the signs to identify the mother?

Case report:

The cadaver of a male newborn wrapped in a towel was found near a building, on January, 22, in the morning.

External examination:

The cadaver is wrapped in a white cotton towel, soaked with blood. It is a male newborn cadaver, with crown-heel length – 49 cm, weight – 3100 gr, normostenic. The head circumference – 35 cm. The skin is pale-cyanotic, sebum is found on the ears, in the neck folds; there are marks of dry blood on the face and trunk. The head is oval-shaped, the length of head hair is about 3 cm. A swelling of soft tissue of 5×7.5 cm and pasty consistency is revealed in the left temporoparietal region. The nasal and mouth orifices are free. The nasal and ear cartilages are soft-

elastic. The thorax is symmetric. The umbilical cord is fresh, wet, pale-red at the place of insertion, without any changes. The placenta is not detached, on the uterine surface 2 cotyledons are absent.

Internal examination:

The soft tissue of the head is grey-yellowish. In the temporoparietal region it is dark-red, with gelatinous consistency. The lungs are colored white-rose, aerated, with mottled, doughy irregular surface. The pleura is thin, without hemorrhages. On slicing the lung tissue is of red color, homogenous, plethoric. Both the whole lung and its fragments, being placed into the water, float. The stomach and small intestine float, many air bubbles appear on its opening under water. Signs of putrefaction are absent.

Radiological examination of the lungs:

The lung fields are transparent, air is detected in the gastrointestinal tract.

Case study Nr. 4

Answer the following questions and draw the proper conclusion:

1. Are there any signs of newborn cadaver, name them.
2. Is the newborn mature or not? Why?
3. Assess the gestational age.
4. Was the child born alive or not? Why?
5. Is the newborn viable or not? Why?
6. Are there any signs of the newborn care?
7. What is the cause of death in this case?
8. How was the placenta removed?

Case report:

The cadaver of a newborn was found in a forest belt, near a village, on March, 13. The cadaver was wrapped in a blue sweatshirt.

External examination:

The cadaver is a male newborn, normostenic. Crown-heel length – 51 cm, weight – 3300 gr, head circumference – 34 cm. The skin is pale-violet, there are marks of dry blood on the head, back and lower limbs. Sebum is found on the neck, in the axillary fossa. The nasal and ear

cartilages are elastic. The nasal and mouth orifices are permeable. The ribs are intact on palpation. The umbilical cord begins in the middle between the xiphoid appendix and pubis, it is soft, wet; its free end edge is regular, oriented obliquely. The testes are palpable in the scrotum. On the posterior surfaces of thighs there are marks of dark-green meconium. Hand nails exceed distal ends of the fingers.

Internal examination:

The soft tissue of the head is without hemorrhages. The skull bones are intact. The brain and its membranes are plethoric. Hydrostatic docimasy is positive. The stomach and small intestine are empty. During the examination of the distal epiphysis of the femoral bone, the diameter of ossification center is 0.6 cm. No injuries are found during cadaver examination. Malformations of internal organs are not observed.

Histological examination of the lungs:

Most of the alveoli are opened and have the aspect of airy cavities; the alveolar walls are covered with flattened epithelium.

Case study Nr. 5

Answer the following questions and draw the proper conclusion:

1. Are there any signs of newborn cadaver, name them.
2. Is the newborn mature or not? Why?
3. Assess the gestational age.
4. Was the child born alive or not? Why?
5. Is the newborn viable or not? Why?
6. Are there any signs of the newborn care?
7. Are there any injuries in the cadaver, what is the mechanism of their production?
8. What is the cause of death in this case?

Case report:

The cadaver of a newborn was found in a basement of a high building.

External examination:

The cadaver is a female newborn, normostenic. Crown-heel length – 51 cm, weight – 3200 gr, head circumference – 34 cm. The head is

oval-shaped, the head hair is brown, its length is about 2.5 cm. There are no injuries on the scalp. The eyes are closed, without hemorrhages under the conjunctiva. The oral and nasal cavities and the external acoustic duct are free. The umbilical cord is fresh, wet; it begins from the center of the abdomen, its length is 30 cm, the peripheral end is not regular. The genital organs are normally developed. The vulvar labia close the vaginal opening. The skin in the anal region and medial surfaces of the thighs are covered with meconium. Hand and leg nails reach distal ends of the fingers. During the examination of the distal epiphyses of the femoral bone, the diameter of ossification center is 0.6 cm.

Internal examination:

The soft tissue of the head is red-greyish. A region of tumefaction and imbibition of soft tissue, 8×7 cm in size, is found in the right parietooccipital region. The skull bones are intact, normally developed. The dura mater is tensioned, plethoric, with an accumulation of 30 ml of liquid blood under it, which covers the whole right hemisphere. The cerebellar tentorium is ruptured at the right ponto-cerebellar angle. The length of the rupture is 0.9 cm; it is with irregular edges and soaked with blood. In the right parietooccipital region the whole pia mater is hemorrhagic. Both grey and white matters are flaccid and plethoric. The border between the matters is not clear. The brain ventricles contain a small quantity of transparent reddish liquid. The soft tissue of the neck and trunk are without hemorrhages. Malformations of internal organs are not observed.

Self-control tests

Match each question designated by number a right answer designated by letters (a), (b), (c), (d), (e):

1. Crown-heel length up to 30 cm
2. Nails slightly exceed distal ends of the fingers
3. Cor biloculare
4. Wet, glossy umbilical cord, without a ring of reddening
5. Cut, ligatured umbilical cord; newborn washed, nappy is put on
6. Sagittal sinus and cerebellar tentorium are ruptured
7. Diameter of Béclard ossification center is about 5-6 mm
8. Kidneys are absent
9. Testes are palpable in scrotum
10. Meconium is located in the large intestine

a) *newborn*
b) *mature newborn*
c) *non-viable newborn*
d) *signs of child care*
e) *intranatal death due to obstetrical trauma*

1. Breslau test is negative
2. Galen test is negative
3. Caput succedaneum is absent
4. Alveoli are collapsed, covered with cubic cells
5. Alveoli are expanded, covered with flattened cells
6. Umbilical cord is present

a) *an infant born alive*
b) *an infant born dead*
c) *in both cases*
d) *none of the above mentioned is correct*

Give a right answer according to the following code:

a) If it is true 1, 2, 3
b) If it is true 1, 3
c) If it is true 2, 4
d) If it is true 4
e) If it is true 1, 2, 3, 4

17. According to the Penal (Criminal) Code (art. 147), neonaticide is:
    1. *Murder of a 1-month-old child committed by his mother*
    2. *Murder of a newborn committed by his father*
    3. *Murder of a 7-days-old child committed by his mother*
    4. *Murder of a newborn child, committed by his mother during the birth or immediately after it*
18. Hydrostatic pulmonary docimasy will be positive in case of:
    1. *the infant was born alive*
    2. *putrefaction of the cadaver*
    3. *frozen lung*
    4. *artificial respiration*
19. Medico-legal autopsy of a newborn cadaver differs from that of an adult in mandatory performing of:
    1. *Hydrostatic tests*
    2. *Cadaver weighing*
    3. *Sagittal sinus and cerebellar tentorium examination*
    4. *Examination of the soft tissue of the back*
20. Commissive neonaticide could be committed by:
    1. *Thoracic-abdominal compression*
    2. *Severe craniocerebral trauma*
    3. *Some toxins administration*
    4. *Lack of necessary care*
21. Omissive neonaticide could be committed by:
    1. *Strangulation by hands or by ligature*
    2. *Abandonment at low air temperature*
    3. *Airway blocking by a foreign body*
    4. *Lack of necessary care*

The following tests are composed of two affirmations (sentences) connected by the conjunction "<u>because</u>". Define if each of these affirmations is correct or not and whether the causal relationship exists between. Give a single answer resulted from the below code:

Answer	1st affirmation	2nd affirmation	relationship
A	Correct	Correct	Correct
B	Correct	Correct	Incorrect
C	Correct	Incorrect	Incorrect
D	Incorrect	Correct	Incorrect
E	Incorrect	Incorrect	Incorrect

22. Hydrostatic pulmonary docimasy is always positive because positive result (except false positive) is conditioned by lung aeration.
23. Béclard ossification center examination in newborn cadavers is not compulsory because ossification centers develop at the end of the first year of extrauterine life.
24. During the autopsy of newborn cadavers the sagittal sinus and cerebellar tentorium should remain intact because its damage during the autopsy will exclude the possibility of differentiation between obstetrical craniocerebral trauma and non-obstetrical one after birth.
25. Anthropometrical measurements (weight, crown-heel length etc.) during medico-legal examination of newborn cadavers are obligatory, because a medico-legal expert should conclude if the infant was born alive or dead.

Choose only one correct answer from the given below:

26. In legal medicine a newborn baby is considered a child, who lived after birth:
    a) *One week*
    b) *Up to 24 hours*
    c) *Up to 72 hours*
    d) *One month*
    e) *Up to 48 hours*
27. The principal sign, which indicates that the infant is a newborn is:
    a) *Presence of caput succedaneum*
    b) *Vernix caseosa coating the skin*
    c) *Presence of meconium in the large intestine*
    d) *Wet, glossy umbilical cord, without a ring of reddening*
    e) *Presence of maternal blood on the fetal body*
28. Assessment of gestational age could be made based on:
    a) *Histological examination of the lungs*
    b) *Béclard ossification center examination*
    c) *Crown-heel length measurement*
    d) *Weighing*
    e) *All above-stated signs*

29. Assessment of extrauterine life could be made based on:
    a) *Umbilical cord state*
    b) *Air penetration into the stomach and intestine*
    c) *State of caput succedaneum and cephalohematoma*
    d) *Presence of meconium in the large intestine*
    e) *All above-stated signs*
30. All the following signs indicate separate existence of the infant, except:
    a) *Positive hydrostatic docimasy*
    b) *Positive Dillon test*
    c) *Lanugo present over the shoulders, around the ears and in the frontal region*
    d) *Umbilicus with a ring of reddening*
    e) *Expanded lungs with white-rose, mottled surface*

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