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LIST OF SYMBOLS, ABBREVIATIONS AND TERMS

ABS	acid-base state;
ALV	artificial lung ventilation;
BP	blood pressure;
CBV	circulating blood volume;
CHD	congenital heart disease
CNS	central nervous system;
CPAP	mode of constant positive pressure in the respiratory tract;
EBT	exchange blood transfusion;
ECG	echocardiography;
ETT	endotracheal tube;
FiO₂	inhaled oxygen fraction;
GA	gestational age;
Hb	hemoglobin;
HDN	hemorrhagic disease of newborns;
HR	heart rate
IHM	indirect heart massage;
IUI	intrauterine infection
IVH	intraventricular hemorrhage;
IPPV	mode of artificial lung ventilation with intermittent positive pressure;
MAP	mean airway pressure;
MBP	mean blood pressure;
NICU	neonatal intensive care unit;
NSG	neurosonography;
pCO₂	partial pressure of carbon dioxide in the blood;

PEEP	positive pressure at the end of exhalation;
PIP	airway pressure at the height of inspiration;
pO₂	partial pressure of oxygen in the blood;
RD	respiratory disorders
RDS	respiratory distress syndrome;
RF	respiratory failure;
RR	respiratory rate;
RT	respiratory tract;
Sa O₂	saturation of hemoglobin with oxygen in arterial blood, which is measured by pulse oximetry
VEBT	volume of exchange blood transfusion;
WHO	World Health Organization;

PREFACE

In the context of reforming the medical sector of Ukraine, practice-oriented training aimed at improving the quality and training of specialists who would receive not only theoretical knowledge but also significantly upgrade practical skills. The ultimate goal of training is the formation of clinical thinking, which allows the doctor to work independently in the specialty.

The textbook aims to help in mastering and increase the effectiveness of learning practical skills related to the organization of medical care for newborns. The highlighted algorithms are based on the approved standards of care and provision of medical care to newborns in Ukraine: "Primary, resuscitation and post-resuscitation care for newborns in Ukraine", "Protocol of care for a newborn child with respiratory disorders", "Protocol of medical care for a healthy newborn", "Protocol for medical care of a newborn child with low birth weight".

The use of algorithms during the examination, treatment and determination of tactical actions in various pathological conditions in newborns promotes the development of clinical thinking, discipline, full implementation of the necessary appointments, develops the independence of students.

The textbook is intended for students of higher medical educational institutions. It can also be useful for interns and paramedics.

1. ASSESSMENT OF THE CHILD'S ADAPTATION AFTER BIRTH

The early postpartum period is a time of significant physiological adaptation for both mother and child. First of all, the newborn must get used to life independent of the mother's body, maintaining oxygenation and metabolism at a certain level, this difficult task is performed over a period of time – from hours to days. For a successful transition from fetal to neonatal life requires a complex interaction between the following systems:

- Respiratory
- Cardiovascular
- Thermoregulation
- Immune.

The establishment of respiration is crucial for the transition of the newborn, because the lungs become a gas exchange organ only after the stop of maternal placental circulation. In more than 90% of newborns, this occurs without much difficulty and does not require external intervention (NRP, 2010). However, 10% of newborns need help, about 1% need large-scale resuscitation measures to survive. All staff caring for a newborn immediately after birth should have neonatal resuscitation skills.

2. PRIMARY MEDICAL EXAMINATION

Examination of a healthy newborn in the maternity ward is performed after the primary newborn care. The optimum temperature in the room – 24–26 ° C, the table should be heated, it is best to use a source of radiant heat. Providing these conditions allows you to 5 times reduce the energy expenditure of the newborn (from 100 to 20 calories per 1 kg of body weight per minute). It is desirable to examine the newborn in natural light to properly assess the color of the skin.

Primary medical examination of the newborn in the delivery room

Tasks of the primary medical examination:

1) to determine the presence or absence of congenital anomalies in the child, signs of infection, pathological conditions that require medical intervention.

2) assess the adaptation of the newborn.

3) to carry out a comprehensive assessment of the newborn's condition based on the results of the initial medical examination and taking into account the anamnesis data and to make appropriate appointments for further medical care.

Table 1

Indicators of adaptation that need to be determined during the initial medical examination

SIGNS	NORMAL LIMITS
Heart rate	100–160 in 1 minute
Respiration rate	30–60 in 1 minute
Skin color	Pink, no central cyanosis
Movements	Active
Muscle tone	Satisfactory
Body temperature	36.5–37.5° C

3. GENERAL MEDICAL EXAMINATION OF A NEWBORN

Scheme of primary medical examination of the newborn

The proportions of the newborn's body are characterized by a relatively large head with a predominance of the skull over the face, relatively short neck, chest, narrowed in the upper part and expanded in the lower, short lower extremities and long torso. The midpoint along the length of the body is located in the umbilical region, while in adults – at the level of the pubic joint.

1. Skin color: Reflects the effectiveness of early cardiorespiratory adaptation. In healthy newborns, the skin is pink (physiological erythema of newborns). During screaming, the skin may become slightly cyanotic in color. At a palpation the skin is elastic, can be covered with patrimonial greasing. Full-term newborns have a satisfactory soft tissue turgor, and babies born on a late pregnancy term have dry and flaky skin that does not require treatment. It is necessary to pay attention to the presence of milia, mongoloid spots, toxic erythema that do not require treatment.

The presence of jaundice at birth or its appearance on the first day is a sign of pathology. Determine the presence of edema, palpate the lymph nodes. The symptom of a “white spot” is checked: at the healthy child after pressing on a skin over a breast within 5 s the spot disappears in 3 s. Preservation of the stain for more than 3 s indicates a violation of microcirculation.

2. Head and skull: the shape of the head can be brachycephalic, dolichocephalic. The normal circumference of the head (10-90 percentiles) in full-term newborns is 33–38 cm. In the presence of a birth tumor or cephalohematoma, it is necessary to note the size, indicating the boundaries, consistency. Determine the size and condition of the large and small fontanelles (if they are present). Assess the condition of the cranial sutures: the sagittal suture can be open and its width is not more than 3 mm. Other cranial sutures are palpated at the junction of the bones.

3. Face: the general appearance is characterized according to the position of the mouth, nose, eyes, determine the signs of dysmorphia.

Examine the child on a changing table or in an incubator. When examining a child in the crib there are difficulties in assessing a number of physiological reflexes. The doctor’s hands should be warm, otherwise contact with the child will be broken, which will complicate the examination process.

4. Oral cavity: evaluate the color of the mucosa, symmetry of the mouth corners, integrity of the upper lip and palate.

5. Eyes: pay attention to the presence or absence of developmental abnormalities and hemorrhages in the sclera, scleral color, symmetry and pupils size, possible manifestations of conjunctivitis.

6. External hearing organs: examine the external auditory canal, assess the shape and location of the earlobes. Changes in the shape and location of the auricles are associated with numerous dysmorphic syndromes.

7. Nose: pay attention to the shape of the nose.

8. Neck: pay attention to the presence or absence of crooked neck, neck folds.

9. Chest: normally has a cylindrical shape. The lower aperture is opened, the position of the ribs is symmetrical and close to horizontal.

10. Lungs: pay attention to the absence or presence of retractions of jugular foramen, intercostal spaces, xiphoid process during respiration. During auscultation over the lungs, symmetrical vesicular respiration is normally heard.

11. Heart: listen to the child's heart, assessing the nature of the tones, the presence of additional noise.

12. Abdomen: rounded, involved in the act of breathing, soft, accessible to deep palpation. The lower border of the liver and spleen is determined by palpation. Normally, the liver can protrude 1.0–2.0 cm from the edge of the costal arch. The edge of the spleen is not palpable or can be palpated under the costal arch without protruding below it.

13. Genitals and vagina (anus): The genitals must be clearly formed by female or male type. In boys, the presence of phimosis is physiological. Testicles in full-term newborns are palpated in the scrotum. In full-term girls, large labia cover small ones. Determine the presence of the anus.

14. Inguinal area: determine the presence and symmetry of pulsation in the femoral arteries. A decrease in pulse filling may indicate coarctation of the aorta, and an increase in an open ductus arteriosus.

15. Limbs, spine, joints: pay attention to the shape of the limbs, possible clubfoot, the number of fingers on both sides of the hands and feet. Check the absence of dislocation and dysplasia of the thighs in the hip joints: when raising the legs in the hip joints - the dilution is complete, the symptom of "clicking" is absent. Examining the back, pay attention to the possible presence of spinal hernia, dermal sinuses.

16. Neurological examination: determine muscle tone – posture of child is flexor, during ventral suspension, the head is on the midline with the torso; check physiological reflexes: search, sucking, palmar-oral (Babkin's), grasping, Moro. Search, sucking and swallowing reflexes are assessed during breastfeeding.

Healthy full-term infants with body weight between the 10 th and 90th percentiles do not need the determination of gestational age using postnatal methods.

Indications for postnatal determination of gestational age are low body weight and inconsistency of physical development with gestational age, determined by an obstetrician-gynecologist.

4. NEUROLOGICAL EXAMINATION OF A NEWBORN CHILD

Careful assessment of neurological status is a mandatory part of the examination of newborn. The face of a healthy full-term newborn baby is calm, facial expressions are lively. At pathology the facial expression is dissatisfied, painful, unemotional.

Sociability is one of the criteria for assessing a child's condition. Assess sociability in the complex of behavioral reactions of the newborn to the voice, face, touch of the doctor, based on eye contact, changes in facial expression, changes in the nature of the cry, as well as the reaction of dissatisfaction in the presence of discomfort (forced awakening, hunger, wet diapers, etc.), speed of calming while eliminating irritants. In response to a light stimulus, the child closes his eyelids more closely (if eyes are closed) or squints (if eyes are open). Sometimes in newborns in the first days of life there is a fixation of the gaze on a bright object and even short-term monitoring of its movement. With auditory stimulation (loud sound), the newborn closes his eyes, and often he even has a generalized reaction of resuscitation with a spontaneous Moro reflex.

The newborn's cry is assessed by emotionality, intensity, duration and modulation. The beginning of the examination is often accompanied by a loud shout. Emotional crying occurs in response to abrupt changes in the environment (unfolding, examination, painful irritation) and is characterized by short-lived, dynamic and adequate modulations in response to a gentle voice, stroking, changing position and taking hands. Frequency of infant crying response is in the range of 400–650 Hz. A cry with a frequency of 800–1200 Hz and increasing-decreasing modulation indicates the presence of pain in the child. A weak cry or its absence should always be the reason of concern for the doctor. In full-term infants, aphonia may be the result of intracerebral hemorrhage, intrauterine infections, somatic disease. Weak and unemotional crying may be with hypoglycemia. Irritated (brain) cry accompanies intracerebral hemorrhage, increased intracranial pressure of another genesis, pain. Monotonous (non-emotional) shade of crying occurs in congenital hydrocephalus and bilirubin encephalopathy, hypoglycemia. A hoarse cry indicates damage to the caudal group of cranial nerves (more often the conductive pathways than the nuclei) or the supranuclear fibers

associated with these nuclei. High-frequency crying is characteristic of hypomagnesemia and hypocalcemia. The duration of the cry in a healthy child is adequate to the action of the stimulus (hunger, tactile or painful stimuli); soon after its elimination the cry stops (emotional cry). In hyperexcitability syndrome and intracranial hypertension, this relationship is absent. Features of the newborn's cry can contribute to the diagnosis of some hereditary diseases (cat's cry syndrome, Down's disease, etc.).

Motor activity. In healthy full-term newborns, movements are excessive, uncoordinated, athetosis-like. Peculiarities of motor activity are associated with the predominance of the pallidar system and insufficient myelination. In sick newborns, motor activity (both spontaneous and in response to stimuli) is often altered. Weakening of motor activity is a manifestation of CNS damage or somatic diseases, it can occur both on the background of low muscle tone and with its significant increase (stiffness of movements).

Spontaneous motor activity in healthy newborns is manifested by periodic flexion and extension of the legs, their intersection, repulsion from the support (in the abdominal position repulsion of the legs from the doctor's palm when touching the child's feet – Bauer crawling reflex), hand movements at chest level in the shoulders and radial wrist joints with compression of the hands. The presence of a choreatic component in movements is a consequence of the predominance of extrapyramidal regulation of motility. Increased spontaneous motor activity (hyperexcitability) in newborns is associated with a lack of control of the upper (cortical) part of the motor analyzer.

At inspection it is possible to note the following signs of the ***increased neuroreflex excitability***:

1. Tremor (periodic, defined amplitude and frequency of oscillating movements around a fixed axis). Small-scale tremor of the hands and lower jaw, which occurs when a child cries or worries in the first 3 days of life, is usually not a sign of CNS damage. Prolonged tremor of the extremities at rest, especially in the presence of other pathological symptoms, even in the first days of life should be regarded as a manifestation of hyperexcitability syndrome. Large-scale tremor in newborns is less common, it is characteristic of bilirubin encephalopathy. Prolonged

tremor and intermittent crying may be an unfavorable prognostic sign of hyperkinetic forms of cerebral palsy (CP).

2. Seizures in newborns are involuntary muscle contractions that are associated with pathological processes in the CNS. Muscle contraction occurs suddenly, seizures and has a different duration. Seizures are divided into clonic and tonic. Clonic convulsions – rapid muscle contractions that follow one another over a short period of time and are the evidence of a violation of the cerebral cortex. Tightening of the facial muscles is characteristic. Then the spasm spreads to the extremities, breathing becomes noisy, there may be foam on the lips. There is a rapid heartbeat and pale skin. Prolonged muscle contractions are characteristic of tonic cramps. This occurs when the subcortical structures of the brain are affected. Reductions may be primary or develop after clonic seizures. At tonic spasms – the child the head is thrown back, jaws are closed, hands are bent in elbows and hands. Breathing and pulse are slowed. Small cramps are expressed by trembling or blinking of the eyes, twitching of the facial muscles, limbs.

Seizures can occur with intracranial birth trauma, hypoxic brain damage (as a consequence of edema and metabolic disorders), IUI (as a consequence of meningoencephalitis), toxic lesions of the brain nuclei by free bilirubin (kernicterus), metabolic disorders (metabolic disorders), hypocalcemia).

Muscle tone. For newborns is characterized by a physiological increase in the tone of the flexor muscles (flexor posture), which determines the child's posture: the head is slightly brought to the chest, arms bent at the elbows and pressed to the side of the chest, hands clenched into fists, legs bent at the knees and hip joints. In the position of the child on the side, the head is sometimes slightly tilted back. There are active (posture) and passive muscle tone. Active muscle tone in a healthy full-term newborn is described as an embryonic posture (arms bent at all joints, brought to the torso, hands clenched into fists, thumbs lying under four others, legs set aside at the hip joints, bent, at the feet bent). Active muscle tone is also assessed on the basis of a test with ventral support.

Approximate indicators of normal passive muscle tone: when the head moves towards the chin, it touches the acromial process of the sternum; extension of the arms at the elbows is possible up to 180 °; hip