RESUSCITATION AND POST RESUSCITATION CARE FOR NEWBORN IN THE DELIVERY ROOM

Learning guide
for the 5th and 6th year students, trainee physicians, paediatricians, neonatologists, general practitioners

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
Харківський національний медичний університет

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РЕАНІМАЦІЙНА ТА ПІСЛЯРЕАНІМАЦІЙНА ДОПОМОГА НОВОНАРОДЖЕНИМ У ПОЛОГОВІЙ ЗАЛІ

Методичні вказівки
для здобувачів вищої освіти 5–6-х курсів за спеціальністю «Медицина», лікарів-інтернів, лікарів-педіатрів, лікарів-неонатологів, лікарів загальної практики – сімейної медицини

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INTRODUCTION

According to the data of the World Health Organization (WHO), about 5–10 % of all newborns in the world require at least partial medical care in the delivery room, from 1 % to 10 % require emergency artificial ventilation (VLV), and approximately 1 % – complete resuscitation, which includes respiratory support, indirect cardiac massage or administration of drugs. Thus, according to the results of statistical studies, 10 % of children born in the United States require any medical interventions in the delivery room, and 1 % of them require extended resuscitation measures during childbirth. Providing adequate resuscitation care to newborns in the first minutes of life can reduce their mortality and/or morbidity by 6–42 %. The timeliness and quality of the initial resuscitation measures in the delivery room largely depends on the result of not only the early postnatal adaptation of the newborn baby, but it also affects the further development and health indicators of the person in the following age periods.

RISK FACTORS OF THE NEED FOR NEONATAL RESUSCITATION MEASURES

Prediction of indications for resuscitation of a newborn is the basis for careful monitoring of the condition of the fetus during childbirth. During each birth, you must be ready to immediately provide resuscitation care to the newborn.

The need for resuscitation of a newborn cannot always be predicted, but the presence of risk factors in the anamnesis of each pregnant woman should be assessed, since high-risk births increase the probability of full resuscitation of the newborn. Antenatal and intranatal risk factors for the need for resuscitation measures for newborns are identified.

Prenatal factors:

– Mother's diabetes
– Hypertension of pregnant women
– Chronic hypertensive disease
– Anemia or fetal isoimmunization
– Death of a fetus or newborn in the anamnesis
– Bleeding in the second or third trimester of pregnancy
– Maternal infection
– Mother's heart/kidney/lung/neurological pathology or thyroid disease
– High water/Low water
– Premature rupture of fetal membranes
– Dropsy of the fetus
– Postponed pregnancy
– Multiple pregnancy
– Inconsistency of the size of the fetus with the term of pregnancy
– Treatment of the mother with the use of magnesium sulfate, adrenoblockers

– Mother's drug addiction
– Anomalies of fetal development
– Decreased fetal activity
– Lack of prenatal medical supervision
– Mother's age: < 16 years or > 35 years

Intranatal factors:

– Emergency caesarean section
– Application of forceps or vacuum extraction of the fetus
– Pelvic or other abnormal presentation of the fetus
– Premature birth
– Induced/rapid labor
– Chorioamnionitis
– Long dry period (> 18 hours)
– Long first period of labor (> 24 hours)
– Prolonged second stage of labor (> 2 hours)
– Macrosomia
– Persistent bradycardia or other threatening nature of the fetal heart rhythm
– Use of anesthesia
– Uterine hyperstimulation
– Prescribing narcotic analgesics to the mother within 4 hours before the birth of the child
– Meconium contamination of amniotic fluid
– Prolapse of the umbilical cord
– Detachment of the placenta
– Placenta previa
– Significant bleeding during childbirth

Key messages from these guidelines are summarised in *Fig. 1*.

BEFORE CARRYING OUT RESUSCITATION MEASURES IN THE DELIVERY ROOM, THE FOLLOWING STEPS MUST BE PERFORMED:

1. Provide for the need for resuscitation, taking into account existing risk factors for the need for resuscitation measures.

2. Prepare the maternity room: prepare a resuscitation table to assist the newborn; ensure the room temperature is not lower than 25°C; prepare and warm the diapers.

3. Prepare equipment: for each birth, it is recommended to prepare 2 sets of equipment and materials - for initial and full resuscitation; in case of multiple pregnancy, both sets are prepared for each child; check the operation of the equipment; ensure the presence of medical personnel who fully possess the necessary skills in carrying out resuscitation measures for a newborn child.

Fig. 1. NLS (Neonatal Life Support) infographic

EQUIPMENT AND ENVIRONMENT

- All equipment must be regularly checked and ready for use.
- Where possible, the environment and equipment should be prepared in advance of the delivery of the infant. Checklists facilitate these tasks.
- Resuscitation should take place in a warm, well-illuminated, draught-free area with a flat resuscitation surface and a radiant heater (if available).
- Equipment to monitor the condition of the infant and to support ventilation should be immediately available.
- Additional equipment, that might be required in case of more prolonged resuscitation should be easily accessible.

TEMPERATURE CONTROL

Recommendations.

Standards

− The infant's temperature should be regularly monitored after birth and the admission temperature should be recorded as a prognostic and quality indicator.

− The temperature of newborn infants should be maintained between 36.5 °C and 37.5 °C.

− Hypothermia (≤ 36.0 °C) and hyperthermia (> 38.0 °C) should be avoided. In appropriate circumstances, therapeutic hypothermia may be considered after resuscitation (see post-resuscitation care).

Environment

− Protect the infant from draughts. Ensure windows are closed and air-conditioning appropriately programmed.

− Keep the environment in which the infant is looked after (e.g. delivery room or theatre) warm at 23–25 °C.

− For infants ≤ 28 weeks gestation the delivery room or theatre temperature should be > 25 °C.

Term and near-term infants >32 weeks gestation

− Dry the infant immediately after delivery. Cover the head and body of the infant, apart from the face, with a warm and dry towel to prevent further heat loss.

− If no resuscitation is required place the infant skin-to-skin with mother and cover both with a towel. On-going careful observation of mother and infant will be required especially in more preterm and growth restricted infants to ensure they both remain normothermic.

− If the infant needs support with transition or when resuscitation is required, place the infant on a warm surface using a preheated radiant warmer.

Preterm infants ≤32 weeks gestation

− Completely cover with polyethylene wrapping (apart from face) without drying and use a radiant warmer.

− If umbilical cord clamping is delayed and a radiant warmer is not accessible at this point, other measures (such as those listed below) will be needed to ensure thermal stability while still attached to the placenta.

− A combination of further interventions may be required in infants ≤32 weeks including increased room temperature, warm blankets, head cap and thermal mattress.

− Skin-to-skin care is feasible in less mature infants however caution is required in the more preterm or growth restricted infant in order to avoid hypothermia.

− For infants receiving respiratory support, use of warmed humidified respiratory gases should be considered.

− A quality improvement program including the use of checklists and continuous feedback to the team has been shown to significantly reduce hypothermia at admission in very preterm infants.

INITIAL ASSESSMENT (*Fig. 2*)

May occur before the umbilical cord is clamped and cut (typically performed in this order):

− Observe Tone (& Colour)
− Assess adequacy of **Breathing**
− Assess the **Heart Rate**
− Take appropriate action to keep the baby warm during these initial steps.
− This rapid assessment serves to establish a baseline, identify the need for support and/or resuscitation and the appropriateness and duration of delaying umbilical cord clamping.
− Frequent re-assessment of heart rate and breathing indicates whether the infant is adequately transitioning or whether further interventions are needed.

Fig. 2. Assessment of tone, breathing and heart rate help determine the need for intervention

Tactile stimulation

Initial handling is an opportunity to stimulate the infant during assessment by

− Drying the infant.
− Gently stimulating the infant as you dry them, for example by rubbing the soles of the feet or the back of the chest.

Tone and colour

− A very floppy infant is likely to need ventilatory support.
− Colour is a poor means of judging oxygenation. Cyanosis can be difficult to recognise. Pallor might indicate shock or rarely hypovolaemia – consider blood loss and plan appropriate intervention.

Breathing

Is the infant breathing? Note the rate, depth and symmetry, work/effort of breathing as

− Adequate
− Inadequate/abnormal pattern – such as gasping or grunting
− Absent

Heart rate

Determine the heart rate with a stethoscope and a saturation monitor ± ECG (electrocardiogram) for later continuous assessment.

- Fast (≥ 100 min^{-1}) – satisfactory
- Slow (60–100 min^{-1}) – intermediate, possible hypoxia
- Very slow/absent (< 60 min^{-1}) – critical, hypoxia likely

If the infant fails to establish spontaneous and effective breathing following assessment and stimulation, and/or the heart rate does not increase (and/or decreases) if initially fast, respiratory support should be started.

Classification according to initial assessment

On the basis of the initial assessment, the infant can usually be placed into one of three groups as the following examples illustrate.

1.

- Good tone
- Vigorous breathing or crying
- Heart rate – fast (≥ 100 min^{-1})

Assessment: *Satisfactory transition* – Breathing does not require support. Heart rate is acceptable (*Fig. 3a*).

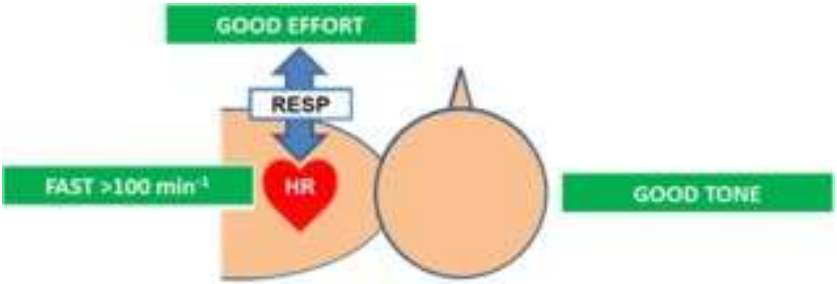

Fig. 3a. Satisfactory transition

Actions:

- Delay cord clamping.
- Dry, wrap in warm towel.
- Keep with mother or carer and ensure maintenance of temperature.
- Consider early skin-to-skin care if stable.

2.

- Reduced tone
- Breathing inadequately (or apnoeic)
- Heart rate – slow (< 100 min^{-1})

Assessment: *Incomplete transition* – Breathing requires support, slow heart rate may indicate hypoxia (*Fig. 3b*).

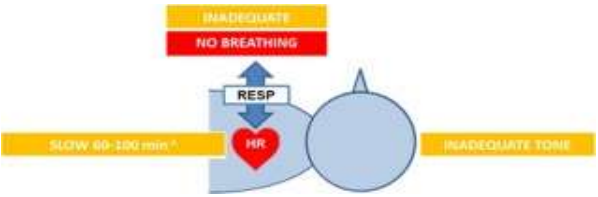

Fig. 3b. Incomplete transition

Actions:

- Delay cord clamping only if you are able to appropriately support the infant.
- Dry, stimulate, wrap in a warm towel.
- Maintain the airway, – lung inflation and ventilation.
- Continuously assess changes in heart rate and breathing
- If no improvement in heart rate, continue with ventilation.
- Help may be required.

3.

- Floppy ± Pale
- Breathing inadequately or apnoeic
- Heart rate – very slow (< 60 min^{-1}) or undetectable

Assessment: *Poor/Failed transition* – Breathing requires support, heart rate suggestive of significant hypoxia (*Fig. 3c*).

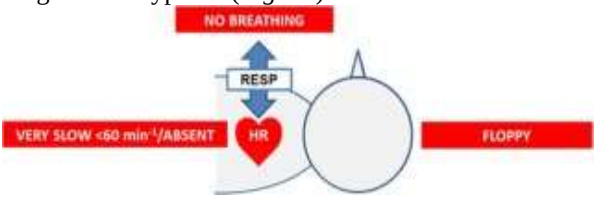

Fig. 3c. Poor/failed transition

Actions:

- Clamp cord immediately and transfer to the resuscitation platform. Delay cord clamping only if you are able to appropriately support/resuscitate the infant.
- Dry, stimulate, wrap in warm towel.
- Maintain the airway – lung inflation and ventilation.
- Continuously assess heart rate, breathing, and effect of ventilation.
- Continue newborn life support according to response.
- Help is likely to be required.

Preterm infants

- Same principles apply.
- Consider alternative/additional methods for thermal care e.g. polyethylene wrap.

− Gently support, initially with CPAP if breathing.
− Consider continuous rather than intermittent monitoring (pulse oximetry ± ECG).

NEWBORN LIFE SUPPORT

Following initial assessment and intervention, continue respiratory support if:
− The infant has not established adequate, regular breathing, or
− The heart rate is < 100 min^{-1}.

Ensuring an open airway, aerating and ventilating the lungs is usually all that is necessary. Without these, other interventions will be unsuccessful.

Airway

Commence life support if initial assessment shows that the infant has not established adequate regular normal breathing, or has a heart rate < 100 min^{-1} (*Fig. 4*).

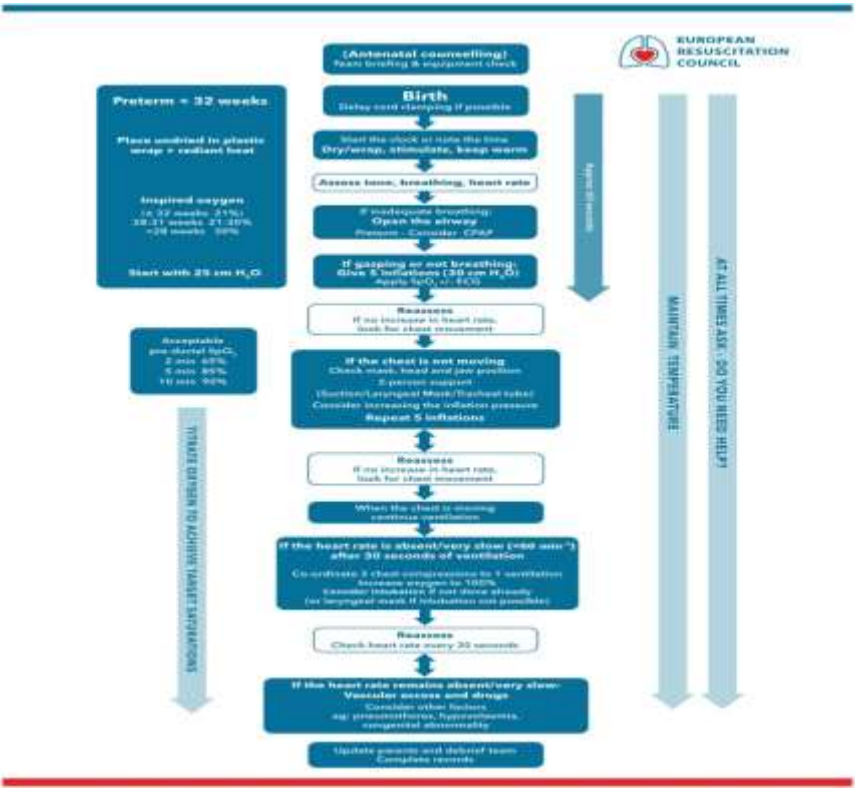

Fig. 4. NLS algorithm

Establishing and maintaining an open airway is essential to achieve postnatal transition and spontaneous breathing, or for further resuscitative actions to be effective.

Techniques to help open the airway

Place the infant on their back with the head supported in a neutral position (*Fig. 5a*).

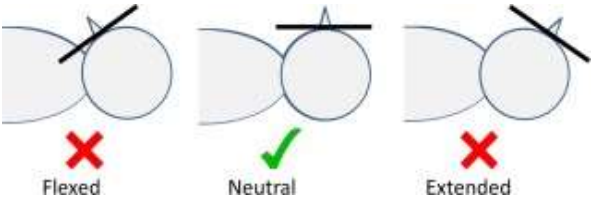

Fig. 5a. Head in a neutral position. Face is horizontal (middle picture), neither flexed (left) or extended (right)

− In floppy infants, pulling the jaw forwards (jaw lift) may be essential in opening and/or maintaining the airway and reducing mask leak (*Fig. 5b*). When using a facemask, two person methods of airway support are superior and permit true jaw thrust to be applied.

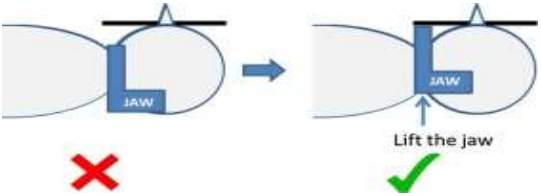

Fig. 5b. Jaw lift – jaw lift enlarges the pharyngeal space

− An oropharyngeal airway may be useful in term infants when having difficulty providing both jaw lift and ventilation, or where the upper airway is obstructed, for instance in those with micrognathia. However, oropharyngeal airways should be used with caution in infants ≤ 34 weeks gestation as they may increase airway obstruction.

− A nasopharyngeal airway may also be considered where there is difficulty maintaining an airway and mask support fails to achieve adequate aeration.

Airway obstruction

− Airway obstruction can be due to inappropriate positioning, decreased airway tone and/or laryngeal adduction, especially in preterm infants at birth.

− Suction is only required if airway obstruction due to mucus, vernix, meconium, blood clots, etc. is confirmed through inspection of the pharynx after failure to achieve aeration.

− Any suctioning should be undertaken under direct vision, ideally using a laryngoscope and a wide bore catheter.

Meconium

− Non-vigorous newborn infants delivered through meconium-stained amniotic fluid are at significant risk for requiring advanced resuscitation and a neonatal team competent in advanced resuscitation may be required.

− Routine suctioning of the airway of non-vigorous infants is likely to delay initiating ventilation and is not recommended. In the absence of evidence of benefit for suctioning, the emphasis must be on initiating ventilation as soon as possible in apnoeic or ineffectively breathing infants born through meconium-stained amniotic fluid.

− Should initial attempts at aeration and ventilation be unsuccessful then physical obstruction may be the cause. In this case inspection and suction under direct vision be considered. Rarely, an infant may require tracheal intubation and tracheal suctioning to relieve airway obstruction.

Initial inflations and assisted ventilation

Lung inflation (*Fig. 6*).

Fig. 6. Five 2–3 s inflations are given via facemask.
Assess heart rate response and chest movement

If apnoeic, gasping or not breathing effectively, aim to start positive pressure ventilation as soon as possible – ideally within 60s of birth.

− Apply an appropriately fitting facemask connected to a means of providing positive pressure ventilation, ensuring a good seal between mask and face.

− Give five "inflations" maintaining the inflation pressure for up to 2–3 s.

− Provide initial inflation pressures of 30 cm H_2O for term infants commencing with air. Start with 25 cm H_2O for preterm infants ≤ 32 weeks using 21–30 % inspired.

Assessment

Check the **heart rate**

− An increase (within 30 s) in heart rate, or a stable heart rate if initially high, confirms adequate ventilation/oxygenation.

− A slow or very slow heart rate usually suggests continued hypoxia and almost always indicates inadequate ventilation.

Check for **chest movement**

− Visible chest movement with inflations indicates a patent airway and delivered volume.

− Failure of the chest to move may indicate obstruction of the airway, or insufficient inflation pressure and delivered volume to aerate the lungs.

Ventilation (*Fig. 7*)

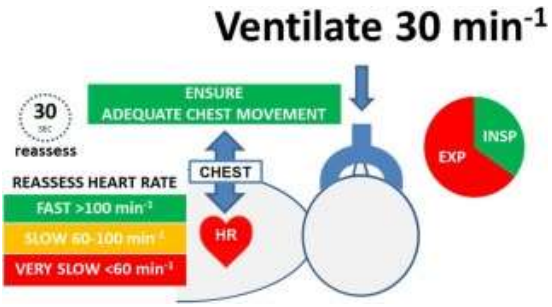

Fig. 7. Once inflation breaths have been successfully delivered, ventilate at 30 breaths min^{-1}. Assess heart rate continuously

If there is a heart rate response

Continue uninterrupted ventilation until the infant begins to breathe adequately and the heart rate is above 100 min^{-1}.

− Aim for about 30 breaths min^{-1} with an inflation time of under 1 s.

− Reduce the inflation pressure if the chest is moving well.

− Reassess heart rate and breathing at least every 30 s.

− Consider a more secure airway (laryngeal mask/tracheal tube) if apnoea continues or if mask ventilation is not effective.

Failure to respond

If there is *no* heart rate response *and* the chest is not moving with inflations

− Check if the equipment is working properly.

− Recheck the head-position and jaw lift/thrust

− Recheck mask size, position and seal.

− Consider other airway manoeuvres:

• 2-person mask support if single handed initially.

• Inspection of the pharynx and suction under direct vision to remove obstructing foreign matter if present.

• Securing the airway via tracheal intubation or insertion of a laryngeal mask.

• Insertion of an oropharyngeal/nasopharyngeal airway if unable to secure the airway with other means.

− Consider a gradual increase in inflation pressure.

− If being used, check on a respiratory function monitor that expired tidal volume is not too low or too high (target about 5–8 mL kg^{-1}).

Then:

- Repeat inflations.
- Continuously assess heart rate and chest movement.

If the insertion of a laryngeal mask or tracheal intubation is considered, it must be undertaken by personnel competent in the procedure with appropriate equipment. Otherwise continue with mask ventilation and call for help.

Without adequate lung aeration, chest compressions will be ineffective; therefore, where the heart rate remains very slow, confirm effective ventilation through observed chest movement or other measures of respiratory function before progressing to chest compressions.

NB! The most sensitive and, therefore, the most important criterion for the effectiveness of resuscitation measures at each stage is the increase in heart rate.

NB! The presence and adequacy of independent breathing is the main sign that determines the need to provide resuscitation care to a newborn.

Term and late preterm infants ≥ 35 weeks

In infants receiving respiratory support at birth, begin with air (21 %).

Preterm infants < 35 weeks

Resuscitation should be initiated in air or a low inspired oxygen concentration based on gestational age:

- ≥ 32 weeks – 21 %
- 28–31 weeks – 21–30 %
- < 28 weeks – 30%

In infants < 32 weeks gestation the target should be to avoid an oxygen saturation below 80% and/or bradycardia at 5 min of age. Both are associated with poor outcome.

Chest compressions

Assessment of the need for chest compressions (*Fig. 8*)

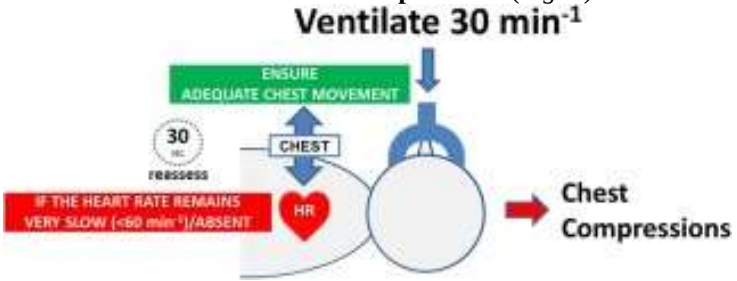

Fig. 8. Deliver 30 s of good quality ventilation before reassessment of the heart rate

If the heart rate remains very slow (< 60 min^{-1}) or absent after 30 s of good quality ventilation, start chest compressions.

When starting compressions:

- Increase the delivered inspired oxygen to 100%.
- Call for experienced help if not already summoned.

Delivery of chest compressions

- Use a synchronous technique, providing three compressions to one ventilation at about 15 cycles every 30 s.
- Use a two-handed technique for compressions if possible.
- Re-evaluate the response every 30 s.
- If the heart rate remains very slow or absent, continue ventilation and chest compressions but ensure that the airway is secured (e.g. intubate the trachea if competent and not done already).
- Titrate the delivered inspired oxygen against oxygen saturation if a reliable value is achieved on the pulse oximeter.

Consider

Vascular access and drugs.

Vascular access

During the resuscitation of a compromised infant at birth peripheral venous access is likely to be difficult and suboptimal for vasopressor administration.

Umbilical venous access

- The umbilical vein offers rapid vascular access in newborn infants and should be considered the primary method during resuscitation.
- Ensure a closed system to prevent air embolism during insertion should the infant gasp and generate sufficient negative pressure.
- Confirm position in a blood vessel through aspiration of blood prior to administering drugs/fluids.
- Clean, rather than sterile, access technique may be sufficient in an emergency.
- The umbilical route may still be achievable some days after birth and should be considered in cases of postnatal collapse.

Intraosseous access

- Intraosseous (IO) access can be an alternative method of emergency access for drugs/fluids.

DURING ACTIVE RESUSCITATION

If the HR remains below 60 min^{-1} despite adequate control of the airway, effective ventilation and chest compressions for 30 seconds, then consider:

Adrenaline:

When effective ventilation and chest compressions have failed to increase the heart rate above 60 min^{-1}

At a dose of 10–30 micrograms kg^{-1} (0.1–0.3 mL kg^{-1} of 1:10,000 adrenaline [1000 micrograms in 10 mL]).

Intra-tracheally if intubated and no other access available.

At a dose of 50–100 micrograms kg^{-1}.

Subsequent doses every 3–5 minutes if heart rate remains < 60 min^{-1}.

Glucose:

In a prolonged resuscitation to reduce likelihood of hypoglycaemia.

Intravenous or intraosseous: 250 mg kg^{-1} bolus (2.5 mL kg^{-1} of 10 % glucose solution).

Volume replacement

With suspected blood loss or shock unresponsive to other resuscitative measures.

Intravenous or intraosseous: 10 mL kg^{-1} of group O Rh-negative blood or isotonic crystalloid.

Sodium bicarbonate:

May be considered in a prolonged unresponsive resuscitation with adequate ventilation to reverse intracardiac acidosis.

Intravenous or intraosseous: 1–2 mmol kg^{-1} sodium bicarbonate (2–4 mL kg^{-1} of 4.2 % solution) by slow intravenous injection.

In situations of persistent apnoea

Naloxone

Intramuscular. An initial 200 microgram dose may help in the few infants who, despite resuscitation, remain apnoeic with good cardiac output when the mother is known to have received opioids in labour. Effects may be transient so continued monitoring of respiration is important.

ACTIONS IN CASE OF INEFFECTIVE RESUSCITATION

If the child's condition does not improve, despite timely and effective ventilation with 100 % oxygen, indirect cardiac massage, as well as the correct administration of medications, you should re-check the correctness of the basic resuscitation procedures and think about other possible reasons for the infant's unsatisfactory response to resuscitation, such as airway abnormalities, pneumothorax, diaphragmatic hernia, or congenital heart disease.

DISCONTINUING RESUSCITATION

When the heart rate has been undetectable for > 10 minutes after delivery, review: clinical factors (e.g. gestation, dysmorphic features), effectiveness of resuscitation, clinical team views about continuing resuscitation.

Stopping resuscitation should be discussed and occur if there has been no response after 20 minutes and reversible problems have been excluded.

Partial or incomplete heart rate improvement with resuscitative efforts makes treatment decisions more complex. It may be appropriate to take the infant to the intensive care unit and consider withdrawing life sustaining treatment if they do not improve.

POST-RESUSCITATION CARE

Infants who have required resuscitation may later deteriorate. Post resuscitation care should be in an environment in which close monitoring can be provided.

Care provided during the resuscitation should be accurately documented.

Glucose

Monitor glucose levels carefully after resuscitation.

Have protocols/guidance on the management of unstable glucose levels.

Avoid hyper- and hypoglycaemia.

Avoid large swings in glucose concentration.

Consider the use of a glucose infusion to avoid hypoglycaemia.

Thermal Care

Aim to keep the temperature between 36.5 °C and 37.5 °C.

Rewarm if the temperature falls below this level and there are no indications to consider therapeutic hypothermia (see below).

Therapeutic Hypothermia

Once resuscitated, consider inducing hypothermia to 33–34 °C in situations where there is clinical and/or biochemical evidence of significant risk of moderate or severe HIE (hypoxic-ischaemic encephalopathy).

Clearly document the evidence to justify treatment including cord blood gases and neurological examination.

Arrange safe transfer to a facility where monitoring and treatment can be continued.

Therapeutic hypothermia, without HIE, is likely to be harmful (see temperature maintenance).

Documentation and Prognosis

Ensure clinical records allow:

accurate retrospective evaluation of the clinical state of the infant at birth

documentation of interventions and response during the resuscitation

CONDITION STABILIZATION OF THE CHILD WHO DID NOT NEED RESUSCITATION

Measures apply to children who, after first aid, are adequately breathing on their own and have a heart rate ≥ 100 beats per minute (bpm).

Necessary actions:

1. Assess the presence of respiratory disorders or persistent central cyanosis.

2. If respiratory disorders, persistent central cyanosis are present, or gestational age is < 32 weeks:

• ensure the correct position of the newborn;

• release the airways (if this has not been done beforehand);

• prescribe CPAP if a child with respiratory disorders, persistent central cyanosis or gestational age < 32 weeks was born in an obstetrical hospital of the III level of perinatal care;

• prescribe a free flow of oxygen to a child with respiratory disorders or persistent (after 10 minutes of life) cyanosis (if it is not possible to apply CPAP);

• use the minimum oxygen concentration that ensures the achievement of the appropriate SpO2 indicator (see Appendix 1) or a change in the color of the skin, lips and mucous membranes to pink;

• transfer the child to the ward (department) of intensive therapy in compliance with the requirements of the "thermal chain", and then act in accordance with the requirements.

Babies with a gestational age of more than 34 weeks, who cry or breathe adequately after providing first aid, demonstrate satisfactory motor activity and do not have respiratory disorders, are returned to the mother's chest to complete physiological adaptation. They are provided with standard medical care for both healthy and low birth weight babies. However, such children need additional monitoring of vital functions. In particular, it is necessary to additionally make sure that such babies have no respiratory disorders within 3 consecutive hours after birth.

Desired actions: as soon as possible after birth, attach the pulse oximeter sensor to the child's right arm and prescribe CPAP.

NB! Assessment of the child's condition according to the Apgar scale is not used to determine the need for resuscitation, the moment of its implementation or the amount of resuscitation measures. This assessment characterizes the general condition of the newborn and the effectiveness of resuscitation measures.

SELF-MONITORING TESTS

1. Full-term newborn, body weight at birth 3 200 g. In the first minute, 5 points according to the Apgar scale. After drying and suctioning mucus, there is no independent breathing, heart activity is rhythmic, heart rate is 142 bpm. Which of the following method of tactile stimulation should be initiated in the delivery room?

A. Patting on the buttocks.

B. Patting or tapping on the soles of the feet.

C. Compression of the chest.

D. Bringing the hips to the abdomen.

E. Directing the flow of oxygen or air to the face or body

2. A newborn child is diagnosed with intranatal asphyxia. .When suctioning mucus from the upper respiratory tract, impurities of meconium are found in the contents. There is no independent breathing. Further action for the neonatologist involves which of the following:

A. Tactile stimulation of breathing.

B. External cardiac massage.

C. Application of 100 % oxygen.

D. Intubation of the trachea, rehabilitation of the respiratory tract.

E. Administration of adrenaline.

3. Which of the following medical drugs can be administered during resuscitation measures:

A. Prednisolone.
B. Cocarboxylase.
C. Epinephrine solution endotracheally or intravenously.
D. Euphilin.
E. Calcium gluconate.

4. Which of the following is the dosage of 0.1 % adrenaline hydrochloride for intravenous administration during resuscitation of newborns:

A. 0.8–0.9 ml/kg. *C. 0.4–0.5 ml/kg.* *E. 0.1–0.3 ml/kg.*
B. 6.1–6.2 ml/kg. *D. 0.5–1.0 ml/kg.*

5. If the heart rate of a newborn is 60 bpm. and there is no tendency for its growth:

A. Continue mechanical ventilation regardless of spontaneous breathing presence.
B. Continue mechanical ventilation and tactile stimulation.
C. Attach to the mother's breast.
D. Continue mechanical ventilation and begin closed cardiac massage.
E. Evaluate according to the Apgar scale.

6. A newborn weighing 4 000 g, height 54 cm, head circumference 34 cm, and chest circumference 33 cm, presents with generalized cyanosis of the skin, muscle hypotonia, contamination of amniotic fluid with meconium during childbirth. After separation from the mother, the child is placed under a source of radiant heat. Primary actions for the neonatologist include which of the following:

A. Free flow oxygen therapy. *D. Indirect cardiac massage.*
B. Suction of tracheal contents. *E. Direct cardiac massage.*
C. Suction of nasopharynx contents.

7. After suctioning mucus from the oral cavity and nasal passages and tactile stimulation, the newborn is unable to breathe independently. The following actions for the neonatologist include:

A. To estimate heart rate.
B. Assess skin color.
C. Insert the probe into the stomach and aspirate its contents.
D. Begin bag and mask ventilation.
E. Intubate the trachea.

8. What is considered the main principle of neonatal resuscitation in the delivery room:

A. Stimulation of cardiac and respiratory activity.
B. Medicinal correction of metabolic disorders.
C. Respiratory support.
D. Post-syndromic therapy.
E. Maintenance of heat balance.

9. Which of the following is the most important and effective measure for a newborn who requires resuscitation:

A. Give oxygen.
B. Conduct an indirect cardiac massage.
C. Provide lung ventilation.
D. Administer adrenaline.
E. Maintain the thermal chain.

10. In what case is the administration of adrenaline indicated during primary neonatal resuscitation:

A. Heart rate is less than 100 bpm after 30 seconds of indirect cardiac massage and mechanical ventilation.
B. Heart rate is less than 100 bpm at birth.
C. Heart rate is less than 100 bpm after 30 seconds of mechanical ventilation.
D. Heart rate is less than 60 bpm after 90 seconds of indirect cardiac massage and mechanical ventilation.
E. Heart rate is less than 60 bpm after 30 seconds of indirect cardiac massage and mechanical ventilation.

Answers:

1	2	3	4	5	6	7	8	9	10
B	*D*	*C*	*E*	*D*	*B*	*D*	*A*	*C*	*E*

SITUATIONAL PROBLEMS

Problem № 1

After the birth, a full-term newborn has no breathing, bradycardia is present, heart rate is 62. Tones of the heart are deaf. The skin is pale cyanotic. There is amniotic fluid in the oropharynx.

1. Your presumptive diagnosis.
2. Plan of resuscitation measures.

Answer to problem № 1

1. Diagnosis: Aspiration with amniotic fluid.
2. Sanitation of the upper respiratory tract in the absence if it is not possible to provide effective ventilation. Attach a pulse oximeter to the right arm and measure saturation, give oxygen through the Neopuff system or an Ambu bag. If, 30 seconds after the measures have been taken, the heart rate increases, the saturation increases, the color of the skin improves, then the child is transferred to the intensive care unit for further treatment and observation. If the heart rate does not increase after these measures, it is necessary to start an indirect cardiac massage. Every 30 seconds, evaluate the dynamics. If after 30 seconds there is no improvement, it is necessary to apply adrenaline intravenously or endotracheally, then enter a physiological solution if hypovolemia is present.

Problem № 2

The child was born from the 1st pregnancy with nephropathy of the 2nd degree, and the 1st protracted emergency delivery with a gestation period of 37 weeks. Amniotic fluid is contaminated with miconium. The score on the Apgar scale is 5–7 points. From birth, the child's breathing is arrhythmic with a slight contraction of the intercostal spaces. 4-5 points according to the Downes scale. During the first feeding, the child had an attack of secondary asphyxia. Fluid is released from the nose and mouth. During auscultation, wet rales of various caliber are heard in the lungs – their number has decreased sharply after suctioning the respiratory tract contents.

1. What is your diagnosis?
2. Specify the main emergency measures.

Answer to problem № 2

1. Meconium aspiration syndrome.
2. Intubation of the trachea, ventilation of the lungs with positive pressure (CPAP), if necessary, the respiratory tract sanitation through an intubation tube; toilet of the upper respiratory tract. Control of breathing rate, heart rate, skin color, blood saturation. Continuation of mechanical ventilation, transfer to the intensive care unit.

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Навчальне видання

РЕАНІМАЦІЙНА ТА ПІСЛЯРЕАНІМАЦІЙНА ДОПОМОГА НОВОНАРОДЖЕНИМ У ПОЛОГОВІЙ ЗАЛІ

Методичні вказівки для здобувачів вищої освіти 5–6-х курсів за спеціальністю «Медицина», лікарів-інтернів, лікарів-педіатрів, лікарів-неонатологів, лікарів загальної практики – сімейної медицини

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