

Ministry of Health of Ukraine
O.O. Bogomolets National Medical University

GUIDELINES
to practical classes for students

Academic discipline: Basics of neonatology

Field of knowledge: 22 "Health care"

Specialty: 222 "Medicine", 228 "Pediatrics"

Department of Pediatrics No. 2

Approved at the meeting of the department
from protocol № 1 dated 28.08.2023

Reviewed and approved by: Center for Pediatric Disciplines
from protocol № 1 dated 28.08.2023

Lesson topic : Neonatal problems of the urinary system.

Competencies :

- carry out an assessment of the general condition of a newborn child by making a reasoned decision according to existing algorithms and standard schemes, observing the relevant ethical and legal norms;
- distinguish and identify leading clinical symptoms and syndromes (edema syndrome, oliguria, polyuria);
- according to standard methods, using the previous data of the patient's history, the data of the patient's examination, knowledge about the person, his organs and systems, establish a preliminary clinical diagnosis of the disease (abnormalities of the development of the urinary system, infections of the urinary system, acute kidney damage);
- collect obstetric anamnesis, evaluate the physical development of a premature baby, the state of organs and systems of the body, based on the results of laboratory and instrumental studies, evaluate information about the diagnosis (general analysis of blood, urine, blood proteins, blood glucose, bilirubin and its fractions, electrolytes, radiography organs of the thoracic and abdominal cavity, ultrasound of the kidneys);
- establish a final clinical diagnosis by making a reasoned decision and analyzing the obtained objective data of clinical, additional examination, carrying out differential diagnosis, observing the relevant ethical and legal norms;
- determine tactics and provide emergency medical care in emergency situations (acute kidney damage) in accordance with existing clinical protocols and treatment standards;
- perform medical manipulations (artificial lung ventilation, indirect heart massage).

Goal:

Formation of professional competences; achievement of program learning outcomes in the process of discussing the topic and performing independent work on the topic; mastering practical skills and methods of providing emergency care.

Equipment: newborn baby manikin, ventilator and oxygen therapy kit, resuscitation bag and face mask size "1", equipment for airway sanitation (rubber pears), umbilical vein catheterization kit (scalpel, ligature, tweezers, umbilical catheter, syringe for injections), neonatal stethoscope, pulse oximeter, diapers, disposable gloves, antiseptic for hand treatment.

Lesson plan and organizational structure

The name of the stage	Description of the stage	Levels of assimilation	Time
Preparatory	<i>Organizational issues</i> <i>Learning motivation:</i> Diseases of the urinary system in children in the neonatal period often have a latent course, without obvious clinical manifestations or with nonspecific symptoms. Untimely detection of this pathology can lead to the development of acute kidney damage, which, in turn, can be the cause of the formation of chronic kidney disease or death. Early diagnosis increases the effectiveness of treatment of diseases of the urinary system, thereby contributing to the reduction of neonatal and child morbidity and mortality. <i>Control of the initial level of knowledge (test control and oral survey):</i> 1. A possible cause of moderate persistent proteinuria in a newborn: A. Kidney injury B. Nephrotic syndrome B. Kidney tumor D. Polycystic kidneys D. Prematurity or low birth weight. 2. Probable cause of hematuria in a newborn: A. Dehydration B. Hypothermia B. Heart failure G. Nephrotic syndrome D. Coagulopathy. 3. The cause of leukocyturia in a newborn: A. Kidney tumor B. Hydronephrosis B. Kidney injury G. Thrombosis of renal vessels D. Severe asphyxia. 4. Nephrotoxic effect of indomethacin: A. Crystallization and obstruction causing tubule damage B. Damage to proximal tubules B. Vasoconstriction of afferent arterioles and reduction of glomerular filtration rate D. Inhibition of tubular secretion D. Direct toxicity. 5. Risk factor for the development of acute kidney injury in a newborn: A. Severe asphyxia B. Birth injury B. Hemorrhagic disease of the newborn D. Congenital hypothyroidism D. Congenital pneumonia.	Introductory Reproductive	25 min

Basic	<i>Performance of practical tasks :</i> - demonstration of a thematic patient in the neonatal intensive care unit; - study of obstetric anamnesis; - evaluation of the results of laboratory and instrumental examination methods; - on the basis of obstetric anamnesis, examination data and results of laboratory and instrumental studies, establishment of a preliminary clinical diagnosis; - determination of factors and pathogenetic mechanisms of disease development; - appointment of treatment (emergency measures, medical treatment, particularities of care, feeding); - determination of disease prevention measures; - familiarization with the operation of the equipment - incubators, resuscitation table, phototherapy lamp, radiant heat lamp, ventilators; - practicing medical manipulations using a dummy of a newborn child.	Introductory Reconstructive Creative Reproductive	1 hour 45 minutes
Final	<i>Control of the final level of training (situational problems):</i> 1. A boy from the first pregnancy from mother with moderate anemia, the first birth with weak labor activity, fetal distress, a caesarean section was performed, was born with the umbilical cord wrapped around the neck with a body weight 3500, 0 g, height 52 cm. Apgar score at birth 2-3 points. Resuscitation was carried out, which included artificial ventilation of the lungs, indirect heart massage, after which the child was transferred to the intensive care unit for further treatment and examination. On the second day of life, the child's condition remained difficult due to signs of hypoxic-ischemic encephalopathy, unstable hemodynamics, respiratory failure that required respiratory support. In addition, the child had oliguria and a creatinine level >130 μmol/L. What is the cause of these symptoms? Determine the tactics of child management. Answer standard:	Creative	30 min

	1) Acute kidney injury as a manifestation of multiple organ failure syndrome due to severe asphyxia. 2) Driving tactics: - control of diuresis, blood pressure, body weight, clinical and biochemical blood tests, general urine analysis, ultrasound of kidneys; - infusion therapy of 10% glucose solution, the volume of liquid per day is equal to the volume of perspiration (25 ml/kg), diuresis for the previous day and pathological losses through the intestines; - 10% solution of calcium gluconate 1-2 ml/kg is administered intravenously (for hypocalcemia and to eliminate the effects of hyperkalemia); - correction of metabolic acidosis; - Lasix 1 mg/kg. 2. A girl from her first pregnancy, which was complicated by the threat of abortion of pregnancy at the gestation period 19-20 weeks and the threat of premature birth at the period of 30-31 weeks, according to ultrasound data ascites in the fetus was detected and increasing in the size of the kidney, first delivery at 37 weeks of gestation, complicated by premature rupture of fetal membranes, with a body weight 1200 g, height 37 cm. After birth, the child required artificial lung ventilation with strict parameters, due to signs of respiratory failure and intensive therapy with correction of hemodynamic disorders. During palpation of the child's abdomen, a tumor of the abdominal cavity was detected. According to the X-ray and thoracic surgeon, a diagnosis of cystic-adenomatous malformation of the lungs was established and expectant tactics with continuation of intensive therapy were determined. Laboratory examination of urine revealed proteinuria, hematuria, and leukocyturia. What pathology of the urinary system in this case is the most likely? Driving tactics? Answer standard: 1) Congenital kidney anomaly (polycystic disease, hydronephrosis, nephroblastoma). 2) Ultrasound control, urinalysis in dynamics, biochemical blood analysis		
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	(creatinine, urea, electrolytes), blood pressure, diuresis, body weight control. Consultation of a nephrologist, surgeon. <i>General evaluation of the student's educational activity</i>		
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Recommended reading :

Basic:

1. Neonatology: a national textbook: in 2 volumes / edited by by Professor E. Ye. Shunko - K., 2015. - Volume 1. - pp. 858-893.
2. Neonatology: textbook: in 3 volumes / T.K. Znamenska, Y.G. Antipkin, M.L. Aryaev, etc.; under the editorship T.K. Znamenskaya. – Lviv: T.V. Marchenko Publisher, 2020. – Volume 3. - pp. 127-144.
3. Unified clinical protocol "Initial, resuscitation and post-resuscitation care for newborns in Ukraine", approved by the Order of the Ministry of Health of Ukraine dated 03/28/2014 No. 225
<http://document.ua/pro-zatverdzhennja-ta-vprovadzhennja-mediko-tehnologichnih-doc190536.html>

Additional:

1. Nelson Textbook of Pediatrics, Volume 1 of 5 volumes, 21th Edition, 2019 by Robert M. Kliegman, Nathan J. Blum, Samir S. Shah, Joseph W. ST GEME III, Robert C. Tasker, Karen M. Wilson, Richard E Behrman, P. 925-928.

Information resources:

- 1.http://medu.pp.ua/57_patologicheskaya-fiziologiya/klinicheskie-laboratornyie-simptomyi-50893.html
- 2.<https://www.karger.com/Article/FullText/513666>
- 3.<https://www.frontiersin.org/articles/10.3389/fped.2022.842544/full>

Questions for student self-preparation for practical training:

1. Examination plan for a newborn child with suspected urinary system disease.
2. Criteria and possible causes of oliguria, leukocyturia, proteinuria, hematuria in newborn children.
3. Classification of diseases of the urinary system.
4. Diagnostic criteria for diseases of the urinary system.

5. Criteria and risk factors for the development of acute kidney injury (AKI) in newborn children.
6. Nephrotoxic drugs.
7. Biomarkers indicating a high risk of HUN development.
8. Tactics of managing children with signs of HUN.
9. Drugs that reduce the risk of HUN development.
10. Supportive renal therapy.

Methodical development is completed

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