

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



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THE ROLE OF CELLULAR ENERGY METABOLISM IN FULL-TERM NEWBORN WITH MANIFESTATIONS OF JAUNDICE IN THE EARLY NEONATAL PERIOD

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Introduction. One of the unconditional features of a newborn child body functioning is the high intensity of all metabolic processes to ensure homeostasis, which is accordingly accompanied by an increased need for energy (ATP) To provide tissues with energy, a baby needs three times more ATP compared to an adult and 2.5 times more ATP compared to children of the second half of life.

The aim of the study. To study the indicators of energy metabolism in full-term newborns with jaundice in the complex of adaptation disorders in the early neonatal period compared to the indicators of healthy newborns.

Materials and methods. A total of 60 full-term newborns were examined, of which 30 children with manifestations of jaundice against the background of concomitant perinatal pathology made up the main (I) research group and 30 healthy newborns without signs of clinical maladjustment during the first week of life - made up the control (II) group. The state of intracellular energy exchange was assessed by determining the following indicators: the activity of succinate dehydrogenase (SDH), glycerol-3-phosphate dehydrogenase (GFDH), and NADH dehydrogenase (NADH) and determination of lactate concentration. Using indicators of SDH, HFDG and NADPH, the coefficient of aerobic respiration (AR)=(SDH-HFDH+NADPH)/GFDH, coefficient of the electron transport chain (ETC) = SDH-HFDH+NADPH was calculated. For a reliable analysis of the detected changes, the obtained data were evaluated using the Statistica, 2010, Excel program.

Results and their discussion. Since newborns are characterized by a change in energy substrates and the predominance of anaerobic glycolysis during the first weeks of life, a sufficiently high energy reserve accumulated in utero is necessary to ensure the stability of energy metabolism. The features of the course of early postnatal adaptation, determined by the degree of severity of perinatal pathology, have a significant influence on the speed of use of such reserves. The analysis of the indicators of energy metabolism in newborns of the 1st group showed an increased level of HFDH - $2.7 \pm 0.12 \mu\text{m}^2$ compared to the control $2.2 \pm 0.11 \mu\text{m}^2$ ($p < 0.05$). The lactate level was also increased by 7.7 ± 0.39 (mmol/l) against 6.2 ± 0.31 in the control group, which indicates a high level of anaerobic glycolysis in this group of children.

There was a decrease in the level of SDH and NADPH, $4.7 \pm 0.25 \mu\text{m}^2$; $8.6 \pm 0.43 \mu\text{m}^2$ compared to $9.1 \pm 0.46 \mu\text{m}^2$ and $14.8 \pm 0.74 \mu\text{m}^2$, respectively, in the control group ($p < 0.05$). It was diagnosed that the aerobic respiration in the children of the main group was 7.8 ± 0.39 units. against 6.3 ± 0.32 u.o. among indicators in the control group ($p < 0.05$). The ETL coefficient was significantly reduced compared to the control by 10.4 ± 0.52 u.o. against 21.3 ± 0.07 u.o. ($p < 0.05$).

Conclusions. The obtained results indicate the presence of significant deviations of energy metabolism indicators in newborns with clinical manifestations of jaundice under conditions of perinatal pathology compared to healthy newborns. In our opinion, bilirubin as a chemical substance can have an effect on the chain of tissue respiration and the processes of oxidative phosphorylation, contributes to a deep energy deficit of tissues in newborns with perinatal pathology.

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PERSISTENCE OF PATHOGEN GROUPS OF MICROORGANISMS IN CHRONIC RHINOSINUSITIS IN PATIENTS WITH TYPE 1 DIABETES

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Introduction. The aim of the study was to determine the species and population composition of the microbiota of chronic purulent maxillary rhinosinusitis in patients with type 1

diabetes mellitus of moderate severity type 1 diabetes mellitus (DM) and 10 patients with CPRS of the same age without concomitant pathology.

The aim of the study. Bacteriological and mycological methods were used to study the species, population level quantitative characteristics of the microbiota and associates of the maxillary sinus biotope in 38 patients with chronic purulent rhinosinusitis (CPRS) with type 1 diabetes mellitus (DM) and 10 patients without HPRS of the same age pathology.

Materials and methods. In patients with CPRS, combined with type 1 diabetes mellitus with moderate severity, bacteria of the genus Bifidobacterium and Lactobacillus, as well as bacteria of the genus Streptococcus (*S.salivarius*, *S.sanguis*, *S.mitis*, *L.lactis*), Corynebacterium. Against this background, the contents of the maxillary sinus cavity are contaminated with pathogenic and opportunistic bacteria of the genus Prevotella, Fusobacterium, Streptococcus (*S.pneumoniae*, *S.pyogenes*, *S.viridans*), Staphylococcus (*S.aureus*, *S.epidermidis*), *H.influenzae .catarrhalis*, *E.coli* and yeast fungi of the genus Candida. Such changes have led to violations of the dominance of indigenous obligate bacteria in the microbiocenosis.

Results. CPRS in patients with type 1 diabetes disrupts microbial associations. In patients with HCV, the number of associations consisting of 3 species increases 2.7 times, but the number of associations consisting of 4 species of microorganisms decreases 1.4 times. The number of associations consisting of 5 species in patients decreases by 3.5 times.

Among the most numerous associations consisting of 3 species of pathogenic and conditionally pathogenic autochthonous facultative microorganisms, the associations of the following representatives are more common: *M.catarrhalis*, *S.aureus* and *Bacteroides spp.*; *Prevotella spp.*, *S.viridans* and *S.salivarius*; *M.catarrhalis*, *Prevotella spp.* and *S.epidermitis*; *H.influenzae*, *Prevotella spp.* and *S.epidermitis*. Associations consisting of 4 species were found in 34% of patients and consist of *S.pneumoniae*, *M.catarrhalis*, *S.pyogenes*, *Fusobacterium spp.*; *S.pneumoniae*, *E.coli*, *S.aureus* and *Candida spp.*; *S.pneumoniae*, *E.coli* Hly+, *S.viridans* and *Candida spp.*

The dominant pathogens of the chronic inflammatory process in the maxillary sinuses are *S.pneumoniae*, *H.influenzae*, *M.catarrhalis*. Other bacteria (*S.pyogenes*, *S.aureus*, *E.coli* Hly+, *B.fragilis*) are additional or accidental (*E.coli* Hly+, *B.fragilis*) pathogens. All leading pathogens persist in the habitat in the association.

In patients with CPRS, combined with type 1 diabetes mellitus of moderate severity in the contents of the maxillary sinus cavity, an imbalance of autochthonous obligate, facultative and allochthonous microorganisms is formed due to the elimination or formation of a pronounced deficiency of autochthonous obligates, genus *Balibacterus .sanguis*, *S.mitis*, *S.mutans*, *L.lactis*, etc.) and a significant increase in the number and dominant role of pathogenic and opportunistic *S.pneumoniae*, *Bacteroides spp.*, *S.epidermidis*, *M.catarrhalis*, *H.influenzae*, *Prevotella spp.*, *S.viridans*, *S.pyogenes*, *S.aureus* and others.

Conclusions. Therefore, the severity of type 1 diabetes in patients with HPRS negatively affects the species composition, population level, qualitative and quantitative dominance of autochthonous obligate and facultative, as well as allochthonous for the habitat of microorganisms and their associations. The above may indicate the influence of not only the etiological agent, but also a certain association of microorganisms on the severity of HPRS with type 1 diabetes, which must be taken into account when choosing etiotropic treatment.

Безрук В.В.

ДЕСИНХРОНОЗ І ХРОНОБІОЛОГІЧНІ АСПЕКТИ ДІЯЛЬНОСТІ ВИДІЛЬНОЇ СИСТЕМИ (НИРОК) У ДІТЕЙ

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Вступ. Життєдіяльність організму людини можлива лише за умови підтримання постійного складу внутрішнього його середовища – гомеостазу. Хронобіологія – науковий напрямок, що вивчає біологічні ритми (загальні властивості, механізми, еволюцію,