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BIOMARKER D-LACTATE FOR EARLY DIAGNOSTICS OF PURULENT MENINGOENCEPHALITES

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Meningoencephalitis (ME) remains one of the common inflammatory lesions of the central nervous system [1,2]. An analysis of cerebrospinal fluid (CSF) allows doctors to make a diagnosis quickly and effectively [2]. Patients with a 2–3-digit neutrophilic or mixed pleocytosis present the greatest diagnostic difficulties [2]. In this group, there may be patients with bacterial ME in sepsis, brain abscesses, primary bacterial ME in the early stages of the disease or patients who underwent antibiotic therapy, patients with tuberculosis ME, viral ME in the early stages, subarachnoid hemorrhages, as well as victims with severe penetrating traumatic brain injury (TBI) and after planned neurosurgical operations with ME [2]. Moreover, the most significant is the differential diagnosis of bacterial and aseptic MEs, especially in the early days of the complication development. D-lactate is a product of the metabolism of microorganisms which is released into the environment they inhabit [3]. In humans, D-lactate production is very low. Active physical exercise and ketoacidosis lead to only a slight increase in the level of D-lactate in the blood that does not have a diagnostic value [3]. A significant increase in the level of D-lactate in biological fluids indicates a bacterial infection or absorption from sites contaminated by a large number of bacterial pathogens during pathological processes.

Materials and Methods. The main group included 51 patients with secondary purulent ME. There were 34 men (66.67%), 17 women (33.33%), the median age was 54 (44.0-62.0) years. The Department of Neurosurgery of Vitebsk Regional Clinical Hospital had 22 (68.75%) patients with TBI, 2 (6.25%) with brain tumors, 7 (21.89%) with non-traumatic intracranial hemorrhages and 1 (3.13%) with hydrocephalus. The operations were performed on 27 patients - 84.37%. All 32 patients were diagnosed with nosocomial ME. There were 19 patients in the Department of Neurology who were diagnosed with "Secondary purulent ME" (G00, ICD 10). The control group consisted of 56 patients with degenerative-dystrophic diseases of the spine and 4 with hydrocephalus and was comparable to the main group by age and gender criteria. General, biochemical and bacteriological analyzes of CSF were performed. The level of D-lactate in CSF was determined by the test system "D-Lactam" (OOO SIVital, Belarus), bacteriological analysis using test systems (ID 32 E, rapid ID 32 STREP, ID 32 STAPH, ID 32 GN) on an automated microbiological Analyzer ATV Expression (Bio Merieux, France). Statistical processing was performed by the program STATISTICA 10.0 (StatSoft Inc., USA) and MedCalc 10.2. with the calculation of the ROC analysis.

Results. In patients of the main group with ME (n=51), the liquor pressure was increased to 182 (164-205) mm of water. art. In the CSF, the median protein was 3.65 (1.58-7.93) g/l, glucose 1.4 (1.1-3.1) mmol/l. In 15 (29.41%) patients, pleocytosis was incalculable, in the remaining medians it was 1706 (480-5846) in 1 mcl, with a predominance of 95% neutrophils. Patients of the control group (n = 60) liquor pressure - 125 (110-140) mm of water. art., protein concentration - 0.54 (0.35-0.89) g/l, glucose - 3.82 (3.2-4.6) mmol/l, cytosis - 4 (2-6) in 1 mcl The obtained CSF data in the groups differed significantly in protein level ($p<0.000001$), pleocytosis ($p<0.000001$) and glucose ($p<0.001$). From the CSF 12 strains of *Staphylococci* were isolated - 22.64% (95% CI 11.00-34.29), 8 *Streptococci* - 15.09% (95% CI 5.13-25.06), 3 *Enterococci* - 5, 66%, 9 representatives of the *Enterobacteriaceae* family, 16.98% (95% CI 6.53-27.43) and 21 strains - 39.62% (95% CI 26.01-53.23) of non-fermenting Gram-negative rods (NGNP).

The concentration of D-lactate in patients of the main group was 0.69 (0.35-2.0) mmol/l, in the control group - 0.16 (0.12-0.20) mmol/l (p <0.001 U Test by Mann-Whitney). When studying the levels of D-lactate excreted by pathogens and its comparative analysis, the reliable difference between *Staphylococci, Streptococci, Enterococci, Enterobacteria* and HGOP was not established (p> 0.05 U Test by Mann-Whitney). To calculate the point (the value of D-lactate in the CSF) of diagnostic separation and the determination of the diagnostic value, a ROC analysis was performed, which allowed the diagnostic level of D-lactate in the CSF to be set to more than 0.26 mmol/l (sensitivity 92.45% (95% CI : 81.8-97.9), specificity 96.67% (95% CI: 88.5-99.6), area AUC = 0.993 (95% CI: 0.956-1,000), p <0.0001).

Conclusions. D-lactate biomarker can be used as an express method for diagnosing bacterial ME with high sensitivity (p <0.0001) and specificity (p <0.0001).

Prospects for further research. Inclusion of D-lactate levels in the protocols of management of patients with inflammatory diseases of the brain membranes will allow an early differential diagnosis of the etiology of the inflammatory process and a prescription of an effective therapy.

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STRUCTURAL AND FUNCTIONAL STATE OF THE LIVER IN ONE-MONTH-OLD RATS PRENATALLY EXPOSED TO THE ACTION OF STRESS AGENTS

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Over the past few years, the proportion of hepatobiliary system pathologies in the structure of morbidity in children and adolescents has increased [1,2]. A hypothesis that the origins of many liver diseases in adults trace their roots back to the intrauterine period of development [3-5] is actively discussed, which determines the relevance of research in this field. It has been shown that the main place among the liver-damaging factors belongs to stress. The effect of prenatal stress on the morpho-functional state of the liver in offspring has not been studied yet. The aim of this work was to study the morpho-functional state of the liver in newborn offspring of rats who were prenatally exposed to chronic stress.

Materials and Methods. The experiment was conducted on 4-month-old WAG population female rats. Modeling of the stress factor on rats was carried out by immobilization in plastic cases at different times of the day and for different time intervals. The offspring of rats in both groups were sacrificed at the age of: 1 month (40 animals), group 2, 50% of which were in the control group. The young rats were subdivided into two groups: group 1 (control): those obtained from mothers who were kept in the standard vivarium conditions (20 heads); group 2 (main): from mothers who