

# Research Journal of Pharmaceutical, Biological and Chemical Sciences

## Non-Drug Method Of Preventing Lactostasis And Its Complications.

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### ABSTRACT

Thus, to prevent the development of mastitis, timely prevention of lactostasis is necessary. For this it is proposed to use vibration. Vibrotherapy (vibration massage) is a method of therapeutic and prophylactic effects of mechanical vibrations carried out by direct contact of the emitter (vibrator, vibratod) with tissues, providing a multilateral effect on the tissues directly above the vibrator, as well as on organs and systems that are reflectively associated with the zone impact. Vibrotherapy leads to increased local blood flow and lymphatic drainage, activation of tissue trophism, the hypothalamic-pituitary system and the mobilization of the adaptive capabilities of the organism. The morphological and biochemical analysis of blood is a recognized informative test that reflects the general condition of the animals, and makes it possible to judge the immunological reactivity of the organism. Thus, the data obtained during the biochemical analysis of blood did not reveal significant changes in the basic biochemical parameters of the blood of experimental animals after exposure to the Vibrolact-Rabbit apparatus. Studies have shown that all studied parameters in laboratory animals of the experimental group were within the acceptable physiological norms. However, when studying the morphological parameters of blood, one cannot limit oneself to physiological norms, and it is important to evaluate the outlined tendencies and minor shifts occurring within this norm.

**Keywords:** rabbits, lactostasis, non-drug

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## INTRODUCTION

Currently, there is a tendency to late first birth, which increases the incidence of lactostasis in older women. The key point of lactostasis is a violation of the outflow of milk from the mammary glands due to endogenous or exogenous causes. Endogenous causes include duct squeezing by surrounding edematous tissues (interstitial edema), blocking the duct by dense particles formed from casein, calcium salts and fat. Exogenous causes are all traumatic injuries of mammary gland (pressure of the fingers on the mammary gland, aggressive pumping), squeezing clothes, rare feedings that lead to poor emptying of the breast, improper attachment of the child to the breast, etc.

The wrong feeding technique is currently considered to be the most significant factor of lactostasis. Russian surgeons and obstetricians offer another variant of the pathogenesis of lactostasis. The key role is defective expression, which leads to the preservation of bacteria in the ducts, "causing lactic fermentation, coagulation of milk and damage of the epithelium of the milk ducts". Coagulated milk saves lactostasis, and microflora, multiplying in the ducts, causes inflammation.

Currently there is a tendency for later first births, which should increase the incidence of lactostasis and lactational mastitis in older women. So according to the data of the Organization for Economic Cooperation and Development 2012 in the period from the 70s of the XX century to 2009 in Germany, the age of women with first births changed from 24 to 30 years, in the Czech Republic - 22 to 27 years, in France from 24 up to 29 years old and others [17]. Any specific features of the mammary gland and lactation process, characteristic of a certain age of a woman and leading to the predominance of the increased risk of lactational mastitis for him, are not described in the literature. Therefore, the age of the mother is unlikely to have any predictive value.

Lactostasis is a disorder between the inflow and outflow of milk, where the key point is the disturbance of the outflow of milk from the mammary gland due to endogenous or exogenous causes. Endogenous causes include such phenomena as squeezing of ducts by edematous surrounding tissues (interstitial edema); blockage of duct by dense particles formed from casein, calcium salts, fat; galactoceles. All traumatic injuries of the mammary gland are exogenous (finger pressure on the mammary gland, aggressive pumping). A number of authors: Ya. Ya. Yakovlev, F. K. Manerov (2015), O.L. Lukyanova, T.E. Borovik, G.V. Yatsyk, I.A. Belyaev, V.I. Furtsev, Ya. Ya. Yakovlev and F. K. Manerov (2015).

Modern approaches to the treatment of lactostasis is a set of measures aimed at changing the multiplicity and rules of feeding. This is the emptying of the mammary glands every 1.5-2 hours, if necessary - every hour, a gentle massage of the mammary glands, decanting, including the use of a breast pump. Squeezing milk residues should be up to a feeling of comfort in the breast. A. Z. Guseinov, I.N. Milkevich, T.A. Huseynov.

The main component of the therapy of lactostasis remains the use of medical drugs. The best is the use of agents that affect the reduction of prolactin levels (dostinex, bromocriptine) with drugs that improve the flow of milk (prostozhel, oxytocin). More effective and fast-acting is the combined use of Dostinex with oxytocin in combination with a complex of therapeutic measures, which are mostly aimed at normalizing the release of milk from milk acini.

The complex treatment of lactostasis includes physiotherapeutic methods, the purpose of which is to stimulate the outflow of milk from the mammary gland. These are lymphatic drainage methods: oxytocin drug electrophoresis, ultrasound therapy, alcohol compress. And hormone-correcting methods: high-frequency magnetic therapy in the adrenal region. (National leadership. Physiotherapy, 2014, p. 720; National leadership. Physical and rehabilitation medicine, 2016, p. 571).

Thus, to prevent the development of mastitis, timely prevention of lactostasis is necessary. For this it is proposed to use vibration. Vibrotherapy (vibration massage) is a method of therapeutic and prophylactic effects of mechanical vibrations carried out by direct contact of the emitter (vibrator, vibratod) with tissues, providing a multilateral effect on the tissues directly above the vibrator, as well as on organs and systems that are reflectively associated with the zone impact. Vibrotherapy leads to increased local blood flow and lymphatic drainage, activation of tissue trophism, the hypothalamic-pituitary system and the mobilization of the adaptive capabilities of the organism. (National leadership. Physiotherapy, 2014, p. 720; National leadership.

Physical and rehabilitation medicine, 2016, p. 571).

The most well-known devices for local vibrotherapy are physiotherapy devices "Pulsar", "Avim - 1", "VMP - 1", "PEM - 1", "Tonus - 3", "Rektomassazher", "Intravibr", "STM EPS", "OMK EPS" and others. For vibroacoustic therapy the devices "Vitaфон", "Vitaфон-1K", "Intraфон", "Magofon-01" and others are used, in which the amplitude of vibration is 50 - 100 times less than in vibrating massagers, so they are called "microvibration". Dosing of medical procedures is carried out according to the frequency modes of vibration and the area of impact. They take into account the feeling of the patient, who must feel a distinct, painless vibration. Indications for vibrotherapy: diseases of the peripheral nervous system, musculoskeletal system, respiratory system, digestion, central nervous system. Contraindications: injuries and acute diseases of the musculoskeletal system, violation of the integrity of the skin and pain in the area of impact, acute inflammatory diseases, Raynaud's disease, vibratory disease, purulent processes, endarteritis and atherosclerosis of the lower extremities, osteoporosis, thrombophlebitis, lymphostasis, trophic ulcers and bedsores in the impact zone, oncology, idiosyncrasy and general contraindications to physiotherapy. Vibrotherapy is preferably carried out no later than 2 to 3 hours before bedtime. It can be combined with heat therapy, phototherapy and magnetic therapy (Physical and Rehabilitation Medicine in Pediatrics / MA Khan et al., 2018, p. 134 - 139).

### MATERIALS AND METHODS

Hematological studies. In these time periods, blood was collected for hematological studies. Biochemical analysis of blood serum was carried out on an automated biochemical analyzer CS-T240 (manufacturer - "Dirui Industrial Co., Ltd", China) using commercial biochemical kits for veterinary DiaVetTest (manufacturer - Russia) and commercial biochemical randox (manufacturer - USA). The content of erythrocytes (1012 / l), leukocytes (109 / l), hemoglobin (g / l) and hematocrit (%) were determined on an automatic hematology analyzer URIT-2900 Vet Plus (URIT Medical Electronic Group Co., Ltd, China).

### RESULTS AND DISCUSSION

Analysis of morphological and biochemical blood parameters of the rabbit *Oryctolagus cuniculus* L.

The morphological blood test is an informative test that reflects the general condition of the animals, and makes it possible to judge the immunological reactivity of the organism [1].

The results of our studies showed a slight change in the indices of the hemostatic system after exposure to the control group by the Vibrolact-Rabbit apparatus. The analysis of the morphological parameters of the blood of rats revealed that in the animals of the experimental group the content of erythrocytes and hemoglobin in the blood was higher than the control by 25.6 and 33.8% ( $p \leq 0.05$ ), respectively.

The number of leukocytes in the blood is variable. In the morphological analysis of blood, it was found that the number of leukocytes in animals of the experimental group was 11.4% lower compared with the control group. However, the changes were unreliable.

The reduction of platelets develops the risk of damage to the blood vessels, the development of prolonged bleeding. Conversely, high platelets in the blood indicate an increase in the likelihood of thrombus formation, blockage of blood vessels, and, most terrible of all, the formation of thromboembolism (thrombi that break loose from the vessel wall and lead to blockage of the most important blood vessels of the body where blood clots do not usually form) [one]. Thus, analysis of the number of platelets in the blood of rats showed that in the experimental group their number was significantly 89.8% higher ( $p \leq 0.01$ ) relative to the control (Table 1).

**Table 1. Morphological parameters in rabbits after exposure to the device Vibrolact-Rabbit, (X ± x)**

Indicator	Group	
	Control	Experienced
Leukocytes, 10 <sup>9</sup> / l	6,66±1,38	5,90±0,90
Erythrocytes, 10 <sup>12</sup> /l	3,13±0,34	3,93±0,29
Hemoglobin, g / l	63,0±6,90	84,3±7,12*
Hematocrit,%	19,1±1,20	20,4±2,14
Platelets, 10 <sup>9</sup> /L	149,6±25,2	284,0±19,3**

Note: \* - the results are statistically reliable (p≤0.05)

\*\* - the results are statistically significant (p≤0,01)

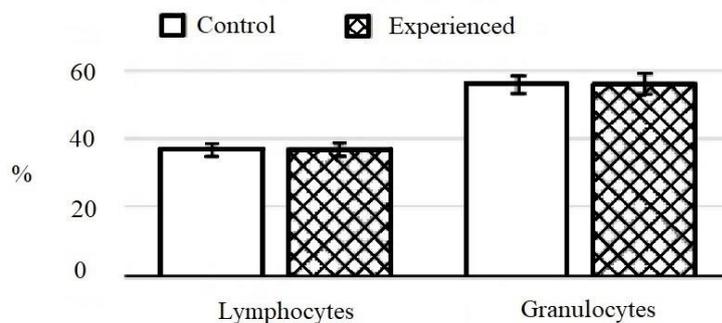
\*\*\* - the results are statistically significant (p≤0.001)

A detailed blood test determines the percentage of white blood cells of various types: neutrophils, eosinophils, basophils, lymphocytes and monocytes. The proportion of some of them in certain diseases or conditions of the body may increase, while others - in proportion to decrease [3]. Since lymphocytes are measured and can be increased in both absolute and relative terms, these states are considered separately as absolute lymphocytosis (an increase in the total number).

Since lymphocytes are measured and can be increased both in absolute and relative terms, these states are considered separately as absolute lymphocytosis (increase in the total number of lymphocytes in the blood) and relative lymphocytosis (increase in the proportion of lymphocytes in the total number of leukocytes).

It was established that the percentage of lymphocytes and granulocytes in the experimental and control groups did not differ, the difference was less than 1.0% (Fig. 1).

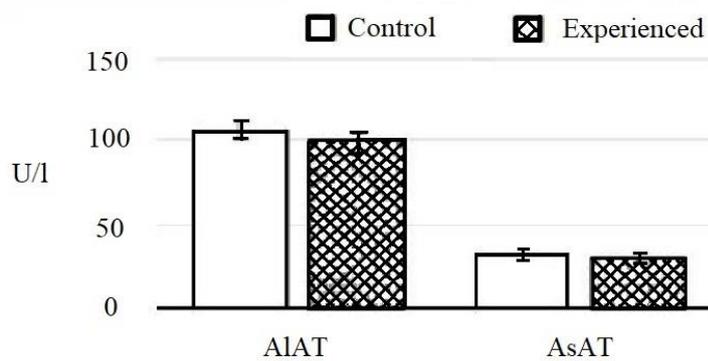
**Figure 1. The content of lymphocytes and granulocytes in the blood of rabbits *Oryctolagus cuniculus* L. after exposure to the device Vibrolact-Rabbit, %**



Thus, the analysis of the reaction of the red blood system of animals showed that the content of the main indicators in the blood of animals of the experimental group were within the physiological norm.

Analysis of the biochemical parameters of the blood serum of laboratory animals of the experimental group showed insignificant changes, primarily in the activity of the main enzymes: alanine aminotransferase (AIAT) and aspartate aminotransferase (AsAT), the values of which made a difference with the control indicators of 7.54 and 13.1%, respectively (Fig. 2).

**Figure 2. Aminotransferase activity (AlAT and AsAT) in the blood serum of *Oryctolagus cuniculus* L. rabbits after exposure to the Vibrolact-Rabbit apparatus, U/l**



Since one of the main reasons for the increase in the activity level of transaminase enzymes (AlAT and AsAT) is their release from damaged organs and tissues into the bloodstream, it can be assumed that there are developing destructive processes in hepatocytes and cardiomyocytes, because the greatest number of transaminases is contained in the liver and heart cells [6].

Attention is drawn to the decrease of creatinine in the blood of experimental group of rabbits (by 7.00%), which is one of the criteria (with the level of urea) of changes in kidney activity [3]. The concentration of urea is also reduced by 39.7% relative to the control value (Table 2).

**Table 2. Biochemical parameters in rabbits after exposure to the device Vibrolact-Rabbit, (X ± x)**

Indicator	Group	
	Control	Experienced
Glucose, mmol / l	8,65±0,68	7,30±0,52
Total protein, g / l	65,4±1,74	59,3±0,9*
Albumin, g / l	35,8±1,11	37,2±1,35
Bilirubin total, µmol / l	2,32±0,11	1,90±0,08
Cholesterol, µmol / L	2,29±0,24	2,24±0,19
Urea mmol / l	3,45±0,57	2,08±0,36
Creatinine, µmol / L	79,9±6,41	74,3±5,6

Note: \* - the results are statistically reliable (p≤0.05)

\*\* - the results are statistically significant (p≤0,01)

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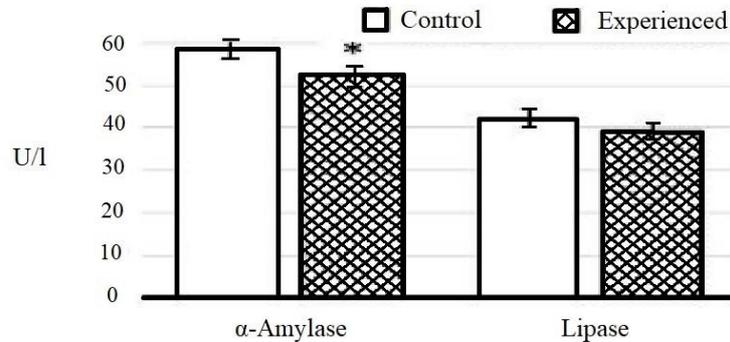
There was a slight decrease in cholesterol level in the experimental group, relative to the control (by 2.18%). A similar downward trend was established relative to such an indicator as total bilirubin (by 18.1%). However, the changes were unreliable.

A decrease in the concentration of glucose in experimental animals, relative to the control, by 15.6%, respectively, was recorded. As it is known, glucose level is one of strictly regulated physiological parameters, and fluctuations in its value have a significant effect on the metabolism of the brain and myocardium [134]. Hypoglycemia is accompanied by dysfunction of the central and peripheral nervous system [135, 136], as well as the functional ability of the heart [137].

The determination of the activity of α-amylase in the blood has great importance in the diagnosis of pathologies, for example, the activity of α-amylase is increased by 2 - 30 times in diseases of the pancreas, such as acute pancreatitis, while the activity of pancreatic type of α-amylase increases, and the activity of salivary type α-amylase does not change [3]. Analysis of α-amylase activity showed a slight significant decrease of 11.5% (p≤0.05), relative to the control. A decrease in the activity of lipase in serum is observed in tumors of

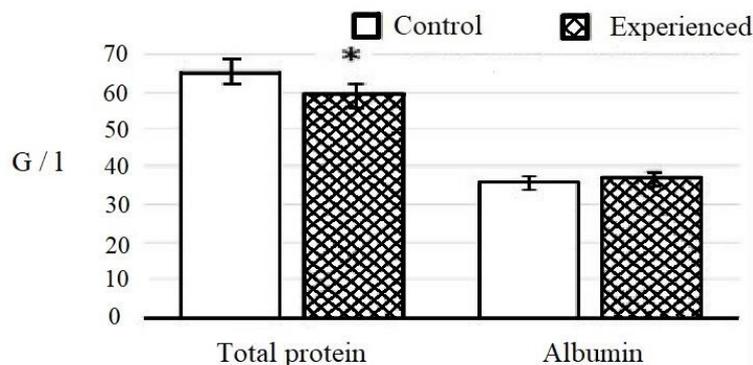
different localization (except the pancreas), a removed pancreas, malnutrition or hereditary triglyceridemia (2). Analysis of lipase activity showed a decrease in this indicator in the experimental group by 6.82%, relative to the control value, however, the obtained values were unreliable (Fig. 3).

**Figure 3.  $\alpha$ -amylase and lipase activity in the serum of rabbits *Oryctolagus cuniculus* L. after exposure to the Vibrolact-Rabbit apparatus, U/l**



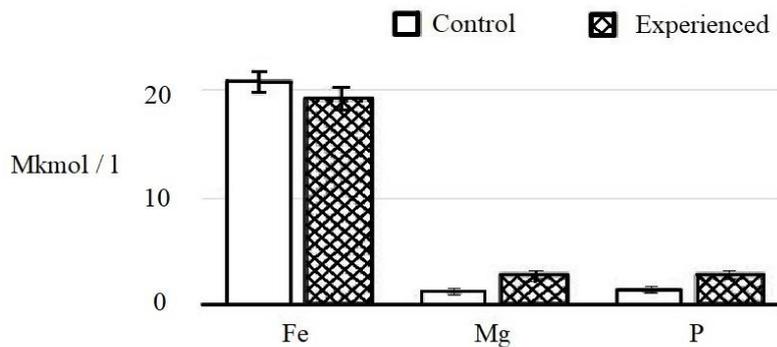
The level of total protein can be judged on the state of hemostasis, because blood has flowability and a viscous structure due to protein. The work of the heart and the whole cardiovascular system depend on these qualities of the blood [6]. Low albumin in plasma leads to the fact that substances that albumin usually "sees" and binds, remain without a substrate for the compound and their concentration in the blood begins to fall, but at the same time, the physiologically active fractions continue to maintain the level of their normal values, preventing thereby forming any clinical signs of pathology [7]. A significant decrease in the level of total protein in the experimental group by 9.33% ( $p < 0.05$ ), with an insignificant increase in the level of albumin by 3.91%, relative to the control (Fig. 4) was noted.

**Figure 4. The content of total protein and albumin in the serum of rabbits *Oryctolagus cuniculus* L. after exposure to the apparatus Vibrolact-Rabbit, G/l**



Significant changes in the mineral composition of serum were not detected. There was a significant increase in the levels of Mg and P, the concentration of which in the serum of rabbits exceeded the control value by 98.5 and 94.0% ( $p < 0.05$ ), respectively. Magnesium refers to the intracellular chemical elements. Approximately half of the Mg ions, like calcium, in the serum are in ionized form, the other half are in combination with proteins or in the form of various salts. The reasons for the change in the level of Mg in the blood are mainly violations of the supply of the ion through the gastrointestinal tract and / or a disorder of the kidneys [1]. Fe content, on the contrary, tended to decrease by 7.66%, relative to the control group. However, the changes were unreliable. The observed fluctuations in the content of chemical elements did not go beyond the physiological ranges (Fig. 5).

**Figure 5. The content of chemical elements (Fe, Mg and P) in the serum of rabbits *Oryctolagus cuniculus* L. after exposure to the apparatus Vibrolact-Rabbit, Mkmol/l**



### CONCLUSIONS

The morphological and biochemical analysis of blood is a recognized informative test that reflects the general condition of the animals, and makes it possible to judge the immunological reactivity of the organism. Thus, the data obtained during the biochemical analysis of blood did not reveal significant changes in the basic biochemical parameters of the blood of experimental animals after exposure to the Vibrolact-Rabbit apparatus. Studies have shown that all studied parameters in laboratory animals of the experimental group were within the acceptable physiological norms. However, when studying the morphological parameters of blood, one cannot limit oneself to physiological norms, and it is important to evaluate the outlined tendencies and minor shifts occurring within this norm.

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