

Evaluation of the Efficacy of Therapy for Patients Suffering From Reflux-Induced Asthma in the Arid Zone

Khazratov U. Kh., Narziev Sh. S.

Bukhara State Medical Institute, Uzbekistan

ANNOTATION

The complex effect of low-intensity infrared laser therapy on the course of reflux-induced asthma (RIA) in 29 patients, aged 18-46 years, living in the arid zone of the Bukhara region, was studied. It has been shown that the use of the laser therapy method quickly stops the obstruction phenomenon, and reduces the symptoms of intoxication, coughing, and asthma attacks. The terms of hospitalization are reduced by an average of 2-3 days. Indicators of bronchial patency FEV 1.0, FEV 75%, and FEV 50% respectively increased in group I by 25.6%, 23.7%, and 23.4%. The growth of IgA amounted to 0.2%, while IgG decreased by 12%. Due to the decrease in agglomerated platelets, the number of solitary platelets increased from $65.46 \pm 2.2\%$ to $82.5 \pm 0.89\%$.

KEYWORDS: *reflux-induced asthma, laser therapy, spirometry, blood rheology, immunity.*

Reflux-induced asthma (RIA) is an infectious-allergic disease, characterized by periodic ingestion of the contents of the gastrointestinal tract moving in the opposite direction, the so-called refluxate into the respiratory tract, and the occurrence of asthma attacks. RIA is often chronic and severe. The disease often leads to the disability of patients, reduces their quality of life, limits their life, and reduces their physical and spiritual activity of patients. It is a public health problem in all countries of the world. According to various authors, the prevalence of this disease in the world ranges from 15 to 50% (8.15).

Some risk factors lead to an exacerbation of the disease. Among them, special are an increased body mass index, products with an excess content of salt, acids, analgesics, xanthines, antispasmodics, tobacco smoke, viral infections, occupational hazards, damp and cold air, animal hair, and others (7.10.11.12).

Among the risk factors, a viral, bacterial, and fungal infection often leads to exacerbation. The main cause of exacerbations of RIA is an infectious factor, i.e. acute respiratory infection (1,2,14). Persistent microorganisms are an important element that supports chronic inflammation not only directly, but also indirectly, through the activation of the main effector cells and, above all, neutrophils. It is the exacerbation of the infectious process in the respiratory system that worsens the patency of the bronchi and leads to obstruction due to inflammatory thick viscous secretion in the lumen of the bronchi, bronchospasm, swelling of the bronchial mucosa, which leads to worsening of the signs of the disease (4, 5).

Infections of the bronchopulmonary system in RIA cause exacerbations in up to 50% of cases. In addition to bacterial infections, respiratory infections occupy an important place, their share is up to 20-30% (1,2).

The arid zone differs from other regions of the republic in extreme climatic conditions, dry and hot summers, low air humidity, and minimal rainfall, which undoubtedly affect the health and muscle

tone of the population. In the last five years, due to global warming, the air temperature has exceeded previous values, in the Central Asian region, especially from the beginning of June to the first half of August. According to UzHydroMetCenter, during the last year in the summer season, the air temperature exceeded by 4-5 degrees compared to the previous figures of the last decade. In connection with the drying of the Aral Sea and the reduction of its area, the process of the disease progresses tenfold. As a result, emerging environmental factors, such as dry, dusty hot air saturated with particles of various toxic substances, getting into the mucous membranes of the respiratory tract of the population living in the Aral Sea zone, have an adverse effect (7.8).

IFNs have been shown to enhance the cytotoxicity of sensitized lymphocytes, natural killer activity, antibody production, and accelerate antibody-mediated lysis of infected cells by macro- and microphages (3).

In the last decade, the use of laser therapy in chronic inflammatory processes of bronchopulmonary pathology has been of particular interest. The use of laser therapy has a multilateral effect, which improves some indicators in the bronchopulmonary system. Low-intensity laser therapy contributes to the elimination of broncho-obstruction, restoration of bronchial drainage activity, reduction of their hyperreactivity and tendency to allergic reactions, modulation of the humoral activity of the immune system, elimination of edema and microcirculatory disorders, increased sympathetic activity in the bronchopulmonary system, improvement of pulmonary hemodynamics (3,4,9, 13).

The treatment of RIA by laser therapy methods consists of the impact on the pathological focus, on the reflexogenic zones of the regulation of the functions of the respiratory organs, in combination with the impact on the classical acupuncture points (5).

The aim of the study is to evaluate the clinical efficacy, tolerability, and safety of laser therapy in the complex therapy of RIA in an arid zone.

Materials and research methods. Under observation were 57 patients with RIA aged 16-47 living in the arid zone, of which 28 were men, and 29 were women. Of these patients, 17 with a mild persistent course, asthma attacks disturbed patients 1-2 times a week and periodically at night. days. In 24 patients with a moderate persistent course, attacks of bronchospasm were detected once a week at night, and in 16 patients with a severe persistent course, daily periodic nocturnal asthma attacks were found.

All patients were divided into two representative groups according to the duration of the disease, age and sex composition, and severity of the disease. The first (main) group included 29 patients: 9 patients with a mild persistent course, 12 with an average, and 8 patients with a severe course of the disease; in addition to basic therapy, they received laser therapy for 10 days at a dose of 5 Hz, a total of 10 procedures for a course of treatment. At the same time, the exposure time per point is 1 minute on the physiotherapy apparatus BTL 4825 SL Preum, UK, 2016. The second (control) group included 28 patients: with a mild persistent course - 8, with an average - of 12, and with a severe course - 8 patients, all of them received only basic therapy.

During the attack, up ravenous laser blood irradiation (SLBI) was performed in the projection of the pulmonary artery and cubital vein, exposure to the paravertebral zones Th1-Th4, Koenig fields, interscapular region, and the region of greatest emphysema (determined by applying the percussion method). Outside the attack, the above zones are supplemented with an impact on the projection zones of the thymus, adrenal glands, receptor zones in the occipital region of the scalp, the inner surface of the upper limb, chest, sternum, anterior surface of the lower leg (14,15).

In the dynamics of treatment, patients underwent clinical, functional, radiological, and laboratory methods of research. The evaluation of the function of external respiration (RF) was carried out by

the "Flow-volume" method using an automatically analyzed device "Medicor" manufactured by "Elektromedica" (Hungary). The parameters studied were FVC - vital capacity during forced expiration (liter / s,%), FEV 1.0 - forced expiratory volume in 1 second, PEF - maximum volumetric air velocity, FEF 75%, 50%, 25% - maximum volume air velocity at the level of small, medium and large bronchi. The peak air volume velocity, indicating the patency of the bronchial tree, was studied using an individual peak flow meter (Vitalograf, Germany). During fluoroscopy, the transparency of the lung field, compaction, and deformation of the roots of the lungs were taken into account. The intensity of clinical symptoms in the dynamics of treatment was assessed on a three-point system (Sivkov II, 1993).

Serum immunoglobulins were studied by radial immunodiffusion (Mancini I., 1965). Local protection of the mucous membranes of the upper respiratory tract was studied by the method of "drug imprint" (6,17,18).

The cytological characteristics of the inflammatory process in preparations of imprints from the mucous membranes of the palatine tonsils and the nasopharyngeal region were evaluated according to S.T. Nadzhimitdinov. The morpho-functional characteristics of peripheral blood platelets were studied using a light microscope METZER BIOMEDICAL, Mumbai (Nadzhimitdinov S.T., Sadykova G.A., 2002). In parallel with the above studies, we studied the qualitative characteristics of platelets in the dynamics of treatment according to the method of S.T. Nadzhimitdinova (2002), in addition to counting platelets, studied their participation in blood coagulation and anticoagulation (6). The results of treatment were analyzed by the method of variation statistics using Student's criteria. The work was performed in the Bukhara Regional Multidisciplinary Medical Center, in the department of allergology.

Results and discussion. The conducted studies showed that in 21 patients with a mild and moderate persistent course in the 1st group, the phenomena of bacterial intoxication syndrome after the treatment stopped within 4-5 days, in 8 patients with a severe persistent course, these phenomena lasted 7-8 days, which led to a more rapid disappearance of the symptoms of the disease. Decreased symptoms of heartburn, intoxication, asthma attacks, coughing, and improved sputum production. Percussion decreased signs of the airiness of the lung tissue, and auscultatory eliminated dry wheezing. When analyzing the blood data, an increase in the number of lymphocytes from 14 ± 2.2 to the norm of $27 \pm 2.4\%$ was revealed, and the erythrocyte sedimentation rate decreased from 19 ± 2.4 to 12 ± 1.7 mm/hour, which indicates an improvement in the immune background. This led to a reduction in the duration of hospitalization by an average of 2-3 days with a total duration of 8-9 days on average.

In the study groups of patients with RIA, the main symptoms of the disease were comparatively studied. As a result of treatment, a relatively high clinical efficacy was found in patients receiving laser therapy. In the groups of patients who received laser therapy in the course of treatment, starting from the second and fourth days, there was a decrease in the intensity of the main clinical symptoms of the disease. According to the sum of points, relatively high efficiency was found in patients who received laser therapy, which in the course of treatment amounted to 11.2 ± 0.55 to 4.6 ± 0.34 (59%) in RIA patients with a mild persistent course, and in RIA patients with an average persistent course from 19.9 ± 0.64 to 12.3 ± 0.93 (38%) points, compared with the data of patients treated in the control group, the intensity of clinical symptoms significantly decreased ($p < 0.05$). Accordingly, in the groups, the intensity of clinical symptoms decreased by 1.6 and 1.4 times compared to before treatment. All patients tolerated laser therapy well, after laser therapy no clinical side effects were detected.

However, in group II, in 8 patients with mild, 12 with moderate, and 8 with severe persistent RIA,

the symptoms of acute respiratory infection lasted an average of about a week and were accompanied by symptoms of intoxication, painful cough with difficult sputum discharge and severe asthma attacks, which required an additional course of antibiotic therapy and an increase in the duration of hospitalization up to 11-12 days.

Thus, it has been shown that the use of laser therapy in complex therapy for exacerbation of RIA contributes to more rapid relief of intoxication and symptoms of the disease.

When analyzing the spirometry parameters before the treatment, all patients with RIA revealed a significant decrease in bronchial patency FEV 1.0, FEV 75%, and FEV 50%. The forced expiratory volume in 1 second was significantly reduced, which in groups I and II, respectively, amounted to $72.4 \pm 0.40\%$ and $74.0 \pm 0.48\%$. Also, the parameters of bronchial patency at small, medium, and large levels, respectively, were $58.3 \pm 0.6\%$, $63.4 \pm 0.67\%$, and $71 \pm 1.49\%$ in group I, and $60.3 \pm 1.2\%$ in group II. %, $62.2 \pm 0.92\%$, and $70.4 \pm 1.41\%$ of the proper level. At the same time, peak flowmetry indicators were significantly reduced by 310 ± 1.62 and 308 ± 0.93 liters/minutes compared with the norm.

When studying the effect of complex therapy in patients with RIA in groups I, and II, positive dynamics of indicators of the function of external respiration was revealed. After the completion of the course of complex therapy, the indices of respiratory function during RIA in patients of group I significantly increased compared with the initial ones ($p < 0.05$) (Table 1). Thus, the indicators of bronchial patency FEV 1.0, FEV 75% and FEV 50% respectively increased in group I by 25.6%, 23.7% and 23.4% ($p < 0.005$): in group II by 4.4% , 3.6% and 6.2%. The improvement in the parameters of the function of external respiration indicated the elimination of the inflammatory process in the dynamics of complex therapy.

In a comparative study of the function of external respiration between groups, in patients of the second group after treatment, a significant increase in bronchial patency at the level of small, medium, and large bronchi, which approached the norm, was revealed.

Dynamics of indicators of the function of external respiration in patients with RIA during treatment ($M \pm m$ %).

Indicator	FVC	FEV 1.0	FEV 75	FEV 50	FEV 25	$\Pi\Phi$ l/m
I group	$\frac{77,5 \pm 0,71}{86,7 \pm 0,7^*}$	$\frac{72,4 \pm 0,409}{8 \pm 0,39^{**}}$	$\frac{58,3 \pm 0,682}{\pm 1,2^{**}}$	$\frac{63,4 \pm 0,6786}{8 \pm 0,72^{**}}$	$\frac{71 \pm 1,4984}{\pm 1,98^{**}}$	$\frac{310 \pm 1,62359}{\pm 2,58^{**}}$
II group	$\frac{71,9 \pm 0,72}{75,8 \pm 1,33}$	$\frac{74,0 \pm 0,487}{8,4 \pm 1,0}$	$\frac{60,3 \pm 1,263}{9 \pm 1,19}$	$\frac{62,2 \pm 0,9268}{4 \pm 1,06}$	$\frac{70,4 \pm 1,41}{75,3 \pm 1,7}$	$\frac{308 \pm 0,93319}{,7 \pm 3,7}$

Note - In the numerator are indicators before, and in the denominator after treatment.

* - ($p < 0.05$), ** - ($p < 0.005$) when compared with the original data.

After treatment, in patients with RIA who received laser therapy compared with the control, the increase in patency in small, medium, and large bronchi, respectively, was 15.1%, 20.4%, and 17.2% higher ($p < 0.005$) (table).

This indicates an improvement in bronchial patency at the entire level of the respiratory tract, the elimination of spasm of the smooth muscles of the bronchi and bronchioles, the removal of their occlusion by bronchial secretions, and the disappearance of edema of the mucous membranes of the bronchi.

An analysis of the immune status indicators revealed that before treatment, all patients had a decrease in serum IgA (2.4 ± 0.1 g/l), and increased levels of IgG (up to 16.0 ± 0.5 g/l). After the treatment, patients of the main group who received laser therapy showed positive changes in

immunological parameters: IgA increased by 0.2%, while IgG decreased by 12% ($p < 0.05$). In patients of the control group, there were no significant changes in the content of serum immunoglobulins ($p > 0.05$).

When analyzing the data obtained from the mucous membranes of the palate, the initially detected lymphocytes were located singly, a decrease in the activity of segmented neutrophils, an increase in their number, destruction of the nuclei, and the absence of phagocytic activity was noted. Microbes inside macrophages were well preserved, the cytoplasm of lymphocytes was destroyed in 90% of cases, and phagocytic activity was not manifested in 15-20% of patients with RIA, which corresponded to the third stage of the inflammatory process according to S.T. Nadzhimitdinov. As a result of treatment in patients receiving laser therapy, microphage processes were activated, regeneration processes were accelerated, and in the initial stage of inflammation, neutrophilic leukocytes were replaced by lymphocytes. Between the kinetics of blood cells and changes in the tissues of the focus of inflammation, a regularity was revealed, which was manifested by a change in the I-th - lymphocytic phase to the II-nd - macrophage, then to the lymphocytic (III) with epithelialization (IV - stage of recovery). In 88% of patients, signs of an increase in the phagocytic activity of neutrophils were revealed, which indicates the stage of recovery.

Initially and in the dynamics of treatment, the number of platelets in the peripheral blood was within the normal range, which amounted to 180,000 and 320,000 mm cube, changes were noted in their qualitative characteristics. The data obtained indicate the occurrence of a primary intravascular platelet thrombus, the main period of which is the time of appearance of the primary platelet thrombus. The quantitative indicators of platelets in patients with RIA with mild and moderate persistent course did not differ from those in healthy individuals. Therefore, in 82% of RIA with a mild persistent course and 73% of RIA with an average persistent course, the morphofunctional parameters of platelets did not differ from those in healthy individuals. When analyzing the qualitative characteristics of platelets, depending on the severity, their corresponding differences were revealed. The qualitative characteristic of the platelet changes when the content of the platelet substance is released. In the case of RIA with the mild and moderate persistent course, young, not released functionally active platelets were found in 45%, 65% of patients, and in healthy people, they were found in 50% of cases. Finished activity, passive, and small platelets were found in 57% and 35% of patients, respectively, RIA with the mild and moderate persistent course and in 50% of healthy individuals.

When analyzing the plateletogram, it was revealed that the functional and morphological properties of peripheral blood platelets provide prognostic information about intravascular platelet micro thrombosis.

With RIA, with an average persistent course in patients treated in the first and second groups, normalization of platelet qualitative characteristics was observed after treatment. In the first group, the number of active platelets decreased from $53.1 \pm 2.2\%$ to $50.1 \pm 1.8\%$ at a rate of $49.9 \pm 1.27\%$. Due to the decrease in agglomerated platelets, the number of solitary platelets increased from $65.46 \pm 2.2\%$ to $82.5 \pm 0.89\%$, the norm is $83.5 \pm 0.69\%$, small ones from $19.1 \pm 2.19\%$ to $10.1 \pm 1.35\%$, norm $10.1 \pm 0.5\%$ and average from 14.3 ± 2.07 to $7.84 \pm 0.89\%$, norm $6.4 \pm 0.79\%$ ($p < 0.05$). It should be noted that no significant changes in these indicators were found in patients treated in the control group. As a result of treatment, according to the cytomorphological properties of peripheral blood platelets, the elimination of aggregation and agglomeration was observed in group II, respectively, in 72% of patients, which indicated the disaggregation of the process. As a result of treatment, platelets were located alone in patients, their size decreased, and they passed into a passive form.

When comparing the data after treatment among the groups, the highest efficiency was observed in

patients who received laser therapy, compared with the control group, the main platelet count indicators turned out to be 1.3 times higher. In patients treated in the control group, these properties of platelets did not change significantly. Thus, in patients with RIA with the mild and moderate persistent course, the use of complex laser therapy in peripheral blood normalizes the functional and morphological properties of platelets and reduces the processes of their adhesion and aggregation, which lead to an improvement in blood rheology. The use of laser therapy in patients with RIA is an effective method; morpho-functional properties of platelets improve in 72% of patients. There were no side effects of laser therapy.

Thus, in reflux-induced asthma, the use of laser therapy leads to a significant reduction in clinical symptoms, regulation of immune status, blood rheology, and an increase in bronchial patency. When using laser therapy, no adverse reactions were detected, and the method is harmless.

References

1. Ershov F.I., N.V. Kasyanova, O.V. Polonsky, Consilium Medicum, Vol. "Infections and antimicrobial therapy", 2003. -№ 6., -P. 129-135.
2. Lobzin Yu.V., Mikhailenko I.K., Lvova N.I. Airborne infections, St.Petersburg, ICF "Foliant", 2000, 184 p.
3. Laser therapy and prevention / Ed. A. V. Kartelisheva, A. G. Rummyantseva, A. R. Evstigneeva, A. V. Geinitza, S. V. Usova. - M.: Practical medicine, 2012. - P. 268-272.
4. Laser therapy and prevention of a wide range of diseases. Guidelines for the use of the laser therapy device RIKTA / edited by Ph.D. Yu. G. Fedorova. - 2nd ed., Rev. and additional - M., MILTA - PKP GIT, 2018. - P. 68-69.
5. Mirkhaidarov A.M., Albinskaya D.R., Kofanova Yu.A. The effectiveness of intravenous laser blood irradiation in the treatment of patients with bronchial asthma. XXIV National Congress on Respiratory Diseases, Proceedings of the Congress, Moscow, October 14-17, 2014 -P. 74.
6. Nazhmitdinov S.T., G.A. Sadikova, A new method for obtaining print preparations. Methodical recommendation, Tashkent, 2003, 6 p.
7. Rustamova M.T. Prevalence and features of the clinical course of chronic bronchitis in the southern Aral Sea // Avtoref. dis... d.m.s.-Tashkent.- 1994,- 39 P.
8. Sultanov F.F. Ecological and physiological aspects of human life in an arid region // Abstracts of the III Congress of Physiologists of Turkmenistan. - AshgariAd. - 1996.-P.13-15.
9. Yusupalieva M.M. Dynamics of the quality of life of patients with bronchial asthma at the stage of rehabilitation treatment with the use of physiotherapeutic methods. XXIV National Congress on Respiratory Diseases, Proceedings of the Congress, Moscow, October 14-17, 2014 -P. 225.
10. Khazratov U.Kh., Narziev Sh.S. Therapeutic efficacy of licorice root in reflux asthma. Collection of articles of the VII international scientific conference "Priority directions in the field of science and technology in the XXI century". 2014. P.90-92.
11. Khazratov U.Kh., Narziev Sh.S., Erkinova N.E. Evaluation of the effectiveness of ultrasonic inhalation in reflux-induced asthma. Therapeutic Bulletin of Uzbekistan. No. 3, 2019.-P.51-54.
12. Khazratov U.Kh., Narziev Sh.S. The use of nebulizer therapy in reflux-induced asthma. Theoretical and Clinical Medicine 2019 yil. No. 4. -p.47-50.

13. Khan M.A., Liang N.A., Mikitchenko N.A., Radetskaya L.I. High-frequency chest oscillation in the complex treatment of children with bronchial asma. Allergology and immunology in pediatrics. 2015.- No. 1 (40). -WITH. 26-32.
14. Global Initiative for Asthma, 2015. [http://www. Ginasthma. Org](http://www.Ginasthma.Org).
15. Mannino D.M. Surveillance for asthma-United States, 1988-1999//MMWR Morb. Mortal. Wkly Rep. 2002 Vol. 51. P. 1-13.
16. НурбаевФ. Э., ТошеваХ. Б. СкринингСердечно-СосудистыхЗаболеванийУСпортсменов //CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES. – 2021. – С. 8-9.
17. Khalilova F. A. et al. COMORBIDE CASES IN CARDIORENAL SYNDROME AND ITS IMPACT ON PATIENTS'QUALITY OF LIFE //EDITOR COORDINATOR. – 2020. – С. 741.
18. Aslonova I. J. et al. The prevalence of chronic pyelonephritis in women with disturbed tolerance for glucose //Asian Journal of Multidimensional Research (AJMR). – 2019. – Т. 8. – №. 11. – С. 81-85.