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The effectiveness of the use of gas-liquid skin treatment in combination with barophoresis of autologous plasma, rich in platelets, in the treatment of patients with rosacea (pilot study)

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Purpose. To evaluate the efficacy of the combination of gas-fluid skin treatment in combination with barophoresis with autologous plasma rich in thrombocytes in the treatment of patients with rosacea.

Material and methods. The study involved 20 patients with rosacea aged 43 to 62 years who underwent barophoresis procedures with autologous platelet-rich plasma. The results were evaluated after each visit using the Rosacea Diagnostic Assessment Scale (DIA) and facial imaging system.

Outcomes. After completing the course of procedures, 90% of patients noted the absence of rosacea effect on the quality of life, a decrease in the severity of clinical symptoms, and a decrease in the CRS index.

Conclusion. In our study, the method of gas-liquid skin treatment in combination with barophoresis with autologous plasma rich in platelets, which can be recommended for the course of treatment of erythematous-telangiectatic rosacea, showed high efficiency.

Key words: dermatology, rosacea, diagnostic evaluation scale, barophoresis, autologous platelet-rich plasma.

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Rosacea is a chronic inflammatory dermatosis characterized by facial skin lesions in the form of erythema and papulopustular elements and eye lesions. The disease is not subject to mandatory statistical accounting, but according to various authors, the incidence ranges from 1.5 to 10% [1, 2].

Rosacea is a disease that significantly worsens the quality of life. According to the National Rosacea Society (NRS), about 90% of patients with this disease report a decrease in self-esteem and self-confidence, and >40% of those surveyed reported that this causes them to avoid public contact or cancel social activities [2].

Clinically, there are 4 subtypes of rosacea:

1. Erythematous-telangiectatic is characterized by flushes to the face and persistent erythema; may also include visible blood vessels;
2. Papulopustular is characterized by persistent red-ta, with transitional papules and pustules;
3. Fimatous is characterized by thickening of the skin, which often leads to an enlarged nose from excess tissue;
4. Ophthalmorosacea is characterized by ocular manifestations such as dry eyes, lacrimation and burning, swelling of the eyelids, recurrent chalazions, which leads to potential loss of vision from corneal damage [3].

To date, there is no exact data on the cause of rosacea. It is believed that such factors as skin phototype (in persons with 1 and 2 phototypes, it is most common), genetic predisposition, stress, exposure to UV radiation or prolonged exposure to high or low temperatures, smoking, regular consumption of spicy and hot foods, hard physical labor can contribute to its development. There is a pre-assumption that rosacea can be considered as angio-neurosis, mainly in the zone of innervation of the trigeminal nerve.

The main links in the pathogenesis of rosacea include neurovegetative, vascular and immune disorders, as a result of which inflammatory processes, neoangiogenesis, oxidative stress, changes in the connective tissue of the dermis, and violation of the barrier function of the skin occur [4].

Previously, it was believed that the main cause of the rosacea is the presence of mites of the genus *Demodex folliculorum* in the sebaceous hair follicles of the facial skin. However, today the pathogenetic role of demodex is questioned [5].

Patients with rosacea have immune dysregulation. Activation of innate immunity leads to an increase in the production of cytokines and antimicrobial peptides. The antimicrobial protein cathelicidin (hCAP18), the level of which is higher in patients with rosacea than in healthy people, is found in neutrophil granules and lamellar bodies of keratinocytes; hCAP18 is secreted and cleaved to the active peptide form LL-37 by KKL5 and proteinase. It is important to note that LL-37 is expressed in neutrophils, mast cells, macrophages, and monocyte granules. In mast cells, LL-37 promotes degranulation and the release of inflammatory mediators. In the skin of people with rosacea, LL-37 is ex-compressed at higher levels and processed into shorter fragments. Fragments of this peptide form promote angiogenesis, induce leukocyte chemotaxis and participate in the production of pro-inflammatory cytokines.

In addition, patients with rosacea have high levels of Toll-like receptor 2 (TLR2) and matrix metalloproteinases (MMPs), which activate these processes [6].

Recent studies have shown the role of transient receptor potential (TRP) cationic channels in the pathogenesis of rosacea. TRPs are divided into 2 groups: vanilloid (TRPV) and ankyrin (TRPA) receptors. Activation of TRP leads to the release of neurogenic inflammation and pain mediators. These vasoregulatory neuropeptides are important mediators that cause 1. the persistent hyperemia characteristic of rosacea. The TRPV1 2. receptor is expressed at a higher level in patients with rosacea 3. [6]. 4.

The main goal of rosacea treatment is to achieve a stable remission. According to domestic clinical guidelines (2020), 5. external treatment is preferred for all types of rosacea, with the exception of hypertrophic - adenoceptors. Systemic antibacterial drugs, systemic retinoids, belladonna alkaloids + phenobarbital + ergotamine are used [4]. 1.

It is also recommended to use physiotherapeutic methods, 2. such as cryotherapy, microcurrent therapy, the use of incoherent intensive light (IPL) sources, diode, potassium-thitanylphosphate, alexandrite and long-pulse neodymium alluminum lasers (Nd:YAG lasers) [4].

In recent years, good results have been noted with the use of autologous plasma (PRP) – a highly concentrated plasma solution containing concentrated platelets, which, in turn, secrete growth factors (GFs) and plasma proteins released as a result of platelet degranulation from a-granules. In addition, PRP includes PDGF, TGF, VEGF, FGF, EGF, KGF, fibronectin, osteonectin, catecholamine, serotonin. These factors responsible for the biological role of PRPs induce early angiogenesis, improve ulcer healing, and modulate inflammation. The antibacterial mechanisms of PRP are not fully understood and are mainly related to GF, antimicrobial peptides and other active substances that are released after platelet activation and degranulation. In addition, PRP is bound to antimicrobial peptides such as human B-defensin-2 (hBD-2), suggesting that hBD-2 is an agent that enhances anti-infective capabilities.

M.T. Ghos et al. conducted a study in which the have demonstrated the efficacy of PRP in the treatment of rosacea. This is due to the strong anti-inflammatory and antibacterial effects of platelet-rich plasma. The data were clinically and histologically confirmed [7].

Given the decrease in the quality of life of patients with rosacea, the problem of rapid skin recovery and prolongation of the remission period is extremely relevant, and the search for ideal therapy is an important task for dermatologists.

The aim of the study was to evaluate the effectiveness of combining gas-liquid skin treatment in combination with barophoresis with autologous platelet-rich plasma in the treatment of patients with rosacea.

MATERIAL AND METHODS

The study involved 20 patients aged 43 to 62 years (mean age 51.5 ± 1.3 years) with rosacea of erythematous-telangiectatic form, who applied to the Center for Aesthetic Rehabilitation and Skin Pathology of the Federal State Budgetary Institution of the State Research Center named after A.I. Burnasyan of the FMBA of Russia, for the purpose of treatment.

Study Inclusion Criteria :

female gender;
facial redness;
telangiectasia (TAE);
feeling of tightness, peeling, dryness, burning of the skin of the face;
absence of chronic diseases of internal organs in the stage of decompensation, and diseases caused by obligate pathogens (syphilis, HIV, hepatitis B, C).

Exclusion Criteria:

Cancer;
the presence of thrombocytopenia.

All patients, after explaining the purpose of the study, signed an informed voluntary consent to participate in the study.

Methods of examination of patients included the collection of complaints and detailed anamnesis, an objective clinical examination, a complete blood count with a quantitative assessment of platelets. For photographic fixation, Reveal Imager (Canfield Imaging Systems, USA) was used - a facial visualization system that provides clear images and provides detailed information about the condition of the skin. The shooting was carried out using daylight, with a flash with cross-polarization. Visualization of the surface layers of the skin and its relief was carried out, and the condition of the vessels was assessed.

At the first visit and 2 weeks after the completion of the course of procedures, patients filled out a questionnaire to determine the dermatologic quality of life index (DICJ), consisting of 11 questions that determined the level of influence of rosacea on the social and domestic life of women. Each question was evaluated on a scale (from 0 to 3 points), the total amount of points was the quality of life index:

1. 0–1 point – does not affect life;
2. 2–5 points – slightly affected;
3. 6–10 points – moderately influenced;
4. 11–20 points – very strong;
5. 21–30 points – extremely influential.

The patient's venous blood was collected in tubes with an anti-coagulant – sodium citrate, after which it was centrifuged for 5 minutes at a rotation speed of 800 rpm until 3 layers were obtained (centrifuge EVA-200, Germany). The middle platelet-rich layer was extracted using a laboratory dispenser, and the resulting plasma was activated with calcium gluconate.

The procedure was carried out on the Jet-Peel device (Israel) in 2 stages:

6. Stage 1 – gas-liquid treatment of the skin of the face and neck for the purpose of lymphatic drainage;
7. Stage 2 – treatment with autologous platelet-rich plasma using the barophoresis procedure.

The patients underwent 6 procedures with an interval of 1 time a week.

The Jet Peel device has a built-in compressor that supplies gas under high pressure to a nozzle with a narrow nozzle.

The throttle accelerates to supersonic speed. Through the built-in conductor, saline solution (or an injectable form of any water-soluble drug) is passively sucked into the nozzle. Liquid droplets mix with gas and form a gas-liquid jet, which affects the skin. The speed of microdroplets of saline solution when leaving the nozzle is 200-300 m/s. Under the influence of the stream, the socket is pressed on the skin, the intercellular connections of the epidermis expand or break, which leads to the peeling effect. Barophoresis of gas and liquid into the intercellular space also occurs. Static pressure and cold around the jet provide an increase in the pain threshold, as a result, the sensations are painless, not requiring anesthesia. During the procedure, a person experiences only a pleasant blowing with a powerful, cool stream of air, which does not cause any discomfort.

The technique of gas-liquid treatment: the gas used is air or oxygen, 0.9% sodium chloride solution is used as the liquid component of the jet. The massage is carried out along the classic massage and lymphatic drainage lines. Under the influence of the stream, a socket is formed on the skin, which is a landmark when performing a massage. The hole is formed both at the angle of inclination of the nozzle at 90° and 45°. The recommended nozzle is a three-nozzle nozzle. The distance from the skin to the tip of the nozzle during gas-liquid massage is 1.0-1.5 cm. With a small content of subcutaneous fat and a tendency of the skin to dryness, it is recommended to use linear movements; For oily skin, both linear and zigzag movements of the nozzle are more often used. All movements in the massage are repeated 8-10 times.

The PRP-S32 nozzle was used for barophoresis, and the nozzle tilt angle is 90°. The distance from the skin to the tip of the nozzle is 0.5-1.0 cm. The procedure is carried out along the massage lines, and it can also be mimic wrinkles or other problem areas. The technique of injecting drugs by barophoresis can be point, linear and scanning. When treating the skin of patients with rosacea, a linear technique of plasma injection was used. The time of point exposure was 2-3 s, while there was a slight local hyperemia of the treated area, which disappeared in a few minutes. On average, about 2.0-2.5 ml of the drug was required to treat all problem areas of the face. The duration of one procedure was 10-15 minutes.

The results were evaluated after each visit using the Rosacea Diagnostic Assessment Scale (DIA), which allows you to assess the severity of rosacea disease: the degree of erythema (from 0 to 3, where 0 is not perceptible; 1 is mild; moderate; 3 is severe), the number of papules and pustules (from 0 to 3, where 0 is 10; 1 – from 11 to 20; 2 – from 21 to 30; 3 – >30), the presence of TAE (from 0 to 3, where 0 – absent; 1 – for-take <10% of the face; 2 – from 11 to 30%; 3 – >30%), dry skin and the presence of peeling (from 0 to 3, where 0 – no dryness; 1 – mild; 2 – moderate, with slight peeling; 3 – severe, with pronounced peeling), the presence of some subjective sensations, namely the feeling of burning and pricking of the skin (from 0 to 3, where 0 is the absence of subjective sensations; 1 – subjective sensations are weak; 2 – moderate; 3 – strong).

RESULTS AND DISCUSSION

The study of the anamnesis of the examined patients showed that hypertension was diagnosed in 10 (50%) patients, vegetative-vascular dystonia in 6 (30%), somatic pathology was absent in 4 (20%). The presence of rosacea in a first-line relative (mother) was noted by 6 (30%) women, bad habits (smoking >15 years) were noted in 7 (35%) patients.

At the first visit, among the complaints were the presence of spider veins/dilated vessels in 20 (100%) patients, redness and dryness of the skin of the face in 18 (90%), a feeling of tightness in the skin of the face in 12 (60%), peeling and burning in 8 (40%). 20 (100%) women complained of subjective sensations of moderate severity, of which 10 (50%) patients had subjective sensations of moderate severity, and 10 (50%) patients had pronounced sensations.

2 weeks after the completion of the course of procedures, 18 (90%) patients had no complaints, and only 2 (10%) women noted a burning sensation in the skin of the face, and they also noted subjective sensations of an insignificant degree.

At the first visit, according to the DICJ, 10 (50%) women noted a very strong impact of the disease on life, 4 (20%) noted a moderate one, 4 (20%) noted a slight one, and an extremely strong – 2 (10%).

According to the DICJ, after completing the course of procedures, 18 (90%) patients noted the absence of rosacea effect on the quality of life, and 2 (10%) had an insignificant effect.

Clinical examination at the first visit revealed erythema in 20 (100%) patients, of which mild in 4 (20%) cases, moderate in 10 (50%) cases, and severe erythema in 6 (30%) cases. TAE was also detected in all 20 (100%) patients, of which in 2 (10%) women, TAE occupied <10% of the face, in 10 (50%) – from 11 to 30% of the face, in 8 (40%) – >30%. Dry skin and the presence of peeling were recorded in all 20 (100%) cases: 6 (30%) patients had moderate dryness with slight peeling, 14 (70%) patients had severe dryness with pronounced peeling.

Clinical examination 2 weeks after completion of the course of procedures revealed erythema in 8 (40%) patients, of which 6 (30%) were mild, and 2 (10%) were moderately pronounced (see Risunok). TAEs were detected in all 20 (100%) patients, of which 12 (60%) women had <10% of the face, and 6 (30%) had TAE from the 11 to 30% of the face, 2 (10%) – >30%. Dry skin and the presence of minor peeling were recorded only in 2 (10%) cases.

The analysis of the results obtained showed that at the first visit in the study group, the overall value for the CRS was 6–11 points, at the final appointment – 1–5 points

CONCLUSION

The most significant endogenous factors in our study were diseases of the cardiovascular system, as well as genetic predisposition, and smoking was an exogenous factor. The identified risk factors for rosacea are consistent with the data of the literature.

When clarifying the complaints, complaints about dryness, tightness of the skin of the face and the presence of spider veins prevailed, that is, the patients were bothered not only by discomfort, but also by a cosmetic defect, which is important in the communicative and psycho-emotional state of women.

When assessing subjective sensations according to the SDOR, all patients noted moderate and pronounced subjective feelings, that is, women sought medical help already at the stage of disease progression. However, after a course of procedures, 90% of patients noted a stable positive trend and did not complain.

In the study of DICG, most women noted a significant deterioration in the quality of life before treatment, after a course of procedures, 90% of patients noted a significant improvement in their condition.

At the clinical examination at the first appointment, most patients were diagnosed with erythema, with moderate to severe erythema in 80% of cases; TAE of varying degrees of severity were recorded in all patients, dryness and peeling in all patients, that is, clinical symptoms were also pronounced in all patients. After a course of procedures, the clinical picture was transformed mainly into an insignificant and mild degree of severity.

Thus, rosacea is a chronic disease, in the development of which both exo- and endogenous risk factors play an important role. This disease has a negative impact on the communicative, psycho-emotional and sexual life of patients. In most cases, women turn to the doctor already at the stage of vivid clinical manifestations, feeling significant discomfort and presenting active complaints, in connection with which the development of new effective non-invasive comfortable methods of correcting this chronic process is relevant. In our study, the method of gas-liquid treatment of the skin in combination with barophoresis, autologous plasma rich in platelets, which can be recommended for the treatment of erythematous-telangiectatic rosacea, showed high efficiency.

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The authors declare that there are no possible conflicts of interest.

*The study had no sponsorship. Received/The article received: 25.10.2024. Accepted: 08.11.2024*In the DICG study, most women noted a significant deterioration in the quality of life before treatment, after a course of procedures, 90% of patients showed a significant improvement in their condition.

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EFFECTIVENESS OF GAS-LIQUID SKIN TREATMENT IN COMBINATION WITH BAROPHORESIS OF AUTOLOGOUS PLATELET-RICH PLASMA IN THE TREATMENT OF PATIENTS WITH ROSACEA (PILOT STUDY)

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Purpose. To evaluate the effectiveness of a combination of gas-liquid skin treatment in combination with barophoresis with autologous platelet-rich plasma in the treatment of patients with rosacea.

Materials and methods. The study involved 20 female patients with rosacea aged 43 to 62 years, barophoresis procedures with autologous platelet-rich plasma were performed. The results were evaluated after each visit according to the rosacea diagnostic assessment scale and facial imaging system.

Results. After completion of the course of procedures 90% of patients noted absence of rosacea influence on the quality of life, reduction of clinical symptomatology severity, also the index on the rosacea diagnostic assessment scale decreased.

Conclusion. In our study, the method of gas-liquid skin treatment in combination with barophoresis of autologous platelet-rich plasma showed high efficiency, which can be recommended for the course treatment of erythematotelangiectatic rosacea. **Key words:** dermatology, rosacea, diagnostic assessment scale, barophoresis, autologous platelet-rich plasma.

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