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# APPLICATION OF INTENSIVE LIGHT RADIATION IN THE PATIENT WITH ERYTHEMATOTELANGIECTATIC ROSACEA

## Abstract

We present a case report of a patient with erythematotelangiectatic form of rosacea. Rosacea is a chronic recurrent dermatosis, characterized by skin lesions of the face in the form of erythema and papulopustular elements, which has polyethiological origin. The disease occurs more frequently in women aged 30-50 years who have a certain genetic predisposition to transient face hyperemia, less often — hyperemia of the neck and décolleté zone. It is believed that individuals with I and II phototypes are more prone to dermatosis, but the disease can occur in any skin phototype. The patient was admitted with complaints on rashes in the chin area and nasolabial triangle, flushing of the face, accompanied by tingling and burning. She never consulted a dermatologist before. The patient was diagnosed with: erythematotelangiectatic form of rosacea (according to the classification proposed by National Rosacea Society in USA, stage I — persistent erythema and telangiectasia). The score according to Rosacea Diagnostic Evaluation Score (RDES, the Russian Score) was 12 points. There are many approaches to rosacea treatment. Drug therapy is divided into systemic, topical and complex schemes. Systemic therapy has a number of side effects, so for mild and moderate-to-severe rosacea, just topical therapy is often prescribed. Because of the presence of pathologically altered vessels and low efficacy of metronidazole, a course of phototherapy with intense incoherent pulsating light at standard parameters was prescribed. There was a significant improvement after two procedures, but vessels smaller than 0.4 mm remained intact, so the duration of the first pulse was increased in order to influence small-caliber vessels. Individual selection of parameters (duration of the first impulse and energy density) was performed based on the dermatoscopic pattern and patient's phototype, which resulted in a significant clinical effect and persistent remission. RDES score was 1 point after treatment. This clinical case demonstrates the effectiveness of phototherapy with intense incoherent pulsating light with individual selection of the duration of the first pulse and energy density in patients with erythematotelangiectatic rosacea. In IPL-treatment schemes, it is desirable to select individual parameters for the duration of the first pulse and energy density, based on the features of the dermatoscopic pattern and skin phototype of each patient.

***Key words:*** *rosacea, erythematotelangiectatic subtype, Intense Pulsed Light Therapy, pulse duration, Demodex*

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IPL — Intense Pulsed Light

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## Introduction

Rosacea (ICD-10 L71) is chronic recurrent dermatosis characterized by skin lesions in the form of erythema and papulopustular elements having a polyethiological origin. The disease is more common in women aged 30 to 50 years with a certain genetic predisposition to transient face hyperemia, less often — hyperemia of the neck and décolleté zone [1]. It is believed that individuals with I and II phototypes are more prone to dermatosis, but the disease can occur with any skin phototype [1].

In Europe, the incidence of rosacea ranges from 1.5 to 10%. According to Russian authors, rosacea accounts for about 5% of all dermatological diagnoses [2]. In the USA the percentage of rosacea among dermatoses ranges from 8 to 9%, and in Scandinavian countries and Germany — from 7 to 10% [3].

There are 4 main subtypes of rosacea (corresponding to erythematous, papulopustular, hypertrophic stages and ophthalmic rosacea in previous classifications) and one type — granulomatous rosacea.

Rosacea subtypes:

- Subtype I — erythematotelangiectatic.
- Subtype II — papulo-pustular.
- Subtype III — phymatous.
- Subtype IV — ocular [1].

The disease may be accompanied by severe psychological discomfort in patients. There is a high degree of anxiety, vulnerability, stress associated with the outward appearance of patients [4].

There are many approaches to the treatment of rosacea. Drug therapy is divided into systemic, topical or complex therapy. Antibiotics from the group of tetracyclines, macrolides, and systemic retinoids are most often used for systemic therapy [1]. The drug of choice is doxycycline [1]. However, systemic therapy has a number of side effects, therefore, in mild and moderate rosacea only topical therapy is more often prescribed [5].

A number of studies have proven the efficacy of IPL-systems (Intense Pulsed Light) in the treatment of the erythematotelangiectatic subtype of rosacea [6]. IPL-therapy is characterized by minimal side effects and prolonged remission after treatment, and therefore topical drugs lose their relevance [5, 7].

We present a clinical case of treatment with intense light radiation in a patient with the erythematotelangiectatic subtype of rosacea.

## Case Report

Female patient N, 40 years old, came to the clinic with complaints of periodic rashes on the chin and in nasolabial triangle, as well as facial hyperemia periodically accompanied by tingling and burning in this area. Transient facial hyperemia has occurred during the last ten years with intake of spicy food, red wine, psycho-emotional stress. Over the past year, the frequency of the above complaints has increased considerably — up to several times a day. Erythema of the nasolabial triangle region has become persistent (**Figure 1**).

The female patient experienced severe psychological discomfort, and she attributed the loss of her job to her appearance. She started avoiding friends. She had never consulted a dermatologist before.

Status localis: during the first consultation with the dermatologist, there were symmetrically dilated vessels, telangiectasia and isolated exacerbated

***Figure 1.*** *Erythema of the nasolabial triangle*

papules in the chin area. Fitzpatrick skin phototype II. The skin of the trunk, upper and lower extremities was of normal color and free from rashes.

Dermatoscopy revealed dilation and branching of blood vessels of different caliber, follicular plugs and scales.

The patient was diagnosed with: erythematotelangiectatic form of rosacea (according to the classification proposed by National Rosacea Society in USA, stage I — persistent erythema and telangiectasia). The score according to Rosacea Diagnostic Evaluation Score (RDES, the Russian Score) was 12 points [8].

Counseling by psychotherapist: the state of consciousness was normal. All kinds of orientation are preserved. Delirium and perceptual deception are not revealed. She has contact willingly, but has difficulties in articulating complaints. She reports paroxysmal itching in the face comparable with insect bites. At the same time there is an irresistible desire to strongly scratch the itchy area of the skin. When she tries to hold back the state becomes painfully unbearable: internal stress rises dramatically, she may lash out and shout at those around. She can restrain herself for a few minutes at most. She notes that itching is exacerbated by stressful situations. She knows in advance when the exacerbation will occur. The urge to scratch the skin increases on with conflicts and troubles. Borderline affective disorders with obsessive and phobic symptoms present in the mental status. Personality traits with anxiety suspiciousness, adhesiveness, pedantry and compulsion. Criticism to own status is preserved. She expresses a desire to undergo psychotherapy.

Conclusion: obsessive-compulsive disorder F42. A course of cognitive behavioral therapy is recommended.

Consultation with a gastroenterologist: biliary dyskinesia of hypokinetic type. Recommendations: diet No. 5, 10% solution of magnesium sulphate in amount of 1 tablespoon 2–4 times per day 10–15 minutes before meals, tincture of ginseng.

Consultation with a gynecologist-endocrinologist: no pathology was revealed.

Test for Demodex folliculorum: positive.

Prescribed treatment: metronidazole gel 0.75% in the morning, metronidazole cream 1% at bedtime, applied in a thin layer under occlusive dressing on pre-cleansed skin. The patient was recommended skin care using mild cleansing, moisturizing and photoprotective agents designed for sensitive skin, and to avoid aggressive cosmetic procedures.

At the dermatologist's appointment in 8 weeks: the patient notes improvement, burning in erythema area disappeared. Symmetrically dilated vessels and telangiectasia were on the facial skin. Erythema is persistent (**Figure 2**). Papules are observed, no excoriation. RDES score was 10.

Dermatoscopy: without changes.

Taking into account the pronounced vascular changes on the face and the slight effect of metronidazole, the patient was prescribed a course of phototherapy with intense incoherent pulsed light. The treatment was carried out using a device that transmits a wavelength of 560 nm and can change the number and duration of pulses, energy density and delay time between pulses. The procedures were carried out with frequency of once a month. The facial skin was treated with two passes in staggered order with a time interval of 2 seconds between pulses. The spot size of

***Figure 2.*** *Erythema of the nasolabial triangle (after 8 weeks)*

***Figure 3.*** *The course of phototherapy*

***Figure 4.*** *Type of erythema of the nasolabial triangle after 2 procedures of phototherapy*

***Table 1.*** *Scheme of treatment of patient N*

| № procedure | Program | Pulse Type | Pulse width 1 (ms) | Pulse width 2 (ms) | Delay (ms) | Energy density (J / cm²) |
|---|---|---|---|---|---|---|
| 1 | Program 1 | Double | 2,0 | 4 | 15 | 24 |
| 2 | Program 1 | Double | 2,0 | 4 | 15 | 26 |
| 3 | Program1 (User defined pulse type parameter) | Double | 2,2 | 4 | 15 | 28 |
| 4 | Program1 (User defined pulse type parameter) | Double | 2,2 | 4 | 15 | 28 |
| 5 | Program1 (User defined pulse type parameter) | Double | 2,4 | 4 | 15 | 28 |
| 6 | Program1 (User defined pulse type parameter) | Double | 2,4 | 4 | 15 | 30 |

the handpiece was 8 × 34 mm². Cooled gel was applied on the treated surface beforehand. Application anesthesia was used (**Figure 3**).

The first two procedures were carried out using standard parameters laid down by the manufacturer (duration of the first pulse of 2.0 ms, duration of the second pulse of 4.0 ms and delay time of 15 ms). Clinical improvement was achieved in the patient: erythema became less pronounced, the area of telangiectasia decreased, RDES — 5 points (**Figure 4**).

The dermatoscopic picture has improved significantly, and most of the dilated vessels were small-caliber vessels, which remained intact, while vessels with a diameter of more than 0.4 mm were coagulated. Given the situation it was decided to increase the duration of the first pulse to affect small-caliber vessels.

Therefore, from the third to the sixth procedure we consecutively increased the duration of the first pulse from 2.0 ms (1 and 2 procedures) to 2.2 ms (3 and 4 procedures) and to 2.4 ms (5 and

***Figure 5.*** *Type of erythema of the nasolabial triangle after 6 procedures of phototherapy*

***Figure 5A.*** *Type of erythema of the nasolabial triangle after 6 procedures of phototherapy*

6 procedures). The energy density varied from 24 to 30 J/cm$^2$. After a course of six procedures, a significant clinical improvement was achieved: erythema became insignificant, telangiectasia regressed, RDES — 1 point (**Figures 5 and 5A**). Dermatoscopy revealed a decrease in the number of vessels of different caliber, including vessels with a diameter of less than 0.4 mm, a decrease in the sizes of the stoma of the hair follicles.

Test results for *Demodex folliculorum*: negative.

After the therapy, the patient was followed-up, during the first month — every other week, and then every six months. After 24 months, there was a positive permanent clinical effect.

## Discussion

We presented a clinical case of IPL-therapy in a female patient with erythematotelangiectatic form of rosacea with individual selection of the duration of the first pulse and energy density resulting in long-term clinical remission.

In 1997, the IPL-system was for the first time used to treat benign vascular skin lesions [9]. Many clinical studies confirm the efficacy, safety and long-term outcomes of this method [9, 10].

Kubanova A. A. and Makhackova Yu. B. describe the results of IPL-treatment efficacy with change of energy density depending on the subtype of the disease and the skin phototype of the patients [11]. In this clinical case, not only the energy density was changed during treatment, but the duration of the first pulse was also consistently increased to 2.4 ms, which made it possible to achieve photothermolysis of pathologically altered vessels with a diameter of less than 0.4 mm. The parameters of the duration of first radiation pulse should be selected individually for each patient taking into account the level at which the epidermis absorbs the energy of photons (phototype of the particular patient), as well as the target on which we want to act. In the erythematotelangiectatic form of rosacea, oxyhemoglobin, which is contained in the vessels, is used as a target. For implementation of selective photothermolysis of pathologically altered vessels it is necessary for the target vessel to have a higher radiation absorption coefficient than chromophores in the surrounding tissues, and for the duration of light exposure to be short enough to prevent irreversible thermal damage to the tissues adjacent to the target vessel [12].

Course treatment with IPL-systems is usually carried out using standard or empirically verified parameters [7, 10]. Photothermolysis of vessels with a diameter of less than 0.4 mm was achieved, and thus the results of IPL-therapy were improved due to longer duration of the first pulse.

## Conclusion

We presented a clinical case of treatment in a female patient diagnosed with erythematotelangiectatic form of rosacea, who reported significant clinical improvement after a course of phototherapy with intense pulsed light. In IPL-treatment regimens it is desirable to choose the individual parameters for the duration of the first pulse and the energy density based on the characteristics of the dermatoscopic pattern and the skin phototype of each patient.

### Conflict of interests

The authors declare no conflict of interests.

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