

Efficacy of Photo Therapy in the Treatment of Vitiligo

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ABSTRACT

Vitiligo is characterized by sudden loss of pigment anywhere on the skin. Foci of depigmentation are prone to peripheral growth, appear as a result of a violation of the secretory function of melanocytes or their death. The development of the disease is not accompanied by subjective symptoms, does not pose a threat to life, but is an unfavorable factor that has a serious impact on the quality of life, the psycho-emotional state of the patient, his mood and leads to disruption of social ties and maladaptation. According to WHO, there are up to 40 million people in the world (about 2.8% of the world's population) suffering from this disease.

Introduction: Vitiligo occurs everywhere regardless of race, gender or age, occurs at any age, but most often from 8 to 25 years. Until now, it is not clear what factors result in abrupt termination of melanin synthesis and death of melanocytes. Some exogenous factors may have a direct or indirect effect on melanocytes - infective, chemical and toxic agents, excessive ultraviolet radiation, stress. At the same time, chronic liver diseases of infectious or toxic origin, helminthic invasion, combination with autoimmune diseases (autoimmune thyroiditis, lupus erythematosus, rheumatoid arthritis, alopecia areata, atonic diseases) can probably contribute to the appearance of vitiligo. Vitiligo is a multifactorial disease with a genetic predisposition. A significant number of genes involved in the pathogenesis of vitiligo have been identified, but it is not yet possible to name the key ones. Currently, several theories of the pathogenesis of vitiligo have been formulated, among which the theory of immune dysregulation of melanogenesis, the neurogenic theory and the theory of oxidative stress are considered the most reasonable. Research in the field of immunology confirms the critical role of cell-mediated reactions in the development of the autoimmune process, as well as in violation of the immune regulation of melanogenesis. At the same time, the results of numerous studies are often contradictory and conclude statements regarding both pronounced changes in the subpopulation nature, and violations of the activation and synthetic ability of immune system cells in vitiligo. Therefore, research in this area is still relevant. Vitiligo, according to a number of researchers, can occur after stress, in turn, the appearance of depigmented foci causes a stress-dependent state, expressed in the development of autonomic, neuroendocrine, immune, metabolic and trophic dysfunctions that form a picture of psycho-emotional disorder. The formation of affective disorders is accompanied by neurophysiological, neurochemical disorders, a vicious circle is created that contributes to the maintenance of the pathological process and the emergence of new foci of depigmentation. The results of studying the causes and mechanisms of development of vitiligo do not give an unambiguous answer, and therefore the treatment of this disease is still one of the most difficult problems. Considering vitiligo as an autoimmune process, foreign researchers use

immunosuppressive therapy with systemic corticosteroid drugs, cyclosporine, which cause inhibition of the processes of activation of immune system cells. On the one hand, these treatments can be effective at the onset of the disease, on the other hand, they cause serious complications and side effects. Insufficiently high efficiency, and with the long-term existence of vitiligo, the lack of effect and high risks of complications and side effects limit the widespread use of these methods of treatment. In modern medicine, in the complex treatment and prevention of vitiligo, medicinal immunocorrective drugs are traditionally used. The chronic persistent nature of dermatosis with an immune component in pathogenesis requires long-term use of this group of drugs. However, given the need for their long-term use, there is a high risk of developing a wide range of side effects and a tolerance syndrome to the drug taken, as a result of which foreign researchers are currently studying the clinical efficacy of non-steroidal inhibitors of pro-inflammatory cytokines pimecrolimus and tacrolimus, as a result of which the spectrum of side effects decreases. action, with various forms of vitiligo. Also, many authors emphasize the high effectiveness of the combination of treatment with ultraviolet physiotherapy. Therefore, to date, ultraviolet physiotherapy for vitiligo is considered the safest and most popular treatment for various forms of vitiligo. Experimental studies have shown the high efficiency of phototherapy using ultraviolet rays in the UVB range (280–315 nm). It has been proven that rays with a wavelength of more than 315 nm (UVA) are ineffective in the treatment of vitiligo, and short-wavelength UVC radiation causes mutations and is carcinogenic. UVB

Materials and methods

The study was conducted on the basis of the regional dermatovenerological dispensary. The study was conducted in the period of time from 2019-2020. We conducted a randomized comparative study of seventeen male patients with extensive depigmented spots on the face, which were snow-white when viewed from the Wood's lamp, were clinically diagnosed with vitiligo, and they were examined in the regional dermatological dispensary of the city of Samarkand. These patients had chronic vitiligo that remained stable for 3 to 10 years. They had previously been treated with various topical medications, including topical steroids and calcipotriene, for at least two years (2 to 6 years) without significant repigmentation. For treatment, the excimer laser was chosen in combination with vitamin D for topical application twice a day. Laser therapy was administered twice a week until patients developed significant repigmentation. Patients began using the excimer laser at a dose of 200 mJ/cm², which increased by 10 percent per visit, until patients experienced phototoxic side effects, including severe erythema and blistering. The treatment dosages were then maintained or reduced by 10 percent depending on the severity of the side effects. None of the patients discontinued treatment due to side effects of laser therapy. The total number of procedures, the duration of treatment and the average dose of laser energy were recorded. As in other studies, we selected percent repigmentation as the main scoring criterion with ranges: <25, 25–50, 50–75, and >75 percent.

Results:

All patients received the recommended course of treatment, which included laser therapy with topical vitamin D. Table 1 shows the effect of combination therapy on patients. Seven out of sixteen patients achieved over 75% repigmentation after 22 treatments or less. Nine patients achieved similar results, but after 40 treatments. There was no correlation between the average dose of laser energy exposure and the percentage of repigmentation. Table number 1.

Количества больных:	Возраст больных	Длительность проведенных процедур	Количество проведенных процедур.	Доза облучения лазером.	Репигментация %
4	18-25	11 недель	22	220	>75
3	26-31	10 недель	20	308	>75
2	32-36	16 недель	35	350	>75
7	37-41	20 недель	40	380	>75

Discussion:

Vitiligo is a chronic, psychologically debilitating and difficult to treat condition. Many of the treatments currently in use require treatment intervals exceeding one year to achieve obvious repigmentation. In this study, patients achieved over 75% repigmentation of facial lesions within 10 to 20 weeks.

There are many theories explaining the effectiveness of light therapy in the treatment of vitiligo. Data show that inactive melanocytes present in the outer sheaths of hair follicles persist in people with vitiligo. The initiation of therapy can then induce the maturation of these platelet melanocytes, with an initial migration up the hair follicle with a final extension into the epidermis. In addition, those characterized by a reduced hairline potential have the most resistant areas.

Seven patients in this series achieved excellent results (>75% repigmentation) in a short time (5 months or less) compared to other treatments such as topical steroids, PUVA, and NB-UVB. These patients achieved rapid results with such excellent results due to the increased sensitivity of the facial hair follicles to the excimer laser. Further research on the prognosis of response to excimer laser therapy may provide further insight into the disease process.

Some studies show that people in different age groups from 18 to 31 may respond faster to therapy and have better results than age groups from 32 to 41. Further research is needed with more applications performed by skin type.

Conclusion

The excimer laser has proven to be a useful tool in the treatment of vitiligo. Patients treated with an excimer laser achieve excellent results within a few months rather than many months or years. More data is needed to determine whether skin type, sex, or other characteristics of hair follicles lend themselves to a greater response to excimer therapy. More broadly, there are very few assessments of recurrence rates in patients undergoing any kind of light treatment. This information will be critical to the patient's decision making and deserves attention.

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