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THE SIGNIFICANCE OF ASSESSMENT OF THE EFFECTIVENESS OF ULTRAVIOLET RADIATION IN PURFURIC-INFLAMMATORY DISEASES AND THE SIGNIFICANCE OF TREATMENT RESULTS

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Annotation

Purulent-inflammatory diseases are common in clinical practice and are associated with a high risk of complications, prolonged disease course and increasing antimicrobial resistance. Therefore, the search for effective adjunctive therapeutic approaches remains highly relevant. This article analyzes the clinical efficacy and pathogenetic significance of ultraviolet (UV) irradiation in the treatment of purulent-inflammatory diseases. The study is based on a systematic review of contemporary domestic and international scientific literature, as well as the synthesis of available clinical and experimental data. The findings indicate that local UV therapy contributes to a reduction in microbial load, faster wound decontamination, early formation of granulation tissue and acceleration of epithelialization processes. In addition, systemic UV applications have been shown to modulate immune responses and improve the overall clinical condition of patients. It was determined that individualized dosing regimens, strict adherence to safety measures and the combined use of UV irradiation with antibiotic therapy are key factors enhancing treatment efficacy. The results support the use of ultraviolet irradiation as an effective adjunctive modality in the comprehensive management of purulent-inflammatory diseases.

Keywords

ultraviolet irradiation, purulent-inflammatory diseases, phototherapy, bactericidal effect, immunomodulation, regeneration.

INTRODUCTION

Purulent-inflammatory diseases are widespread in modern medical practice, they are an important problem in surgery, dermatology, traumatology, dentistry and other clinical areas. These pathologies are characterized by a severe clinical course, a tendency to complications, a long duration of treatment, and a high risk of relapse. The chronicity of purulent processes reduces the quality of life of patients and creates a significant socio-economic burden for the healthcare system [1].

Although antibiotic therapy has been the leading treatment for purulent-inflammatory diseases in recent years, the increasing resistance of pathogenic microorganisms to antibiotics significantly limits the effectiveness of this approach. The increase in nosocomial infections, the widespread spread of biofilm-forming microorganisms, and the side effects associated with long-term use of antibacterial drugs increase the need to search for alternative and complementary treatment methods.

In this context, physical and physiotherapeutic treatment methods, in particular, ultraviolet (UV) radiation-based therapies, are once again becoming the focus of attention in clinical practice. Ultraviolet radiation is a biologically active part of the electromagnetic spectrum, and its antimicrobial, anti-inflammatory, and immunomodulatory effects have been widely documented in the scientific literature. UV radiation suppresses the proliferation of pathogenic microorganisms by photochemically affecting their nucleic acids, while also improving microcirculation in tissues and activating reparative processes [2]. Scientific sources have

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shown that local application of ultraviolet radiation accelerates the biological cleansing of the wound surface, stimulates the physiological formation of granulation tissue, and leads to an acceleration of the epithelialization process. Systemic UV methods have positive effects on modulating the activity of the immune system, reducing the level of endogenous intoxication, and improving the general clinical condition of patients. At the same time, the optimal dosage regimens, clinical efficacy, and safety issues of ultraviolet radiation use have not yet been sufficiently systematized.

The purpose of this study is to analyze the clinical efficacy and pathogenetic significance of ultraviolet radiation in purulent-inflammatory diseases and to scientifically substantiate the possibilities of its use in a complex treatment system.

MATERIALS AND METHODS

This study aimed to assess the clinical and pathogenetic effectiveness of the use of ultraviolet (UV) radiation in purulent-inflammatory diseases, and was conducted on the basis of a systematic review of the scientific literature and a generalization of available clinical and experimental data. The study is analytical-review in nature and does not include experimental or invasive clinical interventions. The analysis included domestic and foreign scientific sources devoted to the use of ultraviolet radiation in purulent-inflammatory processes. The main criteria for selecting literature were their scientific reliability, methodological validity and clinical significance. Clinical observations, experimental studies and review articles published over the past 10 years (2014–2024) were mainly used [3,4,5,6].

In the process of analyzing clinical data, the local state of purulent-inflammatory foci, including the rate of wound surface cleansing, the time of granulation tissue formation, the onset of the epithelialization process, and the duration of the overall healing were considered as the main assessment criteria. In addition, the clinical signs characteristic of the inflammatory process — edema, hyperemia, pain syndrome, and the dynamics of pus discharge — were analyzed based on the data presented in the literature.

Based on the results of microbiological and experimental studies, the bactericidal and bacteriostatic effects of ultraviolet radiation on pathogenic microorganisms were evaluated. In this process, attention was paid to the mechanisms associated with the photochemical effect of ultraviolet radiation on the genetic apparatus of microorganisms, a decrease in microbial load, and a decrease in infectious activity. Also, based on the data presented in the literature, the immunomodulatory and regenerative effects of ultraviolet radiation were analyzed. In particular, the processes associated with the activity of the phagocytic system, changes in cytokine balance, fibroblast proliferation and collagen synthesis were summarized.

The methods of comparison, logical analysis and generalization were used to process the obtained data. The results of the study were aimed at assessing the role and significance of ultraviolet radiation in the treatment of purulent-inflammatory diseases, as well as identifying the possibilities of its inclusion in complex therapy.

RESULTS AND DISCUSSION

Evaluation of clinical effectiveness. An analysis of the available clinical and literature data shows that the use of ultraviolet (UV) radiation in purulent-inflammatory processes has a positive effect on the clinical course of inflammation. In most clinical observations, a relatively short-term decrease in the main signs of inflammation - edema, hyperemia and pain syndrome - was noted against the background of UV therapy. These changes were associated with a decrease in the activity of the infectious process and the delimitation of the purulent focus. According to the results of dynamic assessment of the wound process, in most observations it was found that when ultraviolet radiation was used, the biological cleansing of the wound surface was

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accelerated. The separation of necrotic tissue was observed at a relatively early stage, which created favorable conditions for the physiological formation of granulation tissue. As a result, the onset of the epithelialization process was accelerated and the overall duration of the wound healing process was reduced. The subjective state of patients also showed positive changes associated with the use of ultraviolet radiation. In most cases, a decrease in pain intensity and a decrease in local discomfort were noted, which contributed to the restoration of the general functional activity of patients. In some complex clinical cases, ultraviolet radiation allowed to reduce the volume of surgical interventions or postpone them. The dynamics of laboratory indicators also coincided with clinical observations. According to available data, in most cases, when ultraviolet radiation was used, a tendency to decrease hematological indicators characteristic of the inflammatory process - leukocytosis and erythrocyte sedimentation rate - was detected. This is explained by the anti-inflammatory and pathogenic process-limiting effect of ultraviolet radiation [7]. Discussion of microbiological and photobiological effects. The antimicrobial effect of ultraviolet radiation is widely covered in the literature, which is mainly associated with the photochemical effect on nucleic acids in the cells of pathogenic microorganisms. According to the analysis of the literature, ultraviolet radiation causes damage to the DNA structure, which in turn inhibits the replication and metabolic activity of microorganisms. A summary of the results of experimental and in vitro studies shows that the bactericidal and bacteriostatic effect of ultraviolet radiation depends on the applied spectral range and dosage regimen. In a number of observations, it was noted that ultraviolet radiation exhibited high antimicrobial activity against pathogenic bacteria and fungi. Changes in the composition of the microbiocenosis in the wound area against the background of ultraviolet radiation were also observed. In most observations, a decrease in the number of pathogenic and conditionally pathogenic microorganisms, a decrease in microbial contamination, and a partial restoration of microbiological balance were noted. Some sources indicate that ultraviolet radiation can increase the sensitivity of pathogens to antibiotics, which explains the synergistic mechanisms of action between ultraviolet radiation and antibiotic therapy. From a photobiological point of view, ultraviolet radiation increases oxidative stress in the cells of microorganisms, stimulating the formation of reactive oxygen species. This process is accompanied by lipid peroxidation and damage to cell membranes, which plays an important role in limiting the vital activity of microorganisms [10]. Clinical interpretation of immunomodulatory and regenerative effects. Ultraviolet radiation is also important in modulating immunological response mechanisms in tissues undergoing purulent-inflammatory processes. According to available clinical and experimental data, under the influence of ultraviolet radiation, a decrease in the activity of proinflammatory mediators and an increase in the expression of anti-inflammatory factors were observed. At the same time, ultraviolet radiation was associated with an increase in the functional activity of phagocytic cells - neurophils and macrophages. A number of observations have noted an increase in the ability of these cells to phagocytose microorganisms. In addition, an increase in the activity of natural killer cells served to strengthen the cellular immune response. From the point of view of regenerative processes, ultraviolet radiation stimulated the activity of fibroblasts and was associated with the activation of collagen biosynthesis. In most observations, it was found that the physiological formation of granulation tissue and the migration of epithelial cells were accelerated. These processes ensured faster wound surface recovery and the physiological course of reparative processes [8]. General analysis of the results. The generalized data show that ultraviolet radiation is an auxiliary therapeutic method with a multicomponent pathogenetic effect in the treatment of purulent-inflammatory diseases. Its antimicrobial, anti-inflammatory,

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immunomodulatory and regenerative effects, when combined, lead to improved clinical outcomes. These properties scientifically justify the use of ultraviolet radiation in combination with antibiotic therapy. Many observations have shown that such a combined approach allows for faster control of the infectious process, shortens the duration of treatment and improves the general condition of patients [9].

CONCLUSION

The results of the conducted scientific analysis and synthesis of existing clinical data show that ultraviolet (UV) irradiation is an effective and pathogenetically based auxiliary therapeutic method in the treatment of purulent-inflammatory diseases. Its clinical significance is determined by the combination of antimicrobial, anti-inflammatory, immunomodulatory and reparative-regenerative effects. Local application of ultraviolet irradiation serves to limit infectious activity in purulent foci, reduce microbial load and accelerate biological cleansing of the wound surface. As a result, positive changes are observed associated with the physiological formation of granulation tissue and the early onset of the epithelialization process. These processes allow to reduce the overall duration of wound healing and increase the effectiveness of treatment. It is noted that the use of systemic ultraviolet irradiation methods is associated with a balance in the functional state of the immune system, a decrease in the level of endogenous intoxication and an improvement in the general clinical condition of patients. These effects substantiate the important pathogenetic role of ultraviolet radiation in purulent-inflammatory processes. The obtained data indicate that the use of ultraviolet radiation in combination with antibiotic therapy can provide faster control of the infectious process and improve clinical outcomes. However, the widespread introduction of ultraviolet radiation into clinical practice requires compliance with individual dosing regimens, strict control of safety measures and application protocols. In general, ultraviolet radiation is considered a promising auxiliary tool in the complex treatment of purulent-inflammatory diseases. In the future, it is important to conduct large-scale, comparative and randomized clinical studies in order to determine the optimal application strategies of this method, more in-depth assessment of its clinical efficacy and clarify the safety profile.

REFERENCES.

1. Ponomarenko G.N. Fizioterapiya: nacional′noe rukovodstvo. – Moskva: GEOTAR-Media, 2018.
2. Hamblin M.R. Ultraviolet light and its role in wound healing. Journal of Photochemistry and Photobiology B: Biology. – 2018. – Vol. 180. – P. 216–228.
3. Bernard J.J., Gallo R.L., Krutmann J. Photoimmunology: how ultraviolet radiation affects the immune system. Nature Reviews Immunology. – 2019. – Vol. 19, No. 11. – P. 688–701.
4. Radjabov A.A., Derbenev V.A. Photodynamic therapy in the treatment of purulent wounds. Lazernaya Meditsina. – 2017. – Vol. 21, No. 2. – P. 46–49.
5. Aliev M.A., Safarov S.Yu., Magomedov M.S., et al. Efferent therapy methods in diabetic foot syndrome. Vestnik Dagestanskoy Gosudarstvennoy Meditsinskoy Akademii. – 2021. – No. 2. – P. 16–22.
6. Balin V.N., Karshiev H.K., Iordanishvili A.K. Morphological effects of ultraviolet irradiation on tissues. Journal of the Russian Military Medical Academy. – 2016. – No. 4. – P. 137–140.
7. Bondareva E.D., Makarova M.N., Petrov A.A., et al. Ultraviolet irradiation for disinfection purposes in biomedical research. Laboratory Animals for Scientific Research. – 2019. – No. 3. – P. 52–58.

ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

8. Dudenkova N.A., Shubina O.S. Biological effects of ultraviolet radiation. Samara Scientific Journal. – 2022. – Vol. 11, No. 3. – P. 35–40.
9. Markevich P.S., Alexnovich A.V. The role of ultraviolet radiation in modern medicine. Military Medical Journal. – 2019. – No. 3. – P. 30–36.
10. Patra V., Bordag N., Valdebran M., et al. Ultraviolet radiation and the skin microbiome. Scientific Reports. – 2023. – Vol. 13. – Article No. 7207.