

# Clinical Aspects of the Use of Laser Photodynamic Therapy in Cervical Pathology

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**Abstract** The article is devoted to the early diagnosis and treatment of background and precancerous diseases of the cervix is one of the important problems of gynecology, the ultimate goal of which is to reduce the incidence of cervical cancer.

**Keywords** Cervical cancer, Ectopia, Leukoplakia, Dysplasia, Photodynamic therapy

## 1. Introduction

The problem of developing and implementing new effective methods of treating inflammatory diseases of the cervix is one of the urgent problems, the importance of which is due to the wide prevalence of background and precancerous diseases of the cervix against the background of inflammation in women, which violates the reproductive function, increases the risk of precancerous and cancerous processes.

Diseases of the cervix occupy a leading position in the structure of pathology of the female genital organs. In particular, cervical cancer ranks second in the world among malignant tumors of the reproductive organs in women and is second only to breast cancer. Every year, about 70 thousand new cases of cervical cancer are diagnosed, which is 14.2% of all malignant neoplasms in women [1,3]. In recent years, there has been a trend of increasing morbidity in women in the age group up to 40 years [2,5]. Pathology of the cervix (CMM) is one of the most common gynecological diseases, especially in the conditions of a women's consultation, the recovery rate is 22-42%. The urgency of the problem of choosing a method of treatment for benign diseases of the cervix associated with various viruses is due not only to their high frequency in the structure of gynecological pathology in women of young and reproductive age, but also to the significant contribution of this pathology to the possibility of realizing reproductive function, as well as the risk of their progression into precancerous conditions and, possibly, cervical cancer, in the absence of effective standard treatment methods [4,6]. According to the WHO, the progression of cervical

dysplasia to cancer in situ takes about 3-8 years, another 10-15 years passes before the development of micro-invasive cancer. Early diagnosis and adequate treatment of background and precancerous diseases, as well as initial forms of cervical cancer, remain one of the most important problems [1,4]. In the diagnosis of precancerous diseases, various methods are used, but the most accessible for practice are the clinical and visual method, the use of colposcopy, molecular biological methods for detecting PVI (polymerase chain reaction-PCR or DIGENE test), cytological examination of smears and histological examination of a targeted biopsy of the cervix.

Cervical cancer (CC) ranks 2nd in frequency and 3rd in mortality among malignant neoplasms of the female reproductive system [1]. In recent years, there has been an alarming trend of increasing the incidence of CC among women of reproductive age. According to the authors, Nizhny Novgorod statistics are consistent with world data: there is a stable increase in the incidence of breast cancer in general (in the period from 2000 to 2009 by more than 20%) and in the group of young women (over the past decade, 28 cases of breast cancer were recorded in women under the age of 24, including 3 cases – aged 15-19 years). CC is preceded by intraepithelial atypical changes – cervical intraepithelial neoplasia (CIN). The time period from mild neoplasia (CIN I) to breast cancer is on average about 12-15 years. This is a sufficient period for carrying out secondary prevention measures and prescribing "savings" methods of treatment, which is especially important in women of reproductive age.

The method of extended colposcopy is proposed along with cytological examination for screening programs, however, the risk of overdiagnosis and, consequently, the conduct of unjustified aggressive treatment is high. The colposcopic signs of the normal transformation zone are well known. The metaplastic tissue remains "immature" for a long time, which presents certain difficulties for the

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cytologist or colposcopist. Immature metaplasia, metaplasia, and CIN (cervical intraepithelial neoplasia) are identified by the colposcopist as a pathological transformation zone, and it is difficult to make a differential diagnosis without taking a biopsy [2]. This is the main reason for the low specificity of colposcopy, which does not allow it to be used as a screening method.

HPV infection is prevalent among women aged 15-25, decreasing with age. At the same time, it was noted that adolescents and young women have faster HPV elimination and regression of existing HPV-associated pathology compared to older women. Observation of women aged 18-40 years showed that every second patient had self-purification from HPV during two years of follow-up [6,7]. All types of HPV can be divided into two groups: high oncogenic risk, which with a high frequency cause the development of malignant tumors, and low oncogenic risk, detected in benign lesions of the cervix (CMM), including warts. The high oncogenic risk group includes the types of virus: 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68, 73, 82 [1,5] to the group of low oncogenic risk - 6, 11, 36, 42, 43, 44, 46, 47 and 50. Important is not only the early diagnosis of QIN, but also a full-fledged timely treatment.

In connection with the above, the need for scientific research in this direction is obvious, which determines the purpose and objectives of our work.

**The aim of the study** was to develop an optimal scheme for the use of laser photodynamic therapy in the treatment of background and precancerous diseases of the cervix.

## 2. Research Materials and Methods

In accordance with the purpose and objectives of our study, 112 women with background and precancerous diseases of the cervix, who were in the gynecological departments of the regional perinatal center of the Bukhara region, were examined and treated for the period 2017 to 2020. The age of the examined women ranged from 21 to 65 years (mean age  $43,2 \pm 0,3$  years). The diagnosis of the disease was made in accordance with the International Statistical Classification of Diseases and Health Problems, 10-revision (ICD-10), adopted by WHO in 1995.

Cytological examination of smears-prints from the surface of the cervix and the cervical canal is one of the main methods for diagnosing precancerous and malignant diseases of the cervix. Cytological examination revealed the morphological features of the cells, the relationship of individual cell groups, and the location of cell elements in the preparation. Much attention was paid to the detection of the nuclear-cytoplasmic index, the distribution of chromatin in cells, the increase in nucleoli, and the detection of mitotic division patterns. The results of the cytological examination were described according to the classification of Papanicolaou.

Ultrasound Dopplerography (USDG) gave information about the physiology of blood flow and allowed us to study

moving structures (blood flows): perform graphic registration of blood flow, quantitative and qualitative assessment of its parameters.

Preoperative preparation was carried out for all women with a detected genital tract infection and included etiotropic, immunomodulatory therapy, followed by the appointment of eubiotics to normalize the vaginal microbiocenosis. The treatment was carried out in the first phase of the menstrual cycle. Performing laser photodynamic therapy (LFTT) did not require anesthesia. Local laser photodynamic therapy was performed as follows: a photosensitizer was applied to the wound – a 0.05% solution of mytilene blue belonging to the group of phenothiazines (cationic azines) with a maximum absorption of  $\lambda_{max}$  (nm) – 668 nm with an exposure of 5 minutes. Then, after washing off the wound surface of the photosensitizer, the wound surface was illuminated by laser radiation using the ALT-Vostok model 03 device, which corresponds to the technical specifications TSh 64-15302652-002: 2010. Manufacturer “NAF ” LLC (Republic of Uzbekistan) with the following technical characteristics: supply voltage-110-220 V, 50 Hz, 10 W; radiation range-660-670 nm; average total radiation power in the output; plane of the emitting terminal-1.0 W; area of the output hole of the emitting terminal-4 cm<sup>2</sup>; pulse frequency- $24 \pm 10\%$  Hz; modulation frequency- $1.2 \pm 10\%$  Hz. The distance from the end of the light guide to the wound surface was 0.5-5.0 cm in the absence of thermal discomfort in the patient. The total exposure time was 10 minutes in the first phase and 5.0 minutes in the second phase of the wound process.

## 3. Research Results and Discussion

To obtain a true understanding of the nature of the pathological process of the cervix, we conducted a comprehensive clinical, microbiological, colposcopic, cytological, histological examination before treatment, 2 and 12 days after treatment. The clinical examination included a thorough analysis of the premorbid background, the study of complaints, transferred and concomitant extragenital and gynecological diseases, features of menstrual, sexual, and generative function. The state of the cardiovascular, respiratory, endocrine, urinary and digestive systems, and mammary glands was assessed. In the course of the work, a standard range of laboratory tests was used: a general blood test, a general urine test, blood for RW, HBs, HCv, HIV.

Microbiological examination was carried out using bacterioscopic and bacteriological methods. Bacterioscopic examination made it possible to determine the affiliation of microorganisms to obligate-anaerobic species, lactobacilli, to assess the invasiveness of fungal flora, and to evaluate both the qualitative and quantitative composition of bacterial flora. The determination of specific pathogens in the mucus of the cervical canal was carried out by

polymerase chain reaction (PCR). Bacteriological studies revealed that the main pathogens that made up the microbial landscape of the wounds were: *S. aureus*, *S. epidermidis*, *P. aeruginosa*, representatives of the Enterobacteriaceae family-Klebsiella spp, *Proteus* spp, *Enterobacter* spp, the Bacillaceae family (anaerobes) and fungi of the genus *Candida*.

It should be noted that in most cases, microflora were represented by microbial associations. All of them had polyvalent resistance to many antibacterial drugs. High levels of bacterial contamination of wounds (109-1010 CFU/ml) were detected in both study groups of women prior to treatment. Attention is drawn to the fact that the decrease in infiltration in the area of the wound edges in women of the first group occurred on average 2 days earlier ( $P<0.05$ ) than in women of the compared control (second) group - on average 3 days after the start of treatment (on average  $3.5\pm 0.5$  days).

Comparative indicators of relief of clinical signs (reduction of perifocal inflammation and hyperemia of the tissues surrounding the wound, reduction of local edema, infiltration in the area of the wound edges) In women after the treatment, it was shown that in women of the first group, the improvement of all the studied clinical signs occurred on average 1-2 days earlier than in women of the second group. This fact confirms the clinical effectiveness of our proposed treatment with LFTD in women with background and precancerous diseases of the cervix.

There is a tendency of gradual normalization of the indicators of the leukocyte intoxication index (LII) in the dynamics, which reaches normalization on the 10th day after LFTD. LII in women of the second group had the following values: -on day 2,  $2.3\pm 0.3$  usl. units; - on day 4,  $1.6\pm 0.2$  usl. units; - on day 6,  $1.0\pm 0.1$  usl. units; - on day 10, almost the same result ( $1.0\pm 0.1$  usl. units).

The study of the indicators of the leukocyte index of intoxication in women of the second group had the following values in the dynamics after the treatment of diathermosurgery: -on day 2,  $4.9\pm 0.4$  conventional units (standard units); - on day 4,  $3.5\pm 0.5$  standard units; -on day 6,  $1.8\pm 0.5$  standard units; - on day 10,  $1.0\pm 0.3$  standard units.

As can be seen from the results obtained, the tendency to normalize this parameter is faster in women of the first group in relation to the data of women belonging to the second group. I want to remind you that women of a second group, a trend towards normalization of LII was observed on the 10 - day ( $1.0\pm 0.1$  CONV. units).

Thus, the comparative figures LII in women showed that women of the first group reduced LII to normal values was

on average 3 days earlier than in women of the second group, which proves the positive impact LFTD in women with abnormalities of the cervix.

Thus, we have shown that LFTT is characterized by shorter epithelialization times compared to the DH method. At the same time, when comparing the two methods of DH treatment, it can be seen that the beginning and end of epithelization occur significantly later in conization than in coagulation ( $p<0.05$ ), and the total duration of the epithelization process was almost the same ( $p>0.1$ ).

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## REFERENCES

- [1] Smolina G. R., Moskvina S. V. Advantages of a red matrix pulsed laser in the complex treatment of women with chronic endometritis. – 2015. – Vol. 19. – Vol. 2. – P. 17-23.
- [2] Federal clinical recommendations for the diagnosis and treatment of postmastectomy syndrome // fgbi "Moscow research oncological Institute. P. A. Gertsena" MOH / M. V. Eroshenkova, E. V. Filonenko, A. D. Styrcaceae. – M., 2013. – 44 p.
- [3] Federal clinical recommendations for the prevention of early radiation reactions in oncogynecological patients // FGBU "Moscow Research Oncological Institute named after P. A. Gertsena" of the Ministry of Health of the Russian Federation / E. V. Filonenko, A. N. Urlova, L. V. Demidova, A.V. Boyko. - M., 2014. - 19 p.
- [4] Khamdamov B.Z., Sayfidinov S.I., Khamdamov I.B., Tshaeu U.Sh. The role and place laser photodynamic therapy in prevention postoperative complications at treatment of diabetic foot syndrome. // 5th International scientific conference "European Applied Sciences: challenges and solutions" December 10th 2015. Stuttgart, Germany. -P. 27-31.
- [5] Khamdamov B.Z. Indicators of immunocytocine status in purulent-necrotic lesions of the lower extremities in patients with diabetes mellitus. // American Journal of Medicine and Medical Sciences, 2020 10 (7) 473-478  
DOI: 10.5923/j.ajmm.20201007.08.
- [6] Khamdamov B.Z., N.A. Nuraliev. Pathogenetic approach in complex treatment of diabetic foot syndrome with critical lower limb ischemia. //American Journal of Medicine and Medical Sciences, 2020 10 (1) 17-24  
DOI: 10.5923/j.20201001.05.
- [7] Khamdamov B.Z., Islomov A.A., Jabborova N.J., Khamdamov I.B., Khamdamov A.B. Metod of prevention of postoperative complications of surgical treatment of diabetic foot syndrome. European Science Review. – Austria, Vienna, 2018. – №9-10. № 9-10. – P. 194-196.