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Use of the Scar Acceleration Method - Mac® in the Treatment of Vulvovaginal Candidiasis: A Proposal for Treatment in Public Health in Sus, Brazil

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Abstract

Vulvovaginal candidiasis is an infection of the genital mucosa, which involves the vulva and vagina caused by yeast. It is considered a recurrent pathology and a public health problem that causes discomfort by the triggers and that, when left untreated, can lead to health problems. The present study is a report of two cases treated with the MAC® - Scar Acceleration Method - (MAC®) methodology at the Physiotherapy School Clinic of Teaching Center of Campos Gerais (CESCAGE) as a pilot for the proposal to implement the protocol at the Municipal Center for Women's Health—CMM in the municipality of Ponta Grossa—PR, Brazil. The patients were referred by Basic Health Units in the city with complaints of pruritus, vaginal discharge and local burning with the diagnosis of candidiasis evidenced by culture and antibiogram. Patients were treated with photodynamic therapy using the MAC® method for 14 consecutive days with 660 nm red laser phototherapy, 100 mW of power, 9 joules of energy, photosensitizing the drug Turmeric Long in one of the participants and propolis in the other, using 1% methylene blue dye. Both patients and researchers did not have access to which drug was being used for each participant. Photodynamic therapy potentiated the effects of drugs considering that patients showed gradual improvement with the ap-

plied application, which was proven in the analysis of sample secretions performed before and after treatment. The MAC® method had a positive effect in the protocol used and is strengthened as a possibility for treatments aimed at women's health with regard to vulvovaginal diseases. It is suggested and intended to carry out further research with a greater number of patients using the referred method.

Keywords

Candidiasis, Vaginal Infections, Women's Health, Methylene Blue, Photodynamic Therapy

1. Introduction

The normal microbiota of the vagina is usually formed by yeasts of the genus Candida, which may increase at certain times or circumstances at the risk of causing irritating vaginitis or discharge and may be accompanied by urethritis, dysuria or burning. The discharge may be white, yellowish, grayish or greenish, simulating a urinary tract infection. It is common not to show signs or symptoms of vaginitis and a low concentration of fungi [1].

Vaginal discharge is one of the reasons why women seek medical attention in Brazil since it is a very common gynecological problem that affects a large part of the female population, not only in Brazil, but in several countries around the globe. It affects young women of reproductive age at least once or more often, of whom about 5% to 8% will have it due to recurrent vulvovaginal candidiasis with three or more episodes during the year [1] [2].

Immunodeficiency, psycho-emotional changes, antibiotics, use of oral contraceptives, corticosteroids, hormonal changes, inadequate intimate hygiene and/or even the use of clothes that favor local heat in the vaginal region can be mentioned as Vulvovaginal Candidiasis (VVC) triggering factors [3] [4] [5]. It is considered recurrent when at least four specific episodes occur within a year or at least three episodes unrelated to antibiotic therapy within a year [5] [6] [7].

The prevalence of VVC evolved from 0.5% in 1968 to 22.5% in 1998 and as the most common cause of infection of the vulvovaginal mucosa, it is resistant to most antifungals used in treatment protocols in public health. VVC then became the cause of recurrence and constant return of women to Basic Health Units and Reference Centers for Women's Health [8] [9].

Commonly indicated treatments include oral and topical administration of antifungals, such as: Fluconazole, Itraconazole and Clotrimazole, among other antimycotics administered that generate changes in the plasma membrane of microorganisms, making their survival unfeasible and thereby relieving symptoms [5] [10]. These in turn can generate adverse reactions, such as nausea, vomiting and kidney changes [11].

In addition, Vulvovaginitis Candida occurs frequently in pregnant women and can be transmitted to the newborn in the womb during delivery or in the postnatal phase, which demonstrates the importance of developing protocols that are effective in preventing and not spreading the disease [5] [7].

The currently elected protocols for the treatment of VVC use topical and oral antifungals. Many recurrent cases occur due to the resistance of fungal yeasts to these drugs, with reports of post-treatment reactions that include urinary infections, vaginal pain, dysuria and chronic itching [12].

In the present study, the **Scar Acceleration Method** (MAC®) proved to reduce symptoms and improved the quality of life of the patients studied, evidenced by the change in the behavior of fungal activity observed in the patients' microbiological exams.

2. Case Reports

The present study was approved by the Research Ethics Committee of CESCAGE - Higher Education Center of Campos Gerais under CEP No. 3451344. After signing the informed consent form, the participants answered a questionnaire regarding their quality of life, symptoms and physiological situations. It was carried out at the Physiotherapy School Clinic of the Higher Education Center of Campos Gerais in partnership with the Municipal Health Foundation of the Municipality of Ponta Grossa, PR - Brazil, through the referral of patients by the Municipal Women's Center - CMM and Basic Health Unit after having been widely disseminated in various settings of assistance to women in the local Health System for health professionals, especially gynecologists and nurses from the public and private health systems. This is a study of two cases in which two women were selected (P1 and P2) with clinical suspicion of VVC and a history of at least 4 episodes during one year and were considered the inclusion criteria of the study. Diabetic, pregnant and sexually transmitted diseases patients were excluded.

After the anamnesis in which the symptom questionnaire was applied, the modified Visual Analogue Scale (VAS) to identify the intensity of the symptoms, and the application of the MAC® semiological methods that include complementary exams for the assessment and interpretation of the problem, the culture of vaginal secretions was performed for the purpose of diagnostic confirmation, classification and fungal concentration in the collected samples. Thus, we can choose the treatment doses, photopharmaceuticals and cellular markers individually for each case.

The collection of vaginal secretion was performed using the swab in an isolated culture tube and the samples were analyzed in the microbiology laboratory of the Pharmacy Course of the Educational Institution where the research took place. The collected samples were kept for 48 hours in Agar Sabouraud medium suitable for the growth of fungi [13].

After the result of the culture exam, the participants started the treatment with

Photodynamic Therapy (PDT) recommended by the MAC® using 1% methylene blue to stain and photosensitize the propolis and Cúrcuma phytochemicals chosen for the experiment. The drugs were already manipulated with the dye in an application tube, ready for use and developed by the manipulation pharmacy Casa das Formulas, BH - Brazil, partner in the research. The tubes with the compounds were labeled with the inscriptions A and B so that the researchers and participants did not know which phytopharmaceutical was being applied. Next, a randomization was performed in which participant P1 was allocated to receive treatment A (Turmeric), while participant P2 was allocated to receive treatment B (Propolis).

The vulvar area was cleaned with water and neutral PH soap and the patients were placed on a modified Fowler (patient on supine with the trunk elevated to 45˚, the lower limbs in hip and knee flexion and hip abduction).

The photosensitization of the drugs was performed in the vaginal canal with a 660 nm red laser with 100 mW of average power and 9 Joules energy. The equipment used had a 45-degree application rod wrapped with a condom without lubricant positioned in the vaginal opening at 1 cm.

The patients were instructed not to clean the treated area for 12 hours after applications and not to have sexual intercourse during the treatment period. The protocol of the present study was carried out for 14 days in a row with the exception of the weekend and defined based on the Therapeutic Guidelines for Integral Attention for People with Sexually Transmitted Infections of the Ministry of Health that defines the topical drug application for 14 consecutive days [9].

At the beginning of the study, P1 rated the intensity of her symptoms as 9, while P2 rated 7, which is classified as high intensity. The therapy proposed by the methodology improved the quality of life of patients who reported reduced symptoms (**Figure 1**) for a moderate intensity on day 7 for both participants, and a light intensity for P2 and absence of symptoms for P1 at the end of the protocol. The microbiological analysis of the secretions demonstrated total elimination of fungal colonization in patient P1 treated with Turmeric and reduction of yeast cells in the secretions of patient P2 treated with propolis.

3. Discussion

The results obtained in the present study corroborate with studies that have demonstrated the effectiveness of PDT - Photodynamic Therapy in coping with fungal and bacterial infections. While some [14] demonstrated the effectiveness of applying a methylene blue light source in the treatment of Kaposi's sarcoma, melanoma, viruses and fungal infections, others [15] discussed the use of PDT in the process of scar acceleration and the importance of expansion of studies with the technique in view of its significant effectiveness in issues related to bacterial multiresistance.

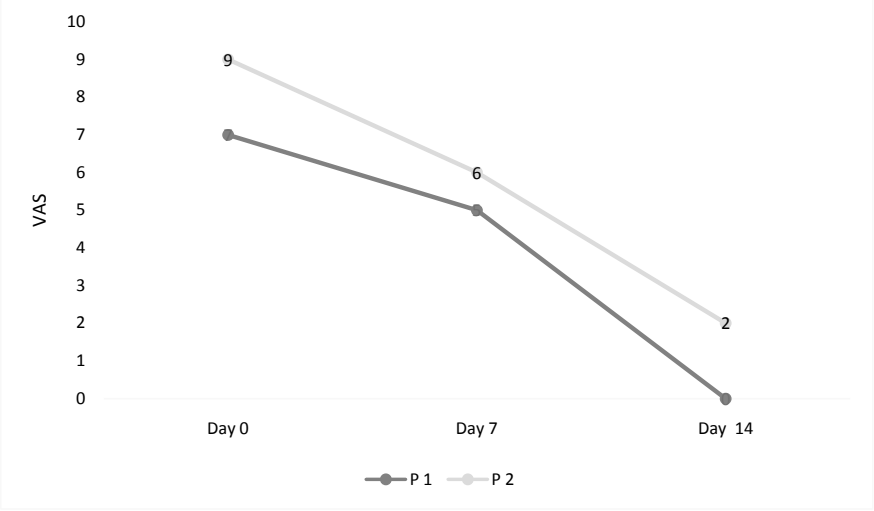

Figure 1. Intensity of symptoms in the patients studied: VAS: Visual Analogue Scale, Day 0: before the protocol, Day 7: Seven days in treatment, Day 14: In the end of the treatment.

The principle of PDT is the interaction between the light of the visible spectrum, the photosensitizing substance and the endogenous oxygen that generates toxicity to the target cells. Photosensitizers are pigments that produce photochemical reactions when associated with the laser or LED promoting the transfer of electrons from the photosensitizer and then energy from it to molecular oxygen generating the so-called singlet which is cytotoxic and destroys the cells of the target tissue that has been stained. [16] [17] [18] [19]. The MAC® uses PDT in its therapeutic proposal, hence the effectiveness that has been demonstrated with the method [20] [21] [22].

The Phytopharmaceuticals Cúrcuma and Propolis are substances with considerable effects in reducing the inflammatory process, antimicrobial, anesthetic, antifungal action, antioxidative and antibiotic healing. When in contact with the laser, these substances are transformed into a photopharmaceutical [13] [14] [23] [24].

A study that reports on the "Effects of propolis in the prevention of lesions in the epidermis induced by UVB radiation in mice" [25], where the authors point out the effects of propolis and its beneficial use in the prevention of lesions of the epidermis, significant attenuation in the thickening of the skin and potential prevention of pathologies caused by uncontrolled cell proliferation can also be considered in understanding the results obtained with the studied patients. They may be related to the actions already known and presented by the two substances used, given that every treatment performed for fungal infections has among the principles the inactivation of cell proliferation of both microorganisms and defense cells that generate the inflammatory process [26].

The partial reduction of yeast cells observed in patient P2 who received treatment with propolis does not exclude the effectiveness of the method, not even of the substance, considering the need for a greater number of sessions in compar-

ison with Turmeric in addition to the influence of variables of the studied patients.

Greater conclusions can only be obtained in future works with a larger number of participants, where it is possible to improve the aspects of comparison of the results and use of the phytopharmaceuticals used.

It is important to highlight that the reports and responses to after treatment, showed improvement in the participants' quality of life. A recurrent problem such as vaginal fungal infections of the Candida albicans type directly influences this aspect, generating discomfort and discomfort during sexual intercourse, interfering in the daily life and in the relationship with the partner. The study carried out on quality of life in women with VVC discusses the topic, still relating it to psychological changes and its influence on social relationships [2].

The studied patients reported that after the treatment, there was an improvement in libido and vaginal lubrication, reduction in abdominal pain and improvement in sexual activity.

4. Final Considerations

The patient who received treatment with Turmeric obtained a total reduction of the reported symptoms, which was confirmed by the microbiological report.

The improvement in the quality of life of the studied patients was clearly perceived by the reports obtained before, during and after the treatment.

The patient who received treatment with Propolis obtained partial reduction of the reported symptoms. It is worth considering the individual variables and the need for a greater number of sessions to obtain the same effectiveness of Cúrcuma with Propolis.

Considering that the present study was composed of 2 samples, it is suggested to continue the research with a larger number of participants to obtain greater conclusions and a 1-year follow-up post-therapy.

5. Conclusion

Photodynamic Therapy associated with photosensitive phytopharmaceuticals Turmeric and Propolis has been shown to reduce the clinical symptoms of Candida albicans. The MAC® presents itself as a possible resource in the treatment of vaginal fungal infections, such as Candida albicans to be developed within the scope of Brazilian Public Health.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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