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SilTech: A New Approach to Treat Aerobic Vaginitis

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Abstract

Background: The aerobic vaginitis (AV) is characterized by increased levels of aerobic bacteria, vaginal inflammation and depressed levels of lactobacilli. Objective: The purpose of this study was to investigate the therapeutic efficacy of SilTech™ vaginal softgel capsules, containing new microcrystals of silver monovalent ions, for aerobic vaginitis (AV). Methods: This prospective study enrolled 32 women diagnosed with AV. All recruited women were treated with SilTech™ vaginal softgel capsules once daily for 7 days (one course). Therapeutic efficacy was evaluated based on clinical and microscopic criteria, and cure rates were calculated. Women who were improved (but not cured) received a second course of therapy. Patients classified with clinical and microscopic failure were treated using other strategies. Results: After one course of therapy, 59.2% (19/32) of women were cured, 19.0% (6/32) were improved (but not cured) and 21.8% (7/32) failed to respond to the therapy. After two courses of therapy, clinical improvement was achieved in additional two women. The therapy was very well tolerated, and during the entire study no drop out related to the SylTech™ vaginal capsules treatment was observed; only two patients (6.2%) experienced a mild transient burning after application. Conclusion: SylTech™ vaginal capsules is an effective therapeutic option for patients with AV, and most women with AV were cured with one course of therapy.

Keywords

Aerobic Vaginitis, Wet Mount Microscopy, Silver, Vaginal Soft Gel Capsule, Vaginal Inflammation, Leucorrhea

1. Introduction

The aerobic vaginitis (AV) is characterized by increased levels of aerobic bacteria, vaginal inflammation and

depressed levels of lactobacilli. Although no incidence rate was given, AV prevalence varied from 5% to 10.5% among symptomatic non-pregnant women [1]. It was observed that the chief complaints of patients with AV were homogeneous and purulent, yellowish or yellow-green in color vaginal discharge, dyspareunia, intermittent vulval and vaginal pruritus and a burning sensation. Purulence is due to the presence of numerous leukocytes in the secretions. During a speculum examination, the vaginal mucosa is red and inflamed, and ecchymotic bleeding points and ulceration are often found in severe forms. Aerobic bacteria are frequently cultured in patients with AV, including group B Streptococci, Staphylococcus aureus, Escherichia coli and Enterococci. The pathogenesis of AV may be related to an imbalance in local immune modulation, a lack of estrogens and copious enteric bacterial colonization [2]. Compared with the normal vaginal flora, the aerobes bacteria increased by three to fivefold and were associated with inflamed vaginal mucosa [3]. This condition is often misdiagnosed as bacterial vaginosis, which may lead to treatment failures and severe complications, such as pelvic inflammatory disease, infertility, miscarriage, chorioamnionitis, premature rupture of membranes and preterm delivery [4]. Currently, there is no generally accepted clinical strategy for treating women with AV. Kanamycin and clindamycin vaginal suppositories have curative effects in no pregnant women [5]. Topical treatment with 2% clindamycin resulted in clinical improvement in >95% of women with severe AV, but the recurrence rate was as high as 28.9% [6]. We conducted this prospective study to evaluate the efficacy of new SilTech™ vaginal softgel capsules, a new technology capable of driving stabilized silver monovalent ions directly to the site of action, for treatment of AV. SylTech™ is a new technology capable of driving stabilized silver monovalent ions directly to the site of action for the maximum extend of antibacterial activity.

2. Methods

This study enrolled women of reproductive age and who presented with symptoms suggestive of AV. Exclusion criteria were as follows: pregnancy or lactation, allergy to the study medication, sexual intercourse, use of antibacterial (topical or systemic) therapy in the previous 10 days. Women with other specific vaginitis (vulvovaginal candidiasis, bacterial vaginosis and trichomonal vaginitis) and mixed vaginal infections, any sexually transmitted disease or genital skin disorders were also excluded. The study was reviewed and approved by the local ethical committee and women were enrolled into the study after they provided written informed consent. Each of the participants was administered a questionnaire on information about their baseline characteristics. At speculum examination, vaginal discharge (normal or abnormal; color, appearance, quantity) was assessed. Vaginal discharge specimens were taken (using cotton swabs) from the upper lateral vaginal wall for microscopic examination and vaginal pH measurement.

A drop of saline was mixed with the discharge on one slide to detect the presence of AV, Trichomonas vaginalis, clue cells and the presence of yeast.

Criteria for the microscopic diagnosis of AV (400 magnifications, phase contrast microscope) was based on a composite score built on lactobacillary grades, numbers and proportion of leukocytes, background flora and proportion of parabasal epitheliocytes [2].

Briefly, a composite AV score of 1 - 2 corresponded to “no signs of AV”, 3 - 4 to “mild AV”, 5 - 6 to “moderate AV”, and any score above 6 to “severe AV” was adopted.

Each of the study participants received SilTech™ vaginal softgel capsules once daily for 7 days (one course of therapy). Therapeutic efficacy was assessed based on clinical and microscopic criteria. Cure was defined as the composite AV score less than 3 and with a symptoms and signs reduction above 70%, improvement (but not cured) was defined as an AV score decreased by at least 2 but that was still ≥3 with a symptoms and signs reduction lower than 70%, and failure was defined as no improvement in symptoms and AV score. Women who were improved (but not cured) were given a second course of therapy, while those who were classified as clinical and microscopic failure were treated using another strategy. Patients with one course of therapy and two courses of therapy were both reevaluated at a test-of-cure visit (5 ± 3 days after the end of treatment) and at a follow-up visit (35 ± 5 days after the end of treatment). At each subsequent visit. Clinical symptoms and signs were recorded and compared with the situation at the initial visit and AV scores were recalculated. Participants were asked to return for evaluation whenever indicated by the presence of symptoms. Statistical analysis was performed with JMP® software (version 7.0.1, SAS Institute Inc., Cory, NC, USA) and the R2.7.2 software package (R Foundation for Statistical Computing). Quantitative variables were compared between groups using Student’s t-test, or non-parametric (Mann-Whitney or Wilcoxon) tests in the case of non-normal distribution.

3. Results

A total of 32 women with AV were enrolled into the study. Their mean age was 31.6 ± 7.3 years. The baseline clinical and laboratory characteristics of women with AV are summarized in **Table 1**. After one course of therapy, 59.2% (19/32) of women were cured, 19.0% (6/32) of women were improved and the general response rate was 78.2% (25/32). Compared with the initial visit, 84.2% of women had decreased vaginal pH values. The average decrease in the vaginal pH was 0.54 ± 0.43. A return in vaginal flora from little or no lactobacilli to the lactobacilli-dominant morphotype was seen in 62.4% of women. There was a decrease in yellow vaginal discharge in 84.2% of women, vulvovaginal itching in 87.3%, dyspareunia in 88.4%, vulvovaginal burning in 82.8% of patients.

In addition, seven women (21.8%) were classified as having a clinical and microscopic failure and they were treated using another strategy. The infection in six (18.7%) women was improved (but not cured) following one course of therapy, and these women received a second course.

Of these participants, two women were cured. The therapy was very well tolerated, and during the entire study no drop out related to the SylTech^{TM} vaginal capsules treatment was observed; only two patients (6.2%) experienced a mild transient burning after application.

4. Discussion

Some research has been done on treatments for AV. The therapeutic efficacy was different in published studies, because of the variety of pathogenic bacteria cultured in AV patients and the various antimicrobial spectra of different medications used in those studies [7], and to date, there is no standard therapeutic regimen for AV.

AV requires a treatment based on the main targets pivotal for disease: infectious component, inflammatory component and atrophy component. There were very few antibiotics among the conventionally available aminoglycosides, third-generation cephalosporins, penicillin, quinolones, and tetracyclines that possess potent activity (more than 80%) against the common aerobic vaginal pathogens. Local antibiotics most suitable are preferably non-absorbed and broad spectrum, especially covering enteric gram-positive and gram-negative aerobes, clindamycin [8]. However, it is very unlikely that oral administration of the above antibiotics will have a long-term positive effect on the vaginal milieu. Hence, they should only be considered for initial use, with short courses, to control acute symptoms in complicated and severe cases. Silver has a very efficient antibacterial activity but only the monovalent Ion (Ag^{+}) is active. SylTech^{TM} is a new technology capable of driving stabilized silver monovalent ions directly to the site of action for the maximum extend of antibacterial activity [9].

In our study, most of the women with AV had abnormal vaginal flora and an elevated vaginal pH level, indicating that the quantity and quality of Lactobacilli was decreased.

It was found that many of the gram-positive and gram-negative isolated in AV demonstrated changes in susceptibility to antibiotics when grown at different pH values [10]. The therapeutic efficacy of SilTech^{TM} vaginal softgel capsules therapy for AV was encouraging. After one course of therapy, a response rate of about 80% was observed, and clinical improvement was seen in most women. Siltech^{TM} had potent activity against aerobic

Table 1. Baseline clinical and laboratory characteristics of women with aerobic vaginitis.

Variables	Number (percentage)
Burning	27 (84.3)
Itching	12 (37.4)
Dyspareunia	16 (50)
Increased vaginal discharge	31 (96.7)
Vaginal pH	
<5	11 (34.3)
≥5	21 (67.7)
Lactobacillary grades	
IIa	7 (21.8)
IIb	18 (78.2)
III	7 (21.8)

gram-negative and gram-positive bacteria, which are both pathogenic bacteria in AV [9]. In addition, the therapy had poor, or no, interference with lactobacilli [9].

A relevant hallmark of AV is the thinning of the vaginal epithelium with AV, as compared with bacterial vaginosis, where the vaginal wall retains its full 10 to 12 epithelial cell layer thickness. This vaginal thinning in AV is demonstrated in the vaginal smears by the appearance of increased numbers of intermediate and parabasal cells, indicating an increased turnover and desquamation of superficial epithelial cell layers. In extreme cases, therefore, AV has a similar appearance as the so-called desquamative inflammatory vaginitis [11]. For above reasons, treatment of AV may include local estrogens administration, with or without probiotic lactobacilli in cases where atrophy dominates (increased number of parabasal cells) [12] [13].

Siltech^{TM} microcrystals, the micro-technology ensures a range of particles size averaging of 0.2 - 0.3 micron, achieve the maximum extent of interaction on tissue creating a protective film layer [9]. The effective film barrier assists the natural repair of the tissue creating a microenvironment suitable for a fast spontaneous cicatrisation.

Another strength of our work was the choose to deliver the Siltech^{TM} microcrystals through the vaginal softgel capsules. A study evaluates in vitro the adherence capability of Latobacillis preparation to vaginal epithelial cells by comparing two products in soft-gel capsules and in vaginal tablet formulation. It was demonstrated that vaginal softgel capsules product has a better capability of adherence to vaginal epithelial cells, thus affording better protection of the vaginal milieu [14].

Therefore, the soft-gel capsules were significantly preferred more often than the tablet form mainly because of faster dissolving time and easier insertion.

During the study, there were few adverse events overall, in fact only two patients had transient burning, showing the high tolerability of the treatment.

There are some limitations in this study. First, the sample size was small, and larger studies are required to provide statistical power for significance. Second, the short follow-up did not address the large possibility of symptom relapse and the longer-term prognosis for this new approach to AV.

5. Conclusion

In conclusion, SilTech^{TM} vaginal softgel capsule is an effective therapeutic option to treat AV. Most women with AV can be cured after one course of therapy. In addition, further studies are needed to investigate the risk factors for recurrence, and appropriate therapeutic regimen to treat recurrence.

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