

Boric Acid: A Natural Alternative for Recurrent Vaginitis

Effective relief of vaginal irritation

OVERVIEW

75% of all women worldwide have had vaginitis at least once in their lives. Vaginal irritation is one of the most common reasons women visit their physician, accounting for over 10 million clinic visits annually^[1]. Difficult and frustrating to treat; vaginal infections have a high rate of recurrence, unsatisfactory resolution of symptoms, and limited treatment options available. We also know, the long term use of antifungals and antibiotics can have detrimental side effects to vulvar tissue, gut health, and lead to resistant and recurrent infections^[2]. Recurrent vaginitis can be a debilitating and emotionally distressing condition that affects the quality of life of women everywhere.

The Vaginal Microbiome: pH and why it's important.

The production of lactic acid by lactobacillus bacteria is responsible for keeping a healthy vaginal pH between 4.0- 4.5. Lactobacillus along with a carefully balanced milieu of beneficial bacteria creates a protective barrier inside the vaginal canal that prevents unhealthy microorganisms from multiplying too quickly and causing infection. An imbalance in this delicate ecosystem can cause changes in vaginal discharge, odour, itching, burning, and pain. Many factors can lead to changes in vaginal pH, including sexual activity, antibiotics, stress, hormonal changes and vaginal douching^[3].

It is important to note the widespread use of antibiotics for bacterial infections can wreak havoc on this vaginal microbiome. Unfortunately, the antibiotics that kill harmful bacteria also eliminate the good bacteria needed to maintain a healthy acidic vaginal pH^[3,4], disrupting the bacteria-yeast balance in the vagina, resulting in the overgrowth of yeast. The two most common vaginal infections among women are vaginal yeast infections and bacterial vaginosis.

The Science of Boric Acid

Boric acid, also called hydrogen borate or boracic acid, has been used clinically for many years to treat vaginal disorders. It possesses antibacterial, antifungal and antiviral properties making it suitable for treating a wide range of vaginal symptoms. Boric acid has a weak acidity that helps to restore the natural pH balance of the vagina and encourage the proliferation of healthy lactobacillus^[5]. It has also been proposed that the acidic properties of boric acid leads to the disruption of the fungal cell wall and can be used as an effective agent in treating biofilm-associated disorders responsible for recurrent infections^[6]. Not only is vaginal boric acid regarded as a convenient and safe option for treating the symptoms associated with vaginal infections but blood boron analyses indicate little systemic absorption from the vagina and it does not appear to cause any adverse changes to the cervix^[7]. Boric acid is well tolerated even when used as a maintenance therapy^[8] and satisfaction with the relief of symptoms is high among women who have used boric acid suppositories.

Boric Acid for Yeast Infections

Worldwide, recurrent yeast infections affect approximately 138 million women annually. By 2030, the population of women with recurrent vaginal infections each year is estimated to increase to almost 158 million^[9]. Nearly half of all women will suffer from a vaginal yeast infection at least once in their life and for many this number is higher. Most commonly caused by the strain *Candida Albicans* (*C. albicans*), the symptoms of vaginal yeast include itching, redness/burning, a thick or clumpy white discharge and pain with intercourse. Yeast infections occur more frequently in women with diabetes, immunocompromised conditions and history of antibiotic use^[10]. Epidemiologic studies indicate that

non-albicans strains, including *C. glabrata* and *C. tropicalis*, are more resistant to conventional azole antifungal treatment with azoles and could be the cause of resistant and recurrent infections [11]. Boric acid has been shown to be effective against refractory non-albicans yeast species and has been studied in comparison to nystatin, terconazole, flucytosine, itraconazole, clotrimazole, ketoconazole, fluconazole, buconazole, and miconazole in documented studies [12]. 600 mg of vaginal boric acid once or twice per day for 10-14 days has been shown to be effective for vaginal candida infections as it has optimal outcomes (55.3%–100%) when compared to nystatin and azoles, and the recurrence rates are small [12]. In a study of 92 women, boric acid was effective in 98% of the patients who had previously failed to respond to common antifungal agents and has been clearly indicated by clinicians as the treatment of choice for preventative therapy [13].

Boric acid in Bacterial Vaginosis: A Promising Addition to Antibiotics

Bacterial Vaginosis (BV) represents more than half of all cases of vaginitis. BV is caused by an overgrowth of anaerobic bacteria, replacing the normal lactobacilli causing an increase in vaginal pH [14]. BV Can be extremely distressing for women as it presents with a characteristic 'fishy' vaginal odour and irritating discharge. Current treatment for bacterial vaginosis includes antibiotics, such as metronidazole which are approximately 75% effective at one month after treatment; however, this often results in high recurrence rates and secondary yeast infections [15]. BV is more resistant to antibiotics, and also to the protective environment of the vaginal microbiome (pH, lactic acid, and hydrogen peroxide) and this could explain the frequency with which women have recurrent symptoms [16]. Patients with BV are at an increased risk for urinary tract infections, spontaneous abortion, sexually transmitted infections and pelvic inflammatory disease. Additionally, qualitative studies show that BV is associated with a significant impact on self esteem, sexual relationships, and quality of life [15]. While antibiotics remain the first line of therapy despite frequent recurrence, a retrospective study suggested clinical improvement following treatment with 600 mg boric acid for 14 nights in women with a mixed infection of *C. glabrata* vaginitis and BV [17]. In an uncontrolled, non-randomized, retrospective chart review, when boric acid was added to nitroimidazole there was promising long-term (>88% at 12 weeks after the study and 50% at 36 weeks) resolution of recurrent

BV symptoms [18]. Additional studies show oral nitroimidazole followed by 600 mg vaginal boric acid daily for 21 days followed by vaginal metronidazole gel improved symptoms in women with recurrent BV [8].

The Role of Biofilm in Recurrent Vaginal Infections

Biofilm is increasingly recognized as a contributor to vaginal infections. Biofilm has been reported to be present in virtually all women with bacterial vaginosis [19]. Biofilms are communities of microbes that attach to cellular surfaces and produce an extracellular matrix and they are of major clinical significance as they can decrease the response to antibiotics and antifungals. Because of this, biofilms are associated with recurrent and persistent vaginal infection and can contribute to treatment resistance [19]. As interest in biofilm-associated infection increases, so too does the interest in products that can disrupt biofilm formation to support the efficacy of antibiotic and antifungal treatment options [20]. *G.vaginalis* (BV), *C. albicans*, and *C. glabrata* are all well known for forming biofilms and demonstrate a strong ability to adhere to the vaginal epithelium [21].

Evidence of a potential therapeutic benefit from biofilm disruption has been evaluated in a multicenter, long-term study of maintenance suppressive therapy for the prevention of recurrent BV, in which 600 mg of vaginal boric acid was used daily following a 1-week course of antibiotic therapy [18]. Although its mechanism of action is not well understood, unlike conventional therapies, boric acid can not only inhibit biofilm formation but also disrupt mature biofilms. It is theorized boric acid works by changing the acidity of the vagina, and by penetrating and disrupting the cellular membrane [22]. Boric acid inhibits the growth of yeast and bacteria, and improves vaginal symptoms by altering the vaginas immune response to these organisms [23,24]. Compared with conventional antifungal and antibiotic medications, one of the most effective therapies for both recurrent BV and yeast vaginitis has been vaginal boric acid [18].

The Need for Effective Alternatives

Recurrent vaginitis remains a challenge for practitioners to manage and changes in vaginal pH balance can deeply affect a woman's health and wellbeing. Vaginal discomfort and irritation affect millions of women and both clinicians and patients are

frustrated and often discouraged by the repeated use of conventional treatment options. The estimated annual global economic burden of treating vaginitis is \$4.8 Billion^[25]. As a result, many women are looking for alternative, natural and effective ways to support vaginal health. Boric acid can be used safely to treat a variety of vaginal symptoms. Its broad spectrum of clinical application, along with its ease of use, makes boric acid a safe and reliable treatment for those seeking an effective option.

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