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Treatment for Recurrent Vulvovaginitis Candidiasis:  
An Overview of Traditional and Alternative Therapies

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Vulvovaginitis is a widespread disease caused by *Candida albicans*. It can cause much disruption of a woman's life. When recurrent or chronic, treatment for vulvovaginitis can become a significant financial cost for the woman. Recurrent vulvovaginitis is defined as repeated infections that occur four to six times a year. Chronic vulvovaginitis is defined as cyclic infections that occur monthly. The troubling symptoms of recurrent vulvovaginitis affect many reproductive age women. Approximately 75% of reproductive age women will experience vulvovaginitis caused by candida in their lifetime, 40-50% of these women will have recurrent episodes, and 5-8% will suffer chronically.<sup>1,2</sup> Approximately three million women in the United States have recurrent candidial infections.<sup>3</sup> Experts warn that the prevalence of vulvovaginitis will increase due to the increase of non-*C. albicans* species, which most antifungal medications do not treat, and also due to the possibility of antifungal resistance.<sup>4</sup>

Vulvovaginitis candidiasis, commonly known as "yeast infection," is at the least irritating, and can become painful enough to seriously interfere with women's daily lives. Pain from a yeast infection can be so severe that women will have difficulty walking or sitting, some will suffer with dysuria caused by vulvovaginitis and the vaginal pain may lead an inability to tolerate sex that the problem may interfere with a woman's marriage.<sup>2</sup> Psychosocial problems, particularly depression, have been reported due to recurrent vulvovaginitis.<sup>2</sup> The personal and economic impact of depression has been well documented.<sup>2</sup>

Vaginitis remains one of the most common gynecologic complaints that result in a health care office visit.<sup>5</sup> Annually, vaginitis accounts for an estimated 10 million health care office visits.<sup>1</sup> Medical expenses (health care office visit) and nonmedical expenses

(travel, time from work, and treatment) contribute to direct cost of treating candidial vaginitis. In 1995, the total annual expense for treating vaginitis caused by candidiasis was \$1.8 billion with projected expenditures of \$3.1 billion to be spent annually by 2014.<sup>6</sup> The cost of diagnosing and treating vulvovaginitis is soaring even with the debut of over-the-counter medical therapies. Vaginal antifungal preparations rank in the top ten over-the-counter products sold, with an annual estimation of \$250 million.<sup>1</sup> In summary, candida related vulvovaginitis is a widespread disease among women. When recurrent or chronic, it can interfere with a woman's daily activities, her sex life, and can become expensive for her to treat, even when using only over-the-counter drugs.

#### Background

There are numerous known causes for recurrent vulvovaginitis, yet the cause for the recurrent infections can be unknown.

#### Candida species

Up to 25% of reproductive age women may harbor Candida species and are asymptomatic.<sup>7</sup> Candida albicans is the most common cause for vulvovaginitis.<sup>8</sup> A recurrent vulvovaginitis candidiasis caused by a non-*C. albicans* species has identical signs and symptoms as vulvovaginitis caused by *C. albicans*. Almost one-third of women with candidiasis have a non-*albicans* species.<sup>8</sup> It is important to identify the candida species causing the recurrent vulvovaginitis because the non-*albicans* species are unaffected by many of the common medical therapies.<sup>8</sup> Researchers have not identified new medical therapies or preventive therapies for recurrent vulvovaginitis for non-*C. albicans* species.

## Normal Vaginal Flora

The vaginal flora is a delicate balance of bacteria comprised of 23 genera with *Lacobacillus* the most common bacteria.<sup>9</sup> The presence of microbes keeps the vaginal ecosystem balanced with proper nutrition, pH, temperature, hydration and oxygen.<sup>10</sup>

Lactobacilli are hydrogen producing bacterium in the vaginal ecosystem, which keeps the pH of the healthy vagina around 4.5.<sup>10</sup> Shifts in the vaginal environment can decrease the colonization of lactobacilli and cause other bacteria or yeast to proliferate, resulting in vaginal infections.<sup>9</sup> Unfortunately, many factors are known to upset the environmental balance of the vagina. Antibiotics taken for other infections can destroy part of the normal flora of the vagina, as can birth control pills, other minor illnesses, immune suppression, and pregnancy, among other causes.

## Signs and Symptoms of Vulvovaginitis

Women with vulvovaginal candidiasis will commonly complain of intense vulvar and vaginal pruritis with or without vaginal discharge.<sup>2</sup> In more advanced cases, the pruritis often changes to a burning pain that can be severe enough to interfere with walking and sitting. Upon clinical examination, the health care provider may see erythema of the vulva and /or vagina, swelling of the labia minora, and vaginal thrush..<sup>1</sup> The pH of the vagina infected with candidiasis remains normal (4.5). Excoriations may be noted on the vaginal and vulvar epithelium. Under microscopic evaluation, hyphae, pseudohyphae, and blastospores may be seen.<sup>11</sup> While the condition is not clinically dangerous, the discomfort associated with candida vulvovaginitis is such that a preventative measure would be greatly welcomed by the women who suffer from the recurrent or chronic type of disease.

## Predisposing Conditions Related to Recurrent Vulvovaginitis Candidiasis

The balance of the vaginal flora can be altered by a variety of factors, but the most common causes are antibiotic use,<sup>12</sup> normal menstrual cycle pH changes<sup>13</sup> pregnancy<sup>14</sup> and chronic disease processes such as diabetes mellitus and human immunodeficiency virus.<sup>14</sup> Additionally, the correlation of ethnic differences in the incidence of recurrent vulvovaginitis will be reviewed.

### Antibiotic Use

Antibiotic use is known to alter the vaginal normal flora by eradicating much of the healthy vaginal bacteria. Many women experience their first episode of vaginitis candidiasis after a round of antibiotic treatment for another condition, and women with recurrent vulvovaginitis are more likely to experience vaginitis after antibiotic treatment.<sup>7</sup> Even with the increased use of short-term antibiotics, women are two times more likely to have symptomatic vulvovaginal candidiasis after antibiotic therapy. Broad-spectrum antibiotic use for 10-14 days triples the incidence of yeast infections. Women will typically develop vaginitis two weeks after starting an antibiotic.<sup>12</sup>

### Changes in Menstrual Cycle

Candida species have both estrogen and progesterone receptors. Therefore, the incidence of women developing candidial vaginitis before puberty or after menopause is rare. However, childbearing age women are more likely to develop vaginitis caused by candidiasis particularly during the lunar phase of the menstrual cycle.<sup>14</sup> The lunar phase has the highest production of estrogen and progesterone.<sup>14</sup> However, Nelson reported that women who developed vaginal candidial infections did so irrespective of phase of menstrual cycle.<sup>13</sup> This could be due to reinfection of the same vulvovaginitis infection.

However, anecdotally, women who suffer with recurrent vulvovaginitis have reported they know their individual timing in relation to their monthly cycle.<sup>14</sup> Studies determining the reinfection rates are not available.

### Pregnancy

The increased hormone levels associated with pregnancy can predispose women to vaginitis candidiasis.<sup>14</sup> If infected during the first trimester, health care professionals are limited to vaginally administered treatments since they are category B in pregnancy. Single dose fluconazole can be administered in later trimesters, but is considered a category C in pregnancy.<sup>14</sup> Fluconazole use in pregnancy increases the risks of fetal anomalies such as craniofacial defects, skeletal defects and cardiac defects.<sup>14</sup>

Cotch, Hillier, Gibbs, and Eschenbach discovered that pregnant women with *Candida* colonization were more likely to be co-infected with *Trichomonas vaginalis*, and/ or group B streptococci.<sup>15</sup> Even though being colonized with *Candida* is not a direct risk to mother or fetus, the vaginal infections caused by *Trichomonas vaginalis* can place the infant at risk for preterm birth and group B streptococci places the infant at risk for pneumonia and septicemia. Therefore, treating the pregnant patient would be in the best interest of the patient to reduce the incidence of co-infections.

Treating pregnant women can be a challenge for the health care provider. Not only does the provider have to take into consideration the fetal risks with the treatment but also the compliance of the mother. Olsen, et al. reported that only 28% of women would take an antimycotic as prescribed.<sup>16</sup> However, pregnant women reported an increase use of complementary medicines and therapies during pregnancy.<sup>17</sup> Jeavons

reported there were no reports of fetal anomalies or contraindications to ingesting oral lactobacillus, such as yogurt with live cultures, during pregnancy.<sup>9</sup>

### Chronic Disease Processes

Uncontrolled diabetes mellitus is one of the most common chronic systemic illnesses that contribute to recurrent infections.<sup>14</sup> “Hyperglycemia can enhance production of protein surface receptors on *C. albicans* organisms that subvert phagocytosis by neutrophils, making vulvovaginitis more difficult to eradicate”<sup>18</sup>(P. 250). Women with diabetes may require longer medical therapy for treatment.<sup>18</sup> There are no documented studies listing the use of alternative therapies with women who have diabetes. Altered immune systems can expose women to repeated vaginal candidial infections, such as corticosteroid use, chemotherapy, and human immunodeficiency virus. As with diabetes, women with altered immune status will require longer treatment to eradicate the candida.<sup>18</sup>

### Ethnic Considerations

African American women appear to have a higher incidence of recurrent vulvovaginitis.<sup>19</sup> The cause for the increase of vulvovaginitis among the African American population is unknown.<sup>19</sup> In a telephone survey of over 29,000 premenopausal women, researchers discovered African American women suffered approximately three times as many vulvovaginal symptoms as other races.<sup>6</sup>

African American women resort to over-the-counter, alternative treatments more frequently than other races.<sup>20</sup> The authors speculate the increased frequency of using over-the-counter, alternative treatments by African American women may be a result of barriers to health care. However, the type of alternative treatments African American

women resorted to for treatment of vulvovaginitis has not been documented. The African American and Hispanic women population are receptive and are avid users of complementary and alternative medicine.<sup>21</sup>

### Oral Contraceptives

The current theory on the increase of candida in oral contraceptive pill users is due to the active ingredients of estrogen and progesterone.<sup>22</sup> The medical community is split on the likelihood of oral contraceptives contributing to recurrent vulvovaginitis candidiasis. Spinillo, et al. identified women (n=153) with histories of recurrent candidiasis will not improve while on oral contraceptives.<sup>23</sup> However, the incidence of sporadic infections by the controls (women without a history of recurrent vulvovaginitis) did not increase with oral contraceptive use.

In a review of the research literature article, Sobel, et al, concluded that taking oral contraceptives could increase women's risk of acquiring vulvovaginitis.<sup>24</sup> In an incidental finding, Cotch, et al. discovered that women with candidial colonization during pregnancy were more likely to have used oral contraceptives within six months before pregnancy.<sup>15</sup> With the use of low-dose estrogen oral contraceptives the recurrence of vulvovaginitis due to oral contraceptives has decreased, but is still present.<sup>13</sup> The current practice for treating women with recurrent vulvovaginal candidiasis who are taking oral contraceptive is to change the brand of the oral contraceptive, lower the dosage, or change method of birth control to a non-hormonal method.<sup>13</sup>

### Allopathic Medical Treatments

Topical and oral routes of treatment are the prescribed methods of relieving vulvovaginitis candidiasis. Current traditional therapy is proven to treat sporadic

episodes, and a few are effective therapies for recurrent vaginitis. Most topical agents for treating vulvovaginal candidiasis caused by *Candida albicans* are available over-the-counter.<sup>14</sup> In a survey, 73% of women (n=105) reported using over-the-counter medications for recurrent vulvovaginitis.<sup>1</sup> Nyrjesy, Weitz, Grody, and Lorber speculated women with chronic vaginitis would self-medicate in order to keep costs low.<sup>25</sup>

Some vulvovaginitis candidiasis is caused by non-albicans species, which does not respond to over-the-counter treatment, therefore the symptoms return shortly after the medication is used. Authors have reported varying prevalence of *C. albicans* species for vulvovaginal candidiasis from 68%-83%.<sup>4, 8, 15</sup> Eckert, et al., reported only a staggering 28% of women (n=545) had *C. albicans* type vaginal candidiasis.<sup>26</sup> The results of this study causes one to conclude that 72% of the women in their sample would not gain relief from the over-the-counter preparations.

Women alter the delicate balance of the vaginal flora and predisposing themselves to various infections by using over-the-counter treatments. Ross et al. examined the effects of clotrimazole (an over-the-counter medication) in vitro samples.<sup>27</sup> This in vitro study contained the vaginal microbials *L. acidophilis* and *C. albicans*. Adding the clotrimazole eradicated the *C. albicans*, but also eliminated the healthy levels of *L. acidophilis*. Therefore, reducing the healthy levels of *L. acidophilis* will increase the risk of opportunistic infections, such as candida.

Fluconazole is available with a health care provider prescription. This treatment requires the intervention of a health care professional, either by office visit or telephone call. This treatment is only effective with *C. albicans*. The systemic side effects of fluconazole range from upset stomach to liver damage.<sup>11</sup> Fluconazole can interact with

such important medications such as warfarin, oral hypoglycemic agents, phenytoin, theophylline, and rifampin.<sup>22</sup>

### Alternative Therapies for Treatment

Women use alternative therapy treatments for their overall health.<sup>28</sup> Women with vaginal candidiasis are more likely to resort to alternative therapies or over the counter remedies rather than seeking medical treatment.<sup>25</sup> Women with recurrent vulvovaginitis are more likely to resort to alternative therapies for treatment rather than traditional medicine because of the expense of OTC medicines.<sup>29</sup> Same day medical appointments are limited and women with recurrent infections resort to alternative therapies for symptom relief.<sup>29</sup>

Forty-two percent of women (n=105) with recurrent vulvovaginitis have used alternative therapies for treatment.<sup>1</sup> More than half of the women who used alternative treatments reported using *L. Acidophilus* or ingesting yogurt containing live cultures to treat acute exacerbations and for prophylaxis. Other alternative therapies used by women are vinegar douche and boric acid. Exogenous *Lactobacillus acidophilus* (from yogurt), boric acid, tea tree oil, and garlic are the most common alternative therapies used for treating vulvovaginitis candidiasis.

### Exogenous Lactobacillus acidophilus

Limited studies reviewed the efficacy of ingesting yogurt. Hilton, et al, conducted one of the most cited studies in 1992. This study consisted of a small sample (n = 28), but results were promising and positively demonstrated the health benefits of women ingesting yogurt for preventing vulvovaginal candidiasis. Women in this study served as their own controls. The researcher had the subjects take yogurt for six months

then the researcher wanted the women stop taking yogurt for six months. Only 13 women continued with the study. Fifteen of the women refused to stop taking the yogurt and withdrew from the study. The women reported feeling healthy and free from the recurrent candidiasis vulvovaginitis. In another small sample of women (n=23), Shalev, Battino, Weiner, Colodner, & Keness discovered flourishing colonization of *Lactobacillus acidophilus* in the vagina and rectum after ingesting yogurt.<sup>30</sup> The results demonstrated a reduction of candidial vaginitis and bacterial vaginosis.

Novikova & Mardh conducted a descriptive study to compare the characteristics of women (n=83) who have recurrent vulvovaginitis with women who are symptom free.<sup>31</sup> The only significant difference the authors could contribute to these different characteristics between the two groups (those with recurrent vulvovaginitis and those without vulvovaginitis) was that 94% of the symptom-free group consumed yogurt on a regular basis. There are no documented studies on the effectiveness of yogurt with different candida species. Side effects to ingesting yogurt are low. There is a small increase of gastrointestinal upset with yogurt; however this has been reported to be less of a problem with yogurt than other dairy products due to the yogurt processing.<sup>29</sup> There are no contraindications documented with yogurt.<sup>29</sup> Daily cost is approximately \$.50.<sup>29</sup>

#### Boric Acid

Boric acid has been increasing in popularity, particularly for those women with recurrent vulvovaginitis.<sup>29</sup> However, boric acid is not as widely used as yogurt.<sup>25</sup> The authors noted that only 13.6% used boric acid as compared to 38.7% used yogurt for over-the-counter treatment.

Effectiveness of boric acid has been documented to be between 92-98%.<sup>29</sup> The reason for the high cure rate is because boric acid is effective against non-*C. albicans* species as well as candida albicans.<sup>29</sup> The capsule must be placed in the vagina for treatment.<sup>22</sup> The side effects are local, which can include burning, irritation, and excoriation.<sup>29</sup> Cost is \$.80-\$2.00 per day of treatment.<sup>29</sup>

### Tea Tree Oil

Tea Tree oil is an antiseptic and is known for antifungal and antibacterial properties.<sup>32</sup> In vitro studies demonstrated the effectiveness of tea tree oil against several strains of candida.<sup>29</sup> The only clinical data on tea tree oil is from case reports.<sup>29</sup> The route of administration is vaginal, by tampon, douche, or suppository.<sup>33</sup> The most common adverse effect is allergic contact dermatitis. No known side effects are reported.<sup>29</sup> The daily cost of using tea tree oil is \$2-\$20.<sup>29</sup>

### Garlic

Garlic has been used for the antimicrobial properties.<sup>32</sup> Garlic has been a proven effective treatment for *C. albicans* and non *C.-albicans* species among in vitro studies only.<sup>29</sup> The garlic is crushed and wrapped in gauze, then placed in the vagina.<sup>34</sup> Potential side effects for topical use are body odor, allergic reactions or chemical burns.<sup>29</sup> The daily cost for treatment is low, \$.10-\$.50.<sup>29</sup>

### National Recommendations for Research

Evidenced based alternative therapies for preventive measures for vulvovaginal candidiasis are limited. The president of the National Nutritional Foods Association (NNFA) when speaking before the House Appropriations Subcommittee believes that supporting additional research for dietary supplements can reduce health care cost by

billions.<sup>35</sup> “The Office of Dietary Supplements (ODS) was established at the National Institutes of Health in 1995 under Dietary Supplement Health and Education Act, to stimulate, coordinate and disseminate the results of research on the benefits and safety of dietary supplements in the treatment and prevention of chronic disease.”<sup>35</sup> He urged additional funding for Office of Dietary Supplements for FY’04 to increase to \$25 billion. Under the NNFA, the National Center for Complementary and Alternative Medicine (NCCAM) is funded. In FY’03, NCCAM received \$113.8 million to help meet its research goals. The NCCAM has listed studying the effectiveness of probiotics in its FY’04 research priorities for the prevention and treatment of diseases.

#### Conclusion

The diagnosis of recurrent vulvaginitis caused by candida can be frustrating and challenging for the women who suffer. There is limited research available to inform health care providers about the effectiveness of alternative therapies and this limits the amount of evidenced based information nurse practitioners can provide to their patients. However, many of the therapies listed in this article have provided some or complete relief from recurrent or chronic suffers of vulvovaginitis candidiasis.

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