Natural and Holistic Medicine Approach in Evaluation and Treatment of Vaginal and Urinary Tract Health

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While the gut has an estimated 500 different microbial species, the number of microbial species inhabiting the vagina is thought to be approximately 50. The microbiota of the urogenital tract are the topic of much research surrounding not only genitourinary health, but also fertility and pregnancy, and even gynecological conditions such as endometriosis and adenomyosis. We now know there is a continuum of microbes that reside in the female reproductive system from the vaginal introitus to the upper reproductive tract, including the fallopian tubes and the recto-uterine peritoneal pouch.

Normal Female Flora and Function

The vaginal microbial flora of healthy women is largely dominated by the Lactobacillus genus, which typically makes up 90 to 95% of the total bacterial count of the genitourinary tract. The dominant species identified in healthy women have primarily been Lactobacillus gasseri, L. crispatus, L iners, and L.jensenii, although higher levels of L. iners have also been associated with vaginal dysbiosis and obesity. Other common species identified include L. acidophilus, L. rhamnosus, L. plantarum, L. fermentum, L. brevis, L. casei, L. vaginalis, L. delbrueckii, L. salivarius, and L. reuteri, Bifidobacterium spp, are commonly found in the genitourinary tract, with Bifidobacterium breve and B. logum being two of those documented.

Similar to the probiotic organisms for the gastrointestinal tract, the lactobacilli in the female genitourinary tract also have protective and health-promoting actions. These effects have been observed to include:

- **Regulation of vaginal epithelial cell innate immunity**
- **Production of lactic acid, hydrogen peroxide, bacteriocins, and biosurfactants that impact the pH of the vaginal canal and limit uropathogen growth and adherence.**
- **Disruption of the formation of uropathogen-related biofilms which protect pathogens and enable colonization of normal flora such as Candida spp.**
- **Disruption of yeast-to-hyphae differentiation in C. albicans**

Competitive inhibition of binding of pathogenic bacteria, including those responsible for yeast vaginitis, bacterial vaginosis, urinary tract infections, and sexually transmitted infections.

Numerous trials have demonstrated that oral administration of specific strains of lactobacilli – in particular L. crispatus, L. rhamnosus, L. gasseri, and L. reuteri – can both maintain and restore healthy genitourinary microbiota in females.

Many of the initial studies looking at the potential benefits of probiotics for female genitourinary tract health focused on the introvaginal application of lactobacilli strains.

There has been an emerging trend, however, of using oral probiotics to colonize the vagina, backed by a substantial amount of clinical research. Numerous trials have demonstrated that oral administration of specific strains of lactobacilli – in particular L. crispatus, L. rhamnosus, L gasseri, and L. Reteri – can both maintain and restore healthy genitourinary microbiota in females.

In one such study, healthy woman took an oral daily dose of 100 million colony-forming units (CFUs) of a mixture of L. fermentum 57A, L. planatarum 57B and L gasseri 57C. Not only did oral supplementation result in the colonization of both vaginal and rectal epithelium by these strains for several weeks (measured by an appreciable increase in total lactobacilli counts), but it also correlated with improvement of parameters such as vaginal pH and Nugent score (a scoring system of vaginal smears to diagnose bacterial vaginosis). No adverse events were noted during the study.

Vaginal and Urinary Tract Infections

Bacterial vaginosis (BV) and vulvovaginal candidiasis (VVC) are common forms of vagintis seen in both pregnant and nonpregnant females. BV is associated with Gardnerella vaginalis and Atopobium vaginae, while VVC islargely due to C. Albicans, with C. glabrata accounting for 8 to 20%. Mixed infection is also not uncommon. Symptoms of BV may include vaginal itching, malodorous discharge, and dysuria, while VVC commonly presents with vulvar burning , soreness, and irritation.

Almost half of all women will also be plagued by urinary tract infections (UTI's) during their lifetime, with nearly one in three women having a UTIs by the age of 24. UTI's are most frequently caused by Escherichia coli, translocating from the colon and ascending up the urinary tract.

Recurrence of BV, VVC, and/or UTI's is common in susceptible females, leading to repeated courses of treatment with antibiotics or antifungal medications. In addition to the deleterious effects on the gut, treatment with antibiotics also may lead to fungal overgrowth and subsequent need for an antifungal agent. Because of their ability to positively influence the vaginal environment, and the protection that they offer against pathogens, probiotics have been investigated in many clinical trials both as adjunctive and alternative treatments to the standard medication regimes for these conditions. Supplementation of a probiotic formula during and after antibiotic administration may also help mitigate unwanted gastrointestinal side effects from antibiotic use.

In one randomized, double-blind, placebo controlled trial, researchers explored whether probiotics could reduce the risk of recurrence of VVC after a standard course of treatment with fluconazole. After initial treatment with a single dose of oral fluconazole, 59 VVC patients took either an oral probiotic supplement (containing a combination of 7.5 billion CFU's of L. acidophilus, 6 billion CFUs of B. bifidum, and 1.5 billion CFUs of B. longum) or placebo capsules daily for six months. Of the women taking placebo capsules, 35.5% experienced recurrence of VVC; of the women taking probiotics only 7.2% experiences recurrence.

Pregnancy

BV has also been associated with pelvic inflammatory disease (PID), postoperative infection, and preterm birth. Estimates suggest that 40% of cases of spontaneous preterm labor and preterm birth may be associated with BV. Forming the front line of protection in the female genitourinary mucosa, lactobacilli have been shown not only to assist in the treatment of BV, but also to improve the integrity of the cervical os. Similarly, vaginal colonization by healthy lactobacilli protects the uterus and upper reproductive organs from pathogenic invasion, ergo reducing the risk of adverse obstetric outcomes such as miscarriage, premature rupture of membranes (PROM), preterm birth, neonatal sepsis, and neonatal respiratory distress. Beyond this, the use of probiotics during pregnancy has been

studied for the reduction of eczema, allergic rhinitis, and obesity in pediatric populations as well.

Menopause

Estrogen plays an important role in maintaining optimal vaginal ecology by thickening the vaginal epithelium, increasing the volume of vaginal secretions, and enhancing epithelial glycogen production. This glycogen (formed by many glucose molecules) serves as an important source of nutrition for lactobacilli, thereby promoting their colonization in the female reproductive tract. The drop in estrogen production seen in menopause, however, results in a decrease in glycogen production. This in turn shifts microbial balance, decreasing levels of healthy lactobacilli and raising vaginal pH, and leads to an increased incidence of UTIs as well as BV and VVC in menopausal women.

Overall, findings from the reviews of probiotic use for female genitourinary health are positive, with some limitations. Dosage, of course, and strain are both matters to consider for the genitourinary tract, much like the gut. A 2017 review in the Journal of menopausal Medicine of probiotic use for the treatment of vaginal infections in postmenopausal women summarizes the potential benefits of probiotics: “Probiotics positively effects vaginal micro flora composition by promoting the proliferation of beneficial microorganisms, alters the intravaginal microbial infections in postmenopausal (women). Probiotics also reduce the symptoms of vaginal infections (e.g. vaginal discharge, odor, etc.) and are thus helpful for the treatment and prevention of BV and VVC.

A recent review concerning the treatment of BV with probiotics states: The majority of clinical trials yielding positive results have been performed using probiotic preparations containing high doses of lactobacilli suggesting that, beside strain characteristics, the amount of exogenously applied lactobacilli could have a role in the effectiveness of the product.
Another review, surveying the use of probiotics for a broader range of conditions, including UTIs and VVC, concludes: “Although clinical practice recommendations were limited by the strength of evidence, probiotic interventions were effective in treatment and prevention of urogenital infections as alternatives or co-treatments. Finally, a 2016 review in the journal Drugs of probiotic use for recurrent urinary tract infections concludes: “The evidence from the available

studies suggests that probiotics can be beneficial for preventing recurrent UTIs in women; they also have a good safety profile. However, in each of these reviews the need for further research, and the lack of homogeneity in the studies, was duly noted.

Considering that lactobacilli make up over 90% of the microbial presence in the female genitourinary system, the case for probiotic supplementation in the prevention and treatment of vaginal, urinary, and reproductive infections in women – and as maintenance in pregnancy – is quite compelling

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