Cranberries and the Prevention and Treatment of Urinary Tract Infections

by Crestina L. Beites, PhD

Clinical Question: ***Can urinary tract infections be treated effectively with cranberry juice?***

BACKGROUND

Long before early settlers in North America learned to use the cranberry, indigenous people were already reaping benefits from cranberry mixtures. They were mashing cranberries with wild game and animal fat to make pemmican, a high-energy, spoil-resistant survival food. They also used cranberries medicinally to draw poison out of arrow wounds and treat bladder and kidney ailments.[1] Cranberry juice has since evolved into a quintessential North American folk remedy, and as early as the 1920s, it was being used to reduce the frequency of urinary tract infections (UTIs). Because acidic environments are detrimental to bacteria and because consumption of large amounts of cranberries was found to acidify urine, scientists hypothesized that cranberry-rich diets would eradicate *Escherichia coli* from the bladder.[2,3] More than 60 years ago, this idea popularized the use of cranberries for treating UTIs. In the 1960s, cranberry consumption gained wide acceptance as a self-treatment for bladder infections.

THE SCIENCE

Research discredited the belief that acidification of the urine by cranberry consumption contributes to an antibacterial effect. However, research in recent decades has empirically demonstrated the effect of cranberries on bacterial adherence to uroepithelial cells in vitro (i.e., outside of the body, in a Petri dish), once again popularizing their use.[4–6] Cranberries contain a group of high-molecular-weight compounds known as proanthocyanidins (PACs), which have been shown to inhibit the adhesion of P-fimbriated uropathogenic *E. coli* but not diarrheal *E. coli.* This suggests that PACs have a specific effect in preventing the attachment of *E. coli* to the walls of the urinary tract and the bladder. However, cranberries' effect on bacterial stickiness cannot be attributed solely to their PACs. Fructose, found in cranberry juice cocktails and other juices, can also inhibit the type 1 fimbrial adhesin expressed by all P-fimbriated uropathogenic *E. coli*.[7] Despite the in vitro evidence of an antiadherence effect on E. coli in regard to urogenital mucosa, this effect remains clinically unproven and nonspecific to cranberry consumption.

Two systematic reviews[8,9] and one randomized controlled trial[10] have assessed the effectiveness of cranberry products in preventing UTIs. The consumption of cranberry products, compared to placebo or no treatment, resulted in a small reduction in UTIs, but the effect was not statistically significant. In view of the evidence that the benefit of preventing UTIs by cranberry products is small and that UTIs are not currently treated with cranberries in clinical practice, consuming cranberry products cannot be recommended as an effective preventative therapy or as a remedy for UTIs.

THE BOTTOM LINE

Although its antibacterial activity in a Petri dish looked promising, neither cranberry juice nor cranberry capsules have been adequately proven to treat or prevent UTIs. Because real and devastating complications arise from untreated bacteriuria during pregnancy (e.g., pyelonephritis, preterm labour, low neonatal birth weight),[11] recent guidelines support the use of antibiotics.

EFFECTIVE THERAPIES

Antibiotic treatment for pregnant women is tailored to the gestational age of the fetus. Ciprofloxacin and sulfamethoxazole-trimethoprim are effective treatments but are to be avoided in the first trimester because of

possible arthropathies and serious organ formation anomalies.[12] Although some older studies have found an association between the use of nitrofurantoin and cleft lip and palate, more recent meta-analysis studies have failed to show a teratogenic risk in early gestation, which makes nitrofurantoin a good choice for treatment of UTIs in early pregnancy. Because of their relative safety, beta-lactam antibiotics like amoxicillin and cephalexin are also suitable for the treatment of UTIs in pregnant women who have no hypersensitivity or allergy to penicillin antibiotics. Reviews of available antibiotic treatments can be obtained from the Society of Obstetricians and Gynaecologists of Canada[13] and from Motherisk.org.

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