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Pharmacy Column



William Simonson,
PharmD, BCGP, FASCP

Cranberry products for urinary tract infections

William Simonson, PharmD, BCGP, FASCP

Oregon State University, USA

With the advent of the Antibiotic Stewardship Program, signed into law by President Barak Obama in 2014, antibiotic use will fall under increasing scrutiny. The interdisciplinary health care team will increasingly collaborate to reduce, and ideally eliminate, irrational and unnecessary use of antibiotics. This includes incorrectly using antibiotics to treat viral infections, unnecessarily long courses of antibiotic therapy and use of potentially dangerous antibiotics when safer agents are available. With antibiotic use going under a microscope it is likely that caregivers and patients will also look for natural alternatives to commercially manufactured antibiotics.

Urinary tract infection (UTI) is one of the most common conditions for which antibiotics are routinely used in the older patient. Treatment regimens vary depending on a number of factors including the type and severity of infection and whether it is acute or recurrent. The approach to antibiotic treatment of UTI has improved over time. It has been demonstrated that rather than a prolonged 10–14 day course of therapy, which was commonly prescribed decades ago, an acute, uncomplicated UTI can be treated with a short course of an appropriate antibiotic including nitrofurantoin monohydrate macrocrystals, 100 mg twice daily for 5 days or TMP-SMZ, 160/800 mg twice daily for three days.¹ This approach makes sense from a pharmacologic and bacteriologic perspective because these antibiotics are excreted unchanged by the kidneys and each of these medications is concentrated in urine at levels that are far greater than that needed to eradicate typical bacterial pathogens. These shorter courses of antibiotic therapy are likely to decrease the cost of therapy and the risk of adverse antibiotic-induced side effects and will also likely reduce possible complications including the development of antimicrobial resistance and the occurrence of major alterations in the intestinal microbiome which can have profound negative consequences including putting the patient at increased risk of developing *clostridium difficile* infection.²

Further improvement in therapy could be achieved through behavioral steps such as drinking sufficient amounts of water which helps cleanse the urinary tract of bacteria and/or the use of some natural compounds such as ascorbic acid (vitamin C) or cranberry products in place of actual antibiotics.¹ This approach has stimulated considerable interest in cranberry juice for prevention, or perhaps even treatment of UTIs. This column will briefly discuss the use of cranberry products for UTIs and will review some recent scientific studies looking at the safety and efficacy of cranberry products.

Cranberries are rich in antioxidant compounds known as proanthocyanidins (PAC) which are responsible for the juice's vibrant color.³ Fokelore and several scientific studies suggest that PAC helps to prevent urinary tract infections, especially for women who have a history of recurrent infections. The proposed mechanism of action is that the PAC in cranberries alters *E. coli* bacteria, the most common pathogen causing UTIs, making the bacteria less able to adhere to cells lining the urinary tract and bladder so the bacteria are more likely to be washed out during urination.³

The two most common forms of cranberry that have been studied are juice and capsules/tablets containing concentrated amounts of PAC but there are some important nuances about cranberry juice that must first be understood. Commercially available cranberry beverages include a product that contains 100% pure cranberry juice with no additives or other ingredients. It has a natural dark cranberry color and a distinctly tart taste that may be unpalatable to some. A variety of other beverages labeled as containing cranberry juice contain a lower concentration of cranberry juice and may also contain other products such as sugar, high-fructose corn syrup, ascorbic acid and other juices to make the product more palatable. In addition, these products are typically less expensive than the 100% pure cranberry juice.

The type of juice used in an attempt to treat or prevent UTI is important because, while the products containing lesser concentrations of cranberry juice may provide hydration and possibly help

E-mail address: wsimonsonpharmd@aol.com.

to wash bacteria from the urinary tract, depending on the product they may contain insufficient amounts of PAC to offer any protection against UTI.⁴

The other form of cranberry that may be used to prevent UTI is non-prescription cranberry capsules/tablets, which contain concentrated PAC. Depending on the product one capsule may contain as much PAC as that contained in 16 ounces of pure cranberry juice.⁴

Previous studies indicated that cranberries reduce the occurrence of UTI in sexually active women with recurrent UTIs by 40%–50%.⁵ However, other studies, have found no difference between cranberry and placebo groups in treating or preventing UTIs. The most recent 2012 update of the Cochrane review on the use of cranberries for preventing UTIs concluded that, while there was a small trend towards fewer UTIs in people taking cranberry product compared to placebo or no treatment, it was not a statistically significant finding.⁶ However, the authors noted that a number of the studies had a high dropout and low compliance rate, possibly due to the palatability/acceptability of the products, primarily the cranberry juice, and that most of the studies of other cranberry products (tablets and capsules) did not report the amount of “active” ingredient in the product contained so the products may have not been potent enough. This points to the need for additional, well-designed clinical studies.

Three recent studies of the effect of cranberry on UTI have come to conflicting conclusions. One study published in 2017 involved ambulatory women, mean age 41 years, who had a recent history of urinary tract infection. The group was divided in half with one group drinking 240 ml of cranberry-containing beverage per day and the other group drinking the same amount of a placebo beverage containing no cranberry or PAC. After 24 weeks the group drinking the cranberry beverage experienced a 39% reduction in clinical UTI episodes and a 37% reduction of clinical UTI with pyuria.⁷

Another study of cranberry-containing beverage concluded that cranberry concentrate does not seem to effectively prevent UTIs in female patients over the age of 65 with hip fracture and indwelling urinary catheter.⁵ In my opinion, this study may have set the bar too high because women with indwelling catheters have a high likelihood of developing bacteriuria even if they are receiving antibiotics so one would not expect cranberry products to be more effective than antibiotics.

A third study, published in 2016 looked at two groups of female nursing home residents age 65 and older with or without pyuria at

baseline.⁸ One-half received two cranberry capsules per day with the other half receiving placebo. The researchers concluded that administration of cranberry capsules resulted in no significant difference in presence of bacteriuria plus pyuria over 1 year but following publication of the study data there was significant pushback from urologists and cranberry researchers who cited significant flaws in the study design.⁹

While definitive research is lacking, some studies and considerable anecdotal reporting of the efficacy of cranberry products exists, especially in preventing recurrent UTIs. The focus on antibiotic stewardship will certainly continue to increase the interest in cranberry products as an alternative to antibiotics, at least in some clinical conditions. Considering little-to-no risk compared to potential considerable benefit, cranberry products, either in the form of juice or a capsule/tablet, may be a reasonable option for the prevention and possibly the treatment of UTIs but only if the product contains sufficient amount of PAC.

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