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FILE: ■ Cranberry (*Vaccinium macrocarpum*)
■ Urinary Tract Infection
■ Prevention

HC 020181-347

Date: February 29, 2008

RE: Review of the Preventive Effects of Cranberry against Urinary Tract Infections – Results Positive

Jepson RG, Craig JC. Cranberries for preventing urinary tract infections (Review).
*Cochrane Database Syst Rev.*2008;DOI:10.1002/14651858.CD001321.pub.4.

Urinary tract infections (UTIs) are diagnosed when a threshold of bacteria in the urine is exceeded (generally greater than 100,000 cells/mL). UTIs consist of cystitis (bacteria in the bladder), urethral syndrome, and pyelonephritis (infection of the kidney). Symptoms associated with UTIs include pain during urination, cloudy urine, blood in the urine, back pain, and fever. Infants, pregnant women, the elderly, patients with spinal cord injuries, and immunocompromised patients are at increased risk of UTIs. Although UTIs occur in both males and females, they are 50 times more common in females than in males, likely because females have a shorter urethra, which allows easier passage of bacteria into the bladder. UTIs are generally easily treated with antibiotics. Cranberries (*Vaccinium macrocarpum*) have been used widely for many years, usually in the form of cranberry juice, to prevent and treat UTIs. The preventive mechanism has not been definitively established; however, the functioning theory is that constituents of cranberries (fructose and proanthocyanidins) prevent bacteria (particularly *Escherichia coli*) from sticking to uroepithelial cells that line the wall of the bladder. The objective of this review was to evaluate the effectiveness of cranberries in preventing UTIs in high-risk populations.

The following two hypotheses were tested: 1) cranberry juice and other cranberry-containing products are more effective than placebo or no treatment in preventing UTIs in susceptible populations, and 2) cranberry juice and other cranberry-containing products are more effective than all other treatments in preventing UTIs in susceptible populations. A literature review of several databases (MEDLINE, EMBASE, and the Cochrane Central Register of Controlled Trials) and the Internet was conducted to identify randomized clinical trials (RCTs) of studies that evaluated the effectiveness of cranberry products in preventing UTIs relative to placebo, no treatment, or other treatment. Studies of the treatment of

asymptomatic or symptomatic UTIs and of UTIs not caused by bacterial infection were excluded. The primary outcome measure was the number of UTIs in each study group confirmed by a catheter or mid-stream specimen of urine or a "clean-catch" specimen. Secondary outcome measures were in compliance with therapy and adverse side effects. The two authors of this review independently assessed the studies identified to determine eligibility for this review and independently extracted pertinent information (methods, participants, study design, interventions, and outcomes) from those studies that were deemed eligible. The quality of the studies was assessed on the basis of the Cochrane criteria.

Ten studies (n = 1049 subjects) were included in the review: five crossover studies and five parallel-group studies. Detailed tabular material is provided in this review for each of the 10 studies. In seven of the studies, cranberry or cranberry-lingonberry juice was compared with water, juice, or placebo; in the remaining studies, cranberry tablets were compared with placebo. Five of the studies were conducted in the United States, two in Canada, one in the Netherlands, one in Finland, and one in Scotland. One study lasted 1 month (30 mL cranberry juice/day), one study lasted 9 weeks (400 mg cranberry in capsule form), two studies lasted 3 months (400 mg cranberry in capsule form or 300 mL cranberry juice/day), five studies lasted 6 months (300 mL cranberry juice/day, 50 mL cranberry-lingonberry juice 5 days/week, 2 g cranberry juice concentrate, or 15 mL cranberry juice/kg/day), and one study lasted 12 months (250 mL cranberry juice 3 times/day or one concentrated juice tablet 2 times/day).

The methodologic quality of all the trials was good. Four of the studies were included in a meta-analysis, and all of these studies showed that cranberry consumption significantly reduced the incidence of UTIs at 12 months (relative risk: 0.66; 95% CI: 0.47 to 0.92) compared with placebo or control. Only one of the six studies not included in the meta-analysis showed a significant effect of cranberry consumption on reducing the incidence of UTIs. Side effects (bad taste being the most common) were common in most of the studies, and the dropout rate was high in many of the studies. The authors of this review conclude that "evidence from four RCTs indicates that cranberry products can be effective in reducing UTIs. However, it may only be effective in certain sub-populations." Some evidence indicates that cranberry juice may be effective in women with symptomatic UTIs, but the evidence is inconclusive for the elderly. Moreover, the evidence is unclear as to the amount and concentration of cranberry that needs to be consumed and the duration of consumption for the intervention to be effective. Additional "properly designed studies" are needed to clarify these uncertainties.

—*Brenda Milot, ELS*

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