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The relationship between cranberries ingestion and the reduction of the incidence of urinary tract infections

Urinary tract infections (UTIs) are common and are among the most frequent medical conditions requiring outpatient treatment. Approximately 80% of all UTIs occur in women, and 20% to 30% of women with a UTI will have a recurrence. Recurrent UTIs (rUTIs), defined as at least three episodes of UTI in the last 12-months or two episodes in the last 6-months, can occur in susceptible individuals and are a significant source of patient morbidity and health care costs. In individuals with rUTIs, low dose antibiotic prophylaxis for several months can be recommended. However, antibiotics are the main cause for the development of antibiotic resistance and such prolonged treatments can lead to increased resistance.

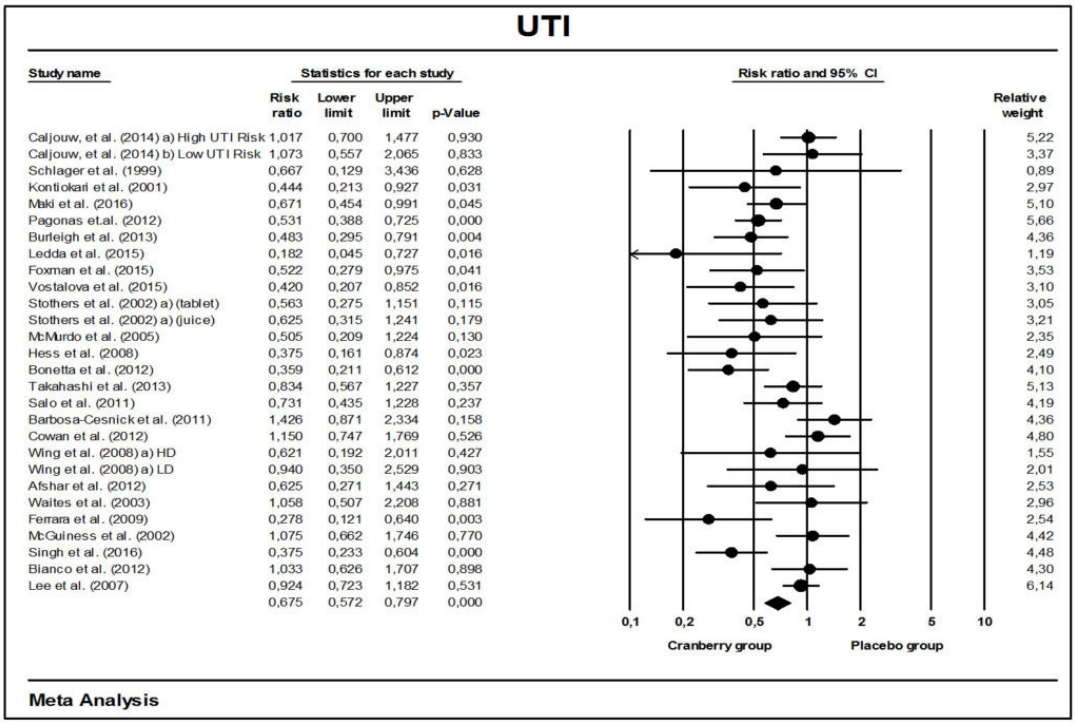

Fig. 1. Forest plot of comparisons of the effects of cranberries ingestion on incidence of UTIs.

Prophylaxis with cranberries is a potential prevention strategy with the health benefits being associated with the high concentrations of polyphenols such as proanthocyanidins (PACs) found in these berries. PACs are stable phenolics with anti-adhesion activity against *Escherichia coli*, acting as receptor analogs and inhibiting the adhesion of *E. coli* to cells by binding to the fimbrial tips.

Taking this into account, together with the results of recent clinical trials evaluating cranberries for the prevention of UTIs, we aimed to perform a systematic review, complying with the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) statement, followed by a meta-analysis and trial sequential analysis (TSA), to clarify the association between cranberries intake and the prevention of UTIs.

Complying with the PRSIMA statement, the initial search identified 157 articles with potential to be included in this meta-analysis. After all the steps, 25 studies were considered suitable for performing qualitative and quantitative analyses. From the 25 studies, 3 were divided into 2 different trials, totalizing 28 studies (4947 patients) included in this meta-analysis.

The results clearly show the potential use of cranberries in a clinical condition of UTI. The weighted risk ratio observed (WRR=0.6750; 95% CI:0.5516-0.7965; *p*-value<0.0001) indicates that the use of cranberry products significantly reduced the incidence of UTIs (Fig. 1). The results of subgroup analysis for type of patient revealed that patients with rUTIs and those that had undergone gynecological surgery were more protected by the intake of cranberries, with a significant reduction of the incidence of UTIs for those groups. The TSA was undertaken (Fig. 2), resulting in a Required Information Size (RIS) of 4875, which was reached, and the cumulative *Z*-curve crosses the boundaries. So, it is possible to reach a conclusion with no need of additional trials.

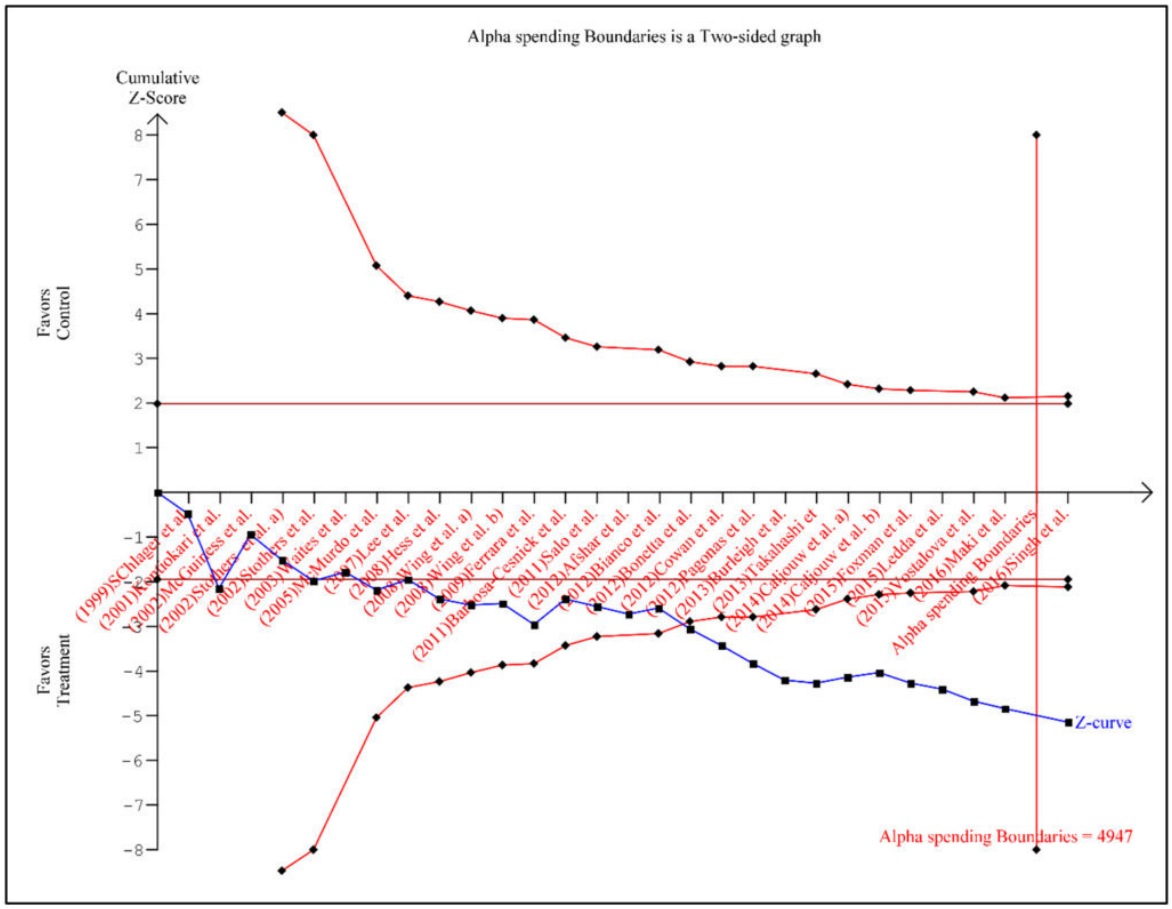

Fig. 2. Trial Sequential Analysis on pooled result of the effects of cranberries ingestion on incidence of UTIs.

In conclusion, physicians could use the results of the present work to recommend the ingestion of cranberries to reduce the incidence of UTIs, particularly in individuals with rUTIs, and so to also reduce the use of antibiotics which can lead to the worldwide emergence of antibiotic resistant microorganisms.

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