Vaccines for the prevention of recurrent urinary tract infections: a systematic review

Authors: Nikoo Aziminia,[A] Marios Hadjipavlou,[B] Shiv Kumar Pandian[A] and Mohamed Hammadeh[A]

Aims

Urinary tract infections (UTIs) pose a major burden of disease worldwide. High prevalence and recurrence rates, coupled with increasing antimicrobial resistance, have highlighted the need for a vaccine. We assessed current vaccine candidates primarily according to clinical efficacy in reducing UTI recurrence rate.

Methods

MEDLINE, EMBASE, PubMed, Cochrane Library, WHO International Clinical Trials Registry Platform Search Portal, and reference lists of relevant reviews were searched up to August 2017 for relevant English-titled citations. Randomised controlled trials were selected by two independent reviewers according to compliance with population, interventions, comparators, and outcomes (PICO) criteria; vaccine versus placebo for the reduction of UTI recurrence in adult patients experiencing recurrent UTIs. Differences in recurrence rates in study populations for individual trials were calculated and pooled, and risk ratios using random effects models were calculated. Risk of bias was assessed using the Cochrane Collaboration's tool and heterogeneity was assessed using Chi^2 and I^2 testing.

Results

598 records were identified, of which 10 studies including data for a total of 1,668 patients were selected. Three vaccine candidates were studied: Uro-Vaxom (6), Urovac (3), and ExPEC4V (1). Uro-Vaxom showed greatest reduction in UTI recurrence rate (RR); the maximal effect was seen at 3 months compared with 6 months after initial treatment (RR 0.67, 95% confidence interval (CI) 0.57–0.78 and RR 0.78, 95% CI 0.69–0.88, respectively). Urovac showed an effect at 20 weeks comparable to that of Uro-Vaxom at 3 months (RR 0.68, 95% CI 0.56–0.83). ExPEC4V achieved reduction in *Escherichia coli* UTI recurrence but this was not statistically significant (RR 0.75, 95% CI 0.52–1.08) and was ineffective against UTIs caused by other uropathogens (RR 1.00, 95% CI 0.55–1.80). Overall, UTI vaccines reduced recurrence compared with placebo (RR 0.72, 95% CI 0.66–0.80), albeit substantial heterogeneity was observed (Chi^2 = 55.60, p<0.00001, I^2 = 84%). ■

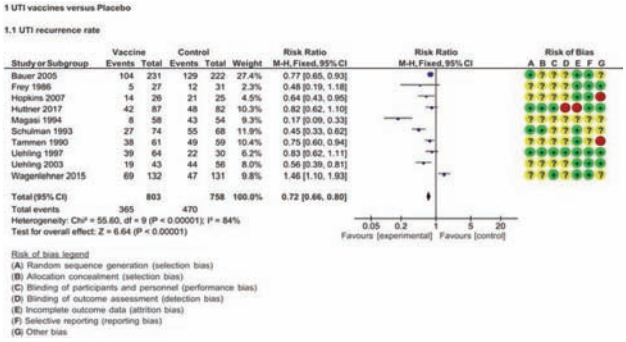

Fig 1. UTI vaccines versus placebo.

Conflict of interest statement

None.

Authors: [A]Department of Urology, Queen Elizabeth Hospital; [B]Department of Urology, Guy's Hospital, London, UK