Cost effectiveness of management strategies for urinary tract infections: results from randomised controlled trial


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study assessed the cost-effectiveness of five management strategies for suspected urinary tract infections. The authors concluded that dipstick testing followed by targeted antibiotics was likely to be the most cost-effective strategy, if the value of a day without moderate symptoms was at least 10 UK pounds sterling. There were a few limitations to the study, but the methods and results were generally well reported and the authors’ conclusions reflect the evidence available.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of five management strategies for suspected urinary tract infections in women, aged 18 to 70 years, who were not pregnant.

Interventions
The five strategies were: immediate empirical antibiotics; delayed (by 48 hours) empirical antibiotics; targeted antibiotics based on a high symptom score, of two or more, from urine cloudiness, smell, nocturia, and dysuria; targeted antibiotics based on dipstick results, for nitrite or leucocytes and traces of blood; targeted antibiotics based on a midstream urine analysis, with symptomatic treatment until the culture and sensitivity results were available.

Location/setting
UK/primary care.

Methods
Analytical approach:
The authors conducted an economic evaluation based on a single trial, with one month of follow-up. The authors stated that the perspective was that of the UK National Health Service (NHS).

Effectiveness data:
The effectiveness of each of the interventions was based on a randomised controlled trial (RCT) of 309 women, aged 18 to 70 years, who were not pregnant and who had a suspected urinary tract infection, either for the first time or as a recurrence (Little, et al. 2010, see ‘Other Publications of Related Interest’ below for bibliographic details). These women completed a symptom diary for 14 days and they were randomised to one of the five interventions.

Monetary benefit and utility valuations:
In a secondary analysis, a utility decrement was applied to the days when patients experienced urinary tract infection symptoms, using data from a published study (Barry, et al. 1997, see ‘Other Publications of Related Interest’ below for bibliographic details).

Measure of benefit:
The primary measure of benefit was the number of days without moderate or severe symptoms. A secondary measure of benefit was quality-adjusted life-years (QALYs) gained.
Cost data:
The cost categories included: consumable costs for midstream urine analysis and dipstick tests, laboratory costs for the urine analysis, initial and follow-up consultation time, antibiotic costs, and referrals to secondary care. The initial resource use (including consultation time) was based on that observed during the RCT, while the resource use during follow-up was based on the patient's general practice notes. When data on the length of consultation time were missing, values were imputed using maximum likelihood estimation. When data on antibiotic use were missing, the antibiotic prescribed was assumed to be trimethoprim. The drug costs were from the British National Formulary and other costs were from standard sources. All costs were reported in UK pounds sterling (£) and the price year was 2005 to 2006.

Analysis of uncertainty:
Sensitivity analysis was conducted using bootstrapping techniques and 1,000 samples. Cost-effectiveness acceptability curves were generated. Threshold analysis was also conducted to find the utility decrement required for the incremental cost-effectiveness ratio to be £20,000 per QALY or £30,000 per QALY gained.

Results
The total costs were £30.6 (SD 13.9) for immediate antibiotics; £31.9 (SD 15.8) for delayed antibiotics; £32.3 (SD 13.9) for symptom-targeted antibiotics; £35.3 (SD 13.3) for dipstick-targeted antibiotics; and £37.1 (SD 15.0) for urine-analysis-targeted antibiotics. The days of moderate or severe symptoms were 3.63 (SD 2.7) for immediate antibiotics; 3.92 (SD 3.8) for delayed antibiotics; 3.92 (SD 3.6) for symptom-targeted antibiotics; 3.14 (SD 2.1) for dipstick-targeted antibiotics; and 4.17 (SD 3.1) for urine-analysis-targeted antibiotics.

Delayed antibiotics, antibiotics targeted by symptom score, and antibiotics targeted by midstream urine analysis were more costly and less effective than immediate antibiotics. For antibiotics targeted by dipstick test, compared with immediate antibiotics, the incremental cost per day without symptoms was £9.70 and the incremental cost per QALY was £12,100.

Sensitivity analysis, using a threshold of £10 per day without symptoms, indicated that antibiotics targeted by a dipstick test was the most cost-effective strategy 70% of the time. Threshold analysis indicated that, for antibiotics targeted by dipstick test compared with immediate antibiotics, a utility decrement of 0.117 per day resulted in an incremental cost effectiveness ratio of £20,000 per QALY gained and a decrement of 0.175 per day resulted in £30,000 per QALY gained.

Authors' conclusions
The authors concluded that dipstick testing followed by targeted antibiotics was likely to be the most cost-effective strategy if the value of a day without moderate symptoms was £10 or more, but these results should be considered cautiously due to the lack of a significant difference in the effectiveness of the treatments.

CRD commentary
Interventions:
The interventions were not described in detail, as the scoring algorithms were not given, but they were reported elsewhere (Little, et al. 2010). The authors justified their selection of these comparators.

Effectiveness/benefits:
The methods used to estimate the efficacy of the treatments were well reported, but it was unclear whether a systematic literature review was conducted, which means it is unclear whether the best estimate for the utility decrement was used. The authors acknowledged the limitation that these utility decrements were from published literature and not based on a quality of life survey of the patients in the trial. The authors did not state whether discounting was applied, but it was not necessary for this disease.

Costs:
The costs considered were relevant to the perspective taken. The resource use and average costs for each category were provided in tables, but the unit costs were not. If any adjustments were made so that all costs reflected 2005 to 2006 prices, they were not reported. Discounting was not necessary given the very short time horizon of one month.
Analysis and results:
The methods used to estimate the efficacy and costs of each of the treatments were well reported. Sensitivity analysis was conducted and cost-effectiveness acceptability curves were presented, but the authors appear to have misinterpreted these curves as the best strategy is determined through the incremental cost-effectiveness analysis and not by the thresholds at which the cost-effectiveness acceptability curves cross each other.

Concluding remarks:
There were a few limitations to the study, but the methods and results were generally well reported and the authors' conclusions reflect the evidence available.

Funding
Funded by the NIHR Health Technology Assessment programme.

Bibliographic details

PubMedID
20139218

DOI
10.1136/bmj.c346

Original Paper URL
http://www.bmj.com/content/340/bmj.c346.abstract

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Aged; Anti-Bacterial Agents /economics /therapeutic use; Anti-Infective Agents, Urinary /therapeutic use; Cost-Benefit Analysis; Female; Humans; Male; Middle Aged; Reagent Kits, Diagnostic /economics; Treatment Outcome; Urinary Tract Infections /diagnosis /drug therapy /economics; Young Adult

AccessionNumber
22010000335

Date bibliographic record published
31/03/2010

Date abstract record published
20/10/2010