Screening and treatment of asymptomatic bacteriuria of pregnancy to prevent pyelonephritis: a cost-effectiveness and cost-benefit analysis

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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.

Health technology
Asymptomatic bacteriuria screening and treatment strategies in pregnant women.

Type of intervention
Treatment and screening.

Economic study type
Cost-effectiveness analysis and cost-benefit analysis.

Study population
Pregnant women.

Setting
The practice setting was not stated. The economic evaluation was carried out in Alabama, USA.

Dates to which data relate
Data for effectiveness analysis were collected from the period 1985-1993. Cost data were collected from the period 1990-1995. No prices were stated.

Source of effectiveness data
Synthesis of previously completed studies.

Link between effectiveness and cost data
Costing was not undertaken on the same patient sample as that used in the effectiveness study.

Outcomes assessed in the review
Primary health outcomes were:

(1) prevalence of asymptomatic bacteriuria,

(2) risk of progression without treating bacteriuria,

(3) risk of developing pyelonephritis with a negative diagnosis of bacteriuria,

(4) antibiotic efficacy and
(5) risk of pyelonephritis after treating bacteriuria.

**Study designs and other criteria for inclusion in the review**
Not stated.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

**Methods used to judge relevance and validity, and for extracting data**
Not stated.

**Number of primary studies included**
Approximately 16 primary studies.

**Methods of combining primary studies**
Means and medians of primary data were used as baseline probabilities for the decision analysis.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
In the baseline analysis, corresponding probabilities were: (1) prevalence of asymptomatic bacteriuria, 6%,

(2) risk of progression without treating bacteriuria, 23%,

(3) risk of developing pyelonephritis with a negative diagnosis of bacteriuria, 1%,

(4) antibiotic efficacy, 80%,

(5) risk of pyelonephritis after treating bacteriuria, 3%.

**Measure of benefits used in the economic analysis**
Cases of pyelonephritis prevented.

**Direct costs**
The viewpoint was that of the health care payer. Charges were used as a proxy for costs. These costs included: screening costs (dipstick and urine culture), bacteriuria treatment costs (antibiotics and vaginal cream) and costs of treating pyelonephritis. Quantities and costs were not reported separately. Price data were not stated. No discounting was done.

**Currency**
US dollars ($).
Sensitivity analysis
Sensitivity analysis (method not stated) varied data concerning: asymptomatic bacteriuria (ASB) prevalence; ASB progression to pyelonephritis (treated and untreated); risk of pyelonephritis in initially ASB-negative gravidas; ASB elimination effectiveness of antibiotics; dipstick sensitivity and specificity; ASB treatment costs; urine culture costs; dipstick costs; pyelonephritis costs.

Estimated benefits used in the economic analysis
Compared with no screening, the dipstick strategy prevented 7 cases per 1000 pregnancies, whilst the culture strategy prevented 12.

Cost results
Total pyelonephritis costs were: $57652 (no screening); $40257 (dipstick); $27832 (culture). Screening and treatment costs of asymptomatic bacteriuria were $1968 (dipstick) and $19269 (culture).

Synthesis of costs and benefits
The incremental cost per case prevented using the culture strategy was $3492. Benefit-cost ratios were 8.8 (dipstick) and 1.5 (culture). The incremental benefit-cost ratio (culture vs dipstick) was 0.7.

Authors’ conclusions
Using the base-case probabilities, both the dipstick and urine culture strategies were cost-effective compared to a strategy of no screening, but compared to each other, the urine culture strategy was less cost-effective. (Note: at a 9% or over prevalence rate for asymptomatic bacteriuria, culture became cost-beneficial compared to dipstick. All other sensitivity analysis variations produced results in favour of the dipstick strategy).

CRD Commentary
The search strategy and the selection criteria used to identify primary studies was not rigorous. Thus, the validity of the clinical study is limited. The costing methodology was not very rigorous: charges were used as a proxy for costs, a method which has limited theoretical foundation. The legitimacy of establishing a comparison of charges with pyelonephritis costs (estimated in a different study) was not stated. However, a thorough sensitivity analysis was performed to allow for uncertainty, which increases the validity of the results. Quantities and costs were not measured separately and price data were not stated; thus, the generalisability of this study is hindered.

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