Clinical and economic effects of mupirocin calcium on preventing Staphylococcus aureus infection in hemodialysis patients: a decision 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
The effect of mupirocin calcium on the prevention of Staphylococcus aureus (S aureus) infection in hemodialysis patients.

Type of intervention
Primary prevention and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Chronic hemodialysis patients.

Setting
Hospital. The study was carried out in the USA.

Dates to which data relate
Effectiveness and resource use data were derived from studies published between 1980 and 1994. Cost data were derived from a 1994 source. The price year was 1994.

Source of effectiveness data
Effectiveness data were derived from a review of the literature and expert opinion.

Modelling
A decision analytic model was used to determine the cost-effectiveness of the three management strategies. A cohort of 1,000 patients in each strategy was followed for one year.

Outcomes assessed in the review
The review assessed the following outcomes: sensitivity and specificity of the test, rates of nasal carriage of S aureus, S aureus infection rates, proportion of infections attributable to nasal carriage, efficacy of mupirocin, natural history of infection, and patient management strategies.

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
Summary statistics from individual studies were used.

Number of primary studies included
At least 15 studies were included in the review.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
Not stated.

Results of the review
The results of the review were as follows:

The sensitivity and specificity of the screening test was 0.98.

Efficacy of mupirocin calcium was 0.91.

The risk of S aureus nasal carriage was 0.5.

The risk of S aureus infection in those with nasal carriage was 0.5.

The risk of S aureus infection attributable to nasal carriage was 0.75.

The probability of hospitalisation after site or systemic infection was 0.5.

The probability of shunt loss was 0.5.

The risk of shunt loss due to bacteremia after access site infection was 0.55.

Methods used to derive estimates of effectiveness
Expert opinion was used to derive estimates of effectiveness. Three experts provided estimates.

Estimates of effectiveness and key assumptions
Compliance with and efficacy of mupirocin calcium was 1.00 (Base case probability). The risk of hospitalisation due to bacteremia after access site infection was 1.00 (Base case probability).

Measure of benefits used in the economic analysis
The number of S aureus infections was used as the measure of benefits.
Direct costs
Direct costs were not discounted given the short time frame of the study (one year). Quantities and costs were reported separately. Direct costs included costs for hemodialysis patient, hospital inpatient, and ambulatory care, and physician payments. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Payment for the screening culture was obtained from a private pathology laboratory in Philadelphia and from the University of Pennsylvania Medical Centre. Antibiotic costs for outpatient treatment were obtained from a survey of 8 pharmacies in the greater Philadelphia area. The price year was 1994.

Statistical analysis of costs
Not reported.

Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were performed on nasal carriage rates, infection rates after nasal carriage, rate of shunt loss, proportion of infections attributable to nasal carriage, and mupirocin calcium cost.

Estimated benefits used in the economic analysis
The number of infections prevented was 140 with the ‘screen and treat’ strategy, and 171 with the ‘treat all’ strategy. Eradication of nasal carriage of S aureus leads to a 45% to 55% reduction in infection.

Cost results
Total costs amounted to $1,324,460 with the ‘screen and treat’ strategy, $991,941 with the ‘treat all’ strategy, and $2,109,313 with the 'no prevention, treat infection' strategy.

Synthesis of costs and benefits
Both prevention options lead to fewer infections and reduced expenditure when compared with the 'no prevention, treat infection' strategy. Sensitivity analyses did not change these results.

Authors' conclusions
Preventing S aureus infection by eradicating nasal carriage in chronic hemodialysis patients reduces morbidity while simultaneously reducing medical care costs.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparators used, namely management strategies derived from a review of the literature. You, as a user of this database, should decide if these are widely used health technologies in your own setting.

Validity of estimate of measure of benefit
The validity of the results is limited by the following points: the authors did not state whether a systematic review of
the literature had been undertaken and the methods and conduct of the review were not reported in detail, effectiveness estimates were combined using narrative methods, and the authors did not report how differences between primary studies were dealt with. Estimation of benefits was obtained directly from the effectiveness analysis. A good aspect of the study was that these limitations were minimised by sensitivity analyses.

**Validity of estimate of costs**
All categories of costs relevant to the perspective adopted were included in the analysis, and costs and quantities were reported separately. A sensitivity analysis was conducted on prices. Medicare payments were used to proxy prices, limiting the generalisability of the cost results.

**Other issues**
The authors did not make appropriate comparisons of their findings with those from other studies, and the issue of generalisability to other settings was not addressed. The authors did not, however, present their results selectively. The study analysed chronic hemodialysis patients and this was reflected in the authors' conclusions. There was uncertainty about the rate of S aureus nasal carriage and infection in chronic hemodialysis patients and sequelae. Optimal treatment regimens in either prevention strategy are unknown. Quality of life was not measured. Costs and complications of treating infections attributable to methicillin-resistant S aureus infections were not considered. Costs of death and other costs borne by the patient and family were not included. The time perspective of the study was limited to one year.

**Implications of the study**
Prevention of related infections by eradicating nasal carriage of S aureus in long-term renal dialysis patients should be aggressively pursued when available.

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