Ceftazidime to cefepime formulary switch: pharmacodynamic and pharmacoeconomic rationale

Owens R C, Ambrose P G, Quintiliani R

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
Cephalosporins, specifically cefepime and ceftazidime, for the treatment of serious nosocomial infections such as pneumonia.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Hospitalised patients with nosocomial bacterial pneumonia.

Setting
Hospital. The economic analysis was conducted in Hartford, Connecticut, USA.

Dates to which data relate
Effectiveness data were collected from studies published between 1991 and 1996. The dates for the collection of resource data and the price years used were not stated.

Source of effectiveness data
Effectiveness data were taken from a review of previously completed studies.

Outcomes assessed in the review
The health outcomes assessed in the review were response rates to treatment and the level of adverse events associated with both treatment options.

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
3 primary studies were included in the analysis, and they were based on randomised controlled trials.

Methods of combining primary studies
The results of studies were not combined.

Investigation of differences between primary studies
Not conducted.

Results of the review
The studies identified found no difference in effectiveness between cefepime and ceftazidime and no significant
difference in the number of adverse events. In one study 85% of patients in the cefepime group (receiving 1g every 12
hours) responded satisfactorily to treatment compared with 72% in the ceftazidime group (1 g every 8 hours). The cure
rates were 93% and 94% for the cefepime and ceftazidime groups respectively. In a blinded sub group, the rates for
satisfactory clinical response were 80% and 88% and for cure rate were 85% for the cefepime group and 73% for the
ceftazidime group. Adverse events were noted to be similar in both groups in this study. In another randomised
controlled trial the cure rates were 91% and 100% in the cefepime and ceftazidime groups respectively whilst the rate
of adverse events were 21% and 5% respectively.

Measure of benefits used in the economic analysis
Since the effectiveness analysis showed no difference in effectiveness/clinical benefit between the intervention and the
comparator, the economic analysis was based on the difference in costs only.

Direct costs
The direct costs associated with the acquisition, preparation and administration of cefepime and ceftazidime were
calculated and the level of resources used were derived from a time-motion study conducted at the authors’ hospital.
Costs were reported separately. Costs included those for staff involved in preparation and administration as well as
supply costs. Patient demographic data from the hospital were used to take account of the proportion of patients with
mild and/or moderate renal function. Costs associated with adverse events do not appear to have been included and the
price years used were not stated. Resource quantities were not reported separately from costs.

Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
Not conducted.
Estimated benefits used in the economic analysis
Not applicable.

Cost results
The authors calculated that, based on the current usage patterns within the hospital, total costs could be reduced by $51,173 per annum. Total costs of treatments were not reported.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
The authors concluded that cefepime was at least as effective and safe as ceftazidime and at a lower cost. As a result the authors' hospital has switched from ceftazidime therapy to cefepime therapy.

CRD COMMENTARY - Selection of comparators
A justification was given for the choice of comparator, a third generation cephalosporin ceftazidime, as this is a therapy which is used in the treatment of nosocomial infections. You as a database user should consider whether this is applies to your own setting.

Validity of estimate of measure of benefit
The authors concluded that the intervention and the comparator were similar in terms of effectiveness based on information taken from the literature on efficacy. However, publications were not identified in a systematic manner, and the estimate of efficacy may thus be subject to bias. In addition, although the studies used by the authors were randomised controlled trials, they do not provide information on confidence intervals or test for statistical significance. A more reliable approach would be to conduct a systematic review in order to identify effectiveness studies.

Validity of estimate of costs
Insufficient details were provided of the time-motion study from which costs were taken. The data collection year was not stated and price years were not reported. Costs were estimated from the perspective of the institution only and excluded costs experienced by others in society such as patients and informal caregivers. It would also have been prudent to conduct a sensitivity analysis to examine how robust the differentials in costs are between the intervention and the comparator. Costs also do not appear to take into account the costs of adverse events that may occur after treatment has been completed.

Other issues
cost data may not be generalisable outside the hospital for which they have been calculated.

Implications of the study
There is a need for a well designed economic evaluation to compare cefepime with third generation cephalosporins and other possible interventions such as beta lactams.

Source of funding
None stated.
Bibliographic details

PubMedID
9149484

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Ceftazidime /economics /pharmacokinetics /pharmacology; Cephalosporins /economics /pharmacokinetics /pharmacology; Formularies, Hospital; Humans; Microbial Sensitivity Tests

AccessionNumber
21997006681

Date bibliographic record published
28/02/1999

Date abstract record published
28/02/1999