Cost-effectiveness comparison of sequential ofloxacin versus standard switch therapy

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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
Conversion of intravenous to oral antibiotics (ofloxacin).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients hospitalized with infections (urinary tract, lower respiratory tract, or skin and soft tissue) requiring intravenous antibiotics. The average age was 62 years (+

Setting
Institutional setting. Buffalo, New York, USA

Dates to which data relate
The effectiveness analysis data were collected from August 1994 to March 1996. Dates of prices used ranged from 1994 to 1995.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing was undertaken on the same patient sample as used in the effectiveness study. It is not clear whether the costing/resource data were collected prospectively (along with effectiveness data) or retrospectively (after effectiveness results were known).

Study sample
89 subjects were randomized. Seven subjects were excluded from the study, and another 8 were lost to follow up. The sample size was not apparently determined through power calculations.

Study design
A prospective randomized controlled open-label parallel group trial. There were two sites, although the majority of subjects were recruited from one of the centres. The duration of follow-up was 4-6 weeks after discontinuation of oral
antibiotic. The eight subjects lost to follow up were evenly divided between the study groups.

**Analysis of effectiveness**
The analysis was based on intention to treat. The health outcomes measured were the success or failure of the antibiotic in curing the infection. No significant demographic differences were found between the groups.

**Effectiveness results**
There was no statistical difference in the success rate between the two groups, with the success rate being 71 - 75% at six weeks post antibiotics. Confidence intervals were not reported. Failures due to adverse effects were reported: 3(7%) in the standard therapy group and 4(10%) in the ofloxacin group. These were not statistically analysed.

**Clinical conclusions**
The standard method of converting intravenous to oral antibiotics provides similar rates of cure, when compared to the sequential method, using intravenous and oral ofloxacin.

**Modelling**
A decision tree was used to estimate costs for treatment successes and failures in the two groups.

**Measure of benefits used in the economic analysis**
The health outcomes measured were the success or failure of the antibiotic in curing the infection. The health outcomes were assessed by clinicians at three time points: the end of hospitalization, at two weeks post discharge, and 4-6 weeks after discontinuation of antibiotics. The number of physicians involved was not stated. The outcomes were not assigned values.

**Direct costs**
Discounting was not necessary within the time frame used. Not all quantities were reported separately from costs. Direct costs were broken down into four main areas: hospital, primary physician, specialist physician, and outpatient. Hospital costs reported are: antibiotic acquisition costs, costs associated with preparation and administration of antibiotics, cost of hospitalization during the time antibiotics were administered, plus any days required for treatment of adverse effects, plus the cost of treatment of co-morbidities during this time.

Hospital costs were calculated from charges by applying the average cost/charge ratio. Actual drug acquisition costs were used. The cost of antibiotic preparation/administration was arbitrarily set at $7 for intravenous and $0.65 for oral. The costs of both primary and specialist physicians were estimated from a combination of the medical record and the July 1994 Blue Cross and Blue Shield of Western New York, Inc Doctor Reference Schedule of Major Medical Allowances.

Outpatient costs included antibiotic prescriptions, laboratory costs, diagnostic tests, home care, and emergency room visits. Information on quantities was obtained through interviews with physicians and patients and reviews of the medical record. All of the prices were estimated from published sources of standard fees from 1994-1995. The stated boundary was that of the health system.

**Statistical analysis of costs**
Cost data were presented stochastically, with means and standard deviations. Statistical analysis was conducted on the mean total cost figures (the sum of the mean costs for hospital, physician and outpatient care). Confidence intervals and p-values were presented, using a one-way ANOVA test.
Indirect Costs
Not considered.

Currency
US dollars ($).

Sensitivity analysis
A one-way simple sensitivity analysis was carried out on the generalizability of the results. Specific assumptions varied were drug acquisition cost (+/- 50%), hospital bed cost (=/- 50%), and on the probability of a successful outcome (cure) ranging from 50 to 95%.

Estimated benefits used in the economic analysis
There was no statistical difference in success rate between the two groups, with the standard therapy success rate of 74% and 75% for ofloxacin. Treatment of both side effects and treatment failures were both considered in the economic analysis.

Cost results
The mean total costs for the standard conversion group were $4,244 (95% CI: $3,428 to $5,059), versus $3,845 (95% CI: $3,103 to $4,586) for the ofloxacin group, a difference of $399. These costs included treatment of adverse drug effects, as well as treatment of failures.

Synthesis of costs and benefits
Since the effectiveness was essentially equal, costs and benefits were combined by calculating the cost of a successful treatment for each group. This was done by taking the average total costs for the group and dividing by the success rate. By this method the mean total cost of standard therapy was $5,735 per successful outcome and $5,126 in the ofloxacin group, a difference of $609. Sensitivity analysis showed that the standard therapy would be less costly than ofloxacin if standard therapy were more than 25% more effective than ofloxacin therapy.

Authors’ conclusions
The authors found an additional saving of $399 per patient receiving sequential ofloxacin over standard switch antibiotics. Sequential ofloxacin resulted in lower overall costs across all variations in room cost and drug acquisition costs.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator was clear. You, as a user of the NHS EED, should consider whether these alternative therapies apply to your own setting.

Validity of estimate of measure of benefit
The estimate of benefit is likely to be internally valid and data were not used selectively.

Validity of estimate of costs
Actual costs were not used. A variety of sources were used to estimate cost data (i.e. hospital bed charges 1994 to 1996, Blue Shield of Western New York, Inc. Doctor Reference Schedule of Major Medical Allowances 1994, RedBook 1995) and thus costs may be either over or under-stated.
Other issues
Because the effectiveness rate was considered to be equal between the two treatment groups, this was a cost-
minimization study. It appears that converting from intravenous to oral ofloxacin, rather than the standard method
resulted in an overall cost savings, however generalizability may be limited.

Implications of the study
The authors claimed that the study's methodology of economic risk poolsprovides a framework for future investigations
in pharmacoeconomics.

Source of funding
The analysis was performed as a component of a clinical study funded by Ortho-McNeil Pharmaceuticals.

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