A cost analysis of long term antibiotic prophylaxis for spontaneous bacterial peritonitis in cirrhosis

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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
Long-term antibiotic prophylaxis for spontaneous bacterial peritonitis (SBP) in patients with cirrhosis and ascites. The treatment strategies were as follows: (1) antibiotic prophylaxis administered to all patients; (2) patients were stratified into a low and high risk group on the basis of serum bilirubin and ascitic fluid protein levels; only patients in the high risk group received antibiotic prophylaxis.

Type of intervention

Economic study type
Cost-effectiveness analysis.

Study population
The study looked at a hypothetical cohort of patients with cirrhosis and ascites who were at risk for developing SBP.

Setting
Hospital. The economic study was set in the USA.

Dates to which data relate
Effectiveness and resource use data were collected from studies published between 1988 and 1996. Cost data were collected from a university hospital setting and a report published in 1994. The price year was not reported.

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

Modelling
A 1-year decision analytic model was used to compare the cost-effectiveness of the three strategies.

Outcomes assessed in the review
The review assessed the 1-year probabilities of primary and recurrent episodes of SBP, the incidence of side effects with long-term prophylaxis, compliance with long-term antibiotic therapy, the probability of being cirrhotic with ascites at high risk for SBP, and mortality of SBP.

Study designs and other criteria for inclusion in the review
Sources searched to identify primary studies
The MEDLINE database was searched for English language articles, and bibliographies of selected articles were reviewed.

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
At least 10 studies were included in the review.

Methods of combining primary studies
Some studies provided separate inputs for the model. It was not reported how the remaining studies were combined.

Investigation of differences between primary studies
Not stated.

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

The 1-year probability of a primary episode of SBP was 30% without antibiotic prophylaxis, 50% in the high-risk group, 8% in the low-risk group, and 3% with antibiotic prophylaxis.

The 1-year probability of recurrent episode of SBP was 70% without antibiotic prophylaxis and 20% with antibiotic prophylaxis.

The incidence of side effects with long-term prophylaxis was 5%.

The compliance with long-term antibiotic therapy was 85% without side effects and 50% with side effects.

The probability of being cirrhotic with ascites at high risk for SBP was 50%.

Mortality of SBP was 30%.

Measure of benefits used in the economic analysis
The number of patients treated for SBP was used as the measure of benefits.

Direct costs
Direct costs were not discounted given the short time frame of the study period (1 year). Quantities and costs were not reported separately. Direct costs covered the costs of diagnosis, treatment, and prophylaxis of SBP, including initial CBC and blood chemistry, ascitic fluid diagnostic tap, fluid analysis, microbiology, chest X-ray, limited ultrasound of the abdomen, IV antibiotics for 5 days, inpatient costs for 5 days, daily CBC, alternate day blood chemistries, follow-up diagnostic paracentesis, fluid analysis, and professional costs. The quantity/cost boundary adopted was that of the NHS Economic Evaluation Database (NHS EED)
hospital. The estimation of quantities and costs was based on actual data. Cost data were collected from a university hospital setting. A cost/charge ratio was obtained from the Health Care Financing Administration cost reports. Costs of antibiotics used for prophylaxis were obtained from a survey of local pharmacies. The price year was not reported.

**Statistical analysis of costs**
Not performed.

**Indirect Costs**
Indirect costs were not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were conducted on key clinical probabilities and cost estimates, ranging from best case to worst case scenario on the outcome measures.

**Estimated benefits used in the economic analysis**
The benefits were not reported. However, it appears that the antibiotic prophylaxis results in a decrease in primary and secondary episodes of SBP.

**Cost results**
Hospitalisation costs per episode of SBP amounted to $7,850. Costs of antibiotic prophylaxis over 1 year amounted to $600.

**Synthesis of costs and benefits**
The lowest cost per patient treated was in strategy 2, followed by strategy 1, and then by the no-prophylaxis strategy.

When the probability of a primary episode of SBP without prophylaxis was less than 0.07, no prophylaxis was preferred.

When this probability was between 0.07 and 0.1, strategy 1 was marginally more cost-effective than strategy 2.

When the cost of antibiotic prophylaxis was less than $150, strategy 1 was the preferred strategy.

**Authors' conclusions**
Antibiotic prophylaxis, particularly when restricted to a subgroup of patients who, by simple laboratory parameters, are identified to be at high risk for SBP, is very cost-effective in the prevention of SBP in patients with cirrhosis and ascites.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparator used. The author chose no prophylaxis as the comparator. This allowed the active value of antibiotic prophylaxis to be evaluated. You, the user of the database, should decide if these health technologies are relevant to your setting.
Validity of estimate of measure of benefit
The author did not state that a systematic review of the literature had been undertaken. More details about the method of combining primary effectiveness data could have been provided. The benefits in the economic analysis were not reported. It would have been helpful to report the averted cases of SBP for strategy 1 and 2 compared to no prophylaxis.

Validity of estimate of costs
All categories of costs relevant to the perspective adopted were included in the analysis. The author did not consider indirect costs or costs related to other frequent and associated complications. Quantities and costs were not reported separately. A sensitivity analysis was conducted on costs, but not on quantities. The price year was not reported.

Other issues
The author made appropriate comparisons of their findings with those from other studies but did not address the issue of generalisability to other settings. The study considered patients with cirrhosis and ascites and this was reflected in the author's conclusions. As acknowledged by the author, the model was designed to favour antibiotic prophylaxis in patients with cirrhosis and ascites in particular, because of assumptions of a high compliance rate and a low incidence of side effects. Because the analysis was limited to 1 year, the possibility of more than one recurrence of SBP was not taken into account.

Implications of the study
The study suggests that antibiotic prophylaxis restricted to a subgroup of high-risk patients is highly cost-effective.

Source of funding
None stated.

Bibliographic details

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Other publications of related interest

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