Evaluation of the dyspeptic patient: a cost-utility study

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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
Seven health technologies in the management of uncomplicated dyspepsia in the primary care setting were compared:

1. antisecretory therapy for 1 month with omeprazole;
2. empiric Helicobacter pylori eradication using oral omeprazole (500 mg twice a day), clarithromycin (500 mg twice a day), and amoxicillin (1000 mg twice daily).
3. Upper endoscopy as a diagnostic test to detect the patients for H pylori eradication
4. Upper gastrointestinal barium study (an upper GI) as a diagnostic test to detect the patients for H pylori eradication
5. serum titer for H pylori as a diagnostic test to detect the patients for H pylori eradication.
6. upper endoscopy as an initial diagnostic test followed by the serum titer for H pylori if positive for ulcer
7. upper GI as an initial diagnostic test followed by the serum titer for H pylori if positive for ulcer

Type of intervention
Treatment; primary prevention; secondary prevention.

Economic study type
Cost-utility analysis.

Study population
A hypothetical adult patient with uncomplicated dyspepsia in the primary care setting.

Setting
Primary care. The economic study was carried out in Michigan, USA.

Dates to which data relate
The data for the clinical probabilities and utility analysis were extracted from the published literature from 1976 to 1995. The dates for resources and prices were not reported.

Source of effectiveness data
The evidence or estimate for final outcomes was derived from a review of previously published studies.

Modelling
A decision analytic model was employed to integrate utilities and costs.

**Outcomes assessed in the review**
A wide range of clinical probabilities, such as the probability of a dyspeptic patient having a duodenal ulcer and the probability of triple therapy being successful in eradicating H pylori, sensitivity and specificity of the tests such as a serum IgG titer for H pylori, the values for utility of health states such as the utility of delaying diagnosis of cancer by 6 weeks, and range of values for sensitivity analysis were determined by the assessment of primary studies.

**Study designs and other criteria for inclusion in the review**
No specific study designs or inclusion and exclusion criteria were reported. The only criterion reported was the exclusion of nonclinical research. No explicit quality review was carried out.

**Sources searched to identify primary studies**
The MEDLARS database of the National Library of Medicine was searched for primary studies.

**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**
250 papers were chosen for the review from a list of approximately 700 abstracts. However, only some 50 of these were reported as references in the paper.

**Methods of combining primary studies**
Not stated.

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

**Results of the review**
The probability of a dyspeptic patient having a duodenal ulcer was 0.14, and the probability of triple therapy being successful in eradicating H pylori by 1 week was 0.85. The sensitivity and specificity of a serum IgG titer for H pylori was 0.9 and 0.95, respectively. The utility of delaying diagnosis of cancer by 6 weeks was 0.7433. The range of the utilities associated with the health states was between 0.4642 and 0.7604.

**Methods used to derive estimates of effectiveness**
A formula was used to calculate the disutility of events (Quality-adjusted Life Years (QALYs) lost) based on utilities attributed to health states by the index of well-being (IWB).

**Estimates of effectiveness and key assumptions**
The disutility (QALYs lost) associated with the health state of delaying diagnosis of cancer for 6 weeks was 0.030. The corresponding value for experiencing upper endoscopy, for example, was 0.001. The range of disutilities (QALYs lost)
associated with the health states was between 0.001 and 0.030. The total range from the highest utility strategy, antisecretory therapy for 1 month with omeprazole, to the lowest utility strategy, an upper GI, was only 0.001 QALY. The differences in QALYs were considered clinically insignificant.

**Measure of benefits used in the economic analysis**

The main measure of benefits was QALYs lost, representing the disutility of individual events such as experiencing endoscopy. The Index of Well-being was used alongside a formula to calculate the QALYs lost as a measure of morbidity. The secondary measures of benefits were the rates of symptomatic ulcer recurrence and death.

**Direct costs**

The quantities were not reported separately. The costs were divided into the costs of drugs, upper endoscopy, an office visit, serum IgG for H pylori, an upper GI, hospitalization for gastrointestinal bleeding, and hospitalization for ulcer surgery. The cost per episode of dyspepsia for each strategy was estimated. The costs were calculated from the payer's perspective. The costs of the drugs were obtained from a survey of 5 pharmacies. Other items of costs were calculated based on the data obtained from 5 health institutions. The dates for the price data were not specified.

**Indirect Costs**

Not carried out.

**Currency**

US dollars ($).

**Sensitivity analysis**

One-way sensitivity analysis was carried out for all the variables of the model. Two-way sensitivity analysis was performed for clinically important pairs of variables.

**Estimated benefits used in the economic analysis**

The disutility (QALYs lost) associated with the health state of delaying diagnosis of cancer for 6 weeks was 0.030. The corresponding value for experiencing upper endoscopy, for example, was 0.001. The total range from the highest utility strategy, antisecretory therapy for 1 month with omeprazole, to the lowest utility strategy, an upper GI, was only 0.001 QALY. The differences in QALYs were considered clinically insignificant. In terms of the secondary measures of benefits, empiric H pylori eradication had the lowest probability of symptomatic ulcer recurrence (1.3% of all dyspeptic patients), and death (2.6 deaths per 100,000 dyspeptic patients). The highest ulcer recurrence and death rate was associated with empiric antisecretory therapy (3.5% of all dyspeptic patients, and 7 deaths per 100,000 dyspeptic patients, respectively). The time horizon of the model was one year. The side-effects of treatments were considered in the economic analysis.

**Cost results**

The costs were:

- a course of H pylori eradication therapy: $126
- an upper GI: $300
- upper endoscopy: $1000
- serum IgG titer for H pylori: $60
Omeprazole 20mg po qd for 4 weeks: $108

Empiric H pylori eradication had the lowest cost per episode of dyspepsia ($1,196.74). The highest cost per episode of dyspepsia was associated with upper endoscopy ($2,125.99).

**Synthesis of costs and benefits**
The primary measure of cost-utility was cost per quality adjusted life year ($/QALY). The study revealed that three strategies (empiric H pylori therapy, testing with a serum H pylori titer and treating if positive, and empiric antisecretory therapy) had roughly similar cost-utility results (less than $1300/QALY) over the hypothetical 1-year period. However, empiric antisecretory therapy was shown to be associated with higher morbidity and mortality rate than the other two strategies. The incremental cost-utility ratio was not calculated since the differences in the utilities were not clinically significant. The sensitivity analysis established the robustness of preferred strategies over a wide range of parameters.

**Authors' conclusions**
The cost-utility analysis suggested that two strategies were reasonable for patients presenting with dyspepsia: (1) empiric H pylori eradication and (2) use of serum H pylori titer to identify patients who might benefit from H pylori eradication. The latter strategy may be preferable as it is less likely to lead to antibiotic resistance. Strategies utilizing an upper GI or upper endoscopy (either with or without serum H pylori titer) or empiric antisecretory therapy do not improve outcomes and are associated with greater cost, morbidity, and/or mortality.

**CRD COMMENTARY - Selection of comparators**
A justification was implicitly given for the choice of the comparator. The authors considered the comparator as the traditional treatment for patient with uncomplicated dyspepsia in a primary care setting. You should consider whether this is a widely employed treatment in your own setting.

**Validity of estimate of measure of benefit**
As the authors noted, limiting the time horizon of the study to one year prevented the study from capturing all the benefits of empiric H pylori eradication strategy. Empiric eradication is likely to protect patients from ulcer recurrence at least for two years. Other strategies may have more ulcer recurrence in a two-year time horizon. The long-term adverse effects of antibiotic resistance in empiric eradication therapy were not captured in the study. The criteria for controlling the quality and relevance of the primary studies were not given.

**Validity of estimate of costs**
Resource quantities were not reported separately from the costs. adequate details of the methods of cost estimation were not given.

**Other issues**
The issue of generalisability to other countries was not addressed.

**Source of funding**
Funded by a grant from the Michigan Health Care Education and Research Foundation (Grant No 196-PR/93-03).

**Bibliographic details**
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Ambulatory Care; Amoxicillin /administration & dosage /economics /therapeutic use; Antacids /economics /therapeutic use; Anti-Bacterial Agents /administration & dosage /therapeutic use; Anti-Ulcer Agents /administration & dosage /economics /therapeutic use; Antibodies, Bacterial /blood; Barium Sulfate; Clarithromycin /administration & dosage /economics /therapeutic use; Contrast Media; Cost-Benefit Analysis; Decision Support Techniques; Dyspepsia /drug therapy /economics /microbiology; Endoscopy, Gastrointestinal; Evaluation Studies as Topic; Follow-Up Studies; Helicobacter Infections /drug therapy /economics; Helicobacter pylori /immunology; Humans; Omeprazole /administration & dosage /economics /therapeutic use; Penicillins /administration & dosage /economics /therapeutic use; Peptic Ulcer /drug therapy /economics; Probability; Quality of Life; Recurrence; Survival Rate; Treatment Outcome; Value of Life

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