Cost-effectiveness of a 'score and scope' strategy for the management of dyspepsia

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 study examined several strategies for the management of uninvestigated dyspepsia. These were endoscopy, score and scope, test and scope, test and treat, and empirical antisecretory treatment.

With the strategy of endoscopy, if the results showed a gastric ulcer or extensive erosive gastritis, a biopsy with histological examination was performed. If the results showed duodenal ulcer or erosive duodenitis, a rapid urease test (RUT) was performed. An eradication treatment (omeprazole, clarithromycin and amoxicillin for 1 week) was prescribed for positive results, and an antisecretory treatment (omeprazole for 2 months) for negative results. An antisecretory treatment was also prescribed for oesophagitis and non-ulcer dyspepsia, normal endoscopy or minor lesions. For a diagnosis of gastric cancer, the patients underwent surgical evaluation.

With a score and scope strategy, a locally validated scoring system was used. If the score was 7 or greater, the patient was at high risk of organic disease and an endoscopy was performed (as described above). In the absence of alarm symptoms or if the score was lower than 7, an antisecretory treatment was given (omeprazole for 2 months).

With the test and scope strategy, a urea breath test (UBT) was performed. If the results were positive for Helicobacter pylori (H. pylori) infection, the patient was referred for endoscopy. If the results were negative, the patient was prescribed an antisecretory treatment (omeprazole for 2 months).

With the test and treat strategy, a UBT was performed. If the results were positive for H. pylori infection, the patient received an eradication treatment. If the results were negative, the patient was prescribed an antisecretory treatment (omeprazole for 2 months).

With the empirical antisecretory treatment strategy, the patients received an antisecretory treatment (omeprazole for 2 months) without performing any invasive or noninvasive diagnostic test.

Type of intervention
Diagnosis and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised a hypothetical cohort of patients with uncomplicated dyspepsia. Patients with clinical suspicion of isolated reflux disease and patients with clinical alarm symptoms suggestive of malignant disease were excluded.

Setting
The setting was primary care. The economic study was carried out in Spain.
Dates to which data relate
The clinical data were derived from studies published between 1975 and 2003. No dates for resource use were reported. The price year was 2003.

Source of effectiveness data
The effectiveness evidence was derived from a synthesis of published studies.

Modelling
A decision tree model was constructed to assess the costs and benefits of the alternative strategies in a hypothetical cohort of patients with symptoms of dyspepsia. Each branch of the tree reflected the management of the patients according to a specific strategy (see ‘Health Technology’). The time horizon of the model was one year. The decision tree was represented graphically.

Outcomes assessed in the review
The outcomes estimated were

the probabilities of gastric ulcer, duodenal ulcer, oesophagitis, functional dyspepsia and gastric cancer after endoscopy;

the percentages of dyspeptic patients with scores of less than 7 and of 7 or more with gastric ulcer, duodenal ulcer, oesophagitis, functional dyspepsia or gastric cancer;

the prevalence of H. pylori in gastric ulcer, duodenal ulcer, oesophagitis, functional dyspepsia or gastric cancer;

the rate of eradication of H. pylori;

the probability of healing after eradication treatment;

the cure rates associated with antisecretory therapy;

the success rate of surgery for patients with gastric cancer; and

the diagnostic accuracy of specific tests.

Study designs and other criteria for inclusion in the review
It was unclear whether primary studies were identified through a systematic review of the literature. Details of the design of the primary studies were not reported.

Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Approximately 43 primary studies provided the clinical data used in the decision model.
Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not reported.

Results of the review
In the case of endoscopy:
the probability of gastric ulcer was 6.7%, duodenal ulcer 20.4%, oesophagitis 10.2%, functional dyspepsia 62.4% and gastric cancer 0.3%;
the prevalence of H. pylori in gastric ulcer was 70%, the eradication rate of H. pylori in gastric ulcer was 80%, the probability of healing after eradication in gastric ulcer was 95%, and the probability of healing after no eradication in gastric ulcer was 20%;
the prevalence of H. pylori in duodenal ulcer was 91%, the eradication rate of H. pylori in duodenal ulcer was 80%, the probability of healing after eradication in duodenal ulcer was 85%, and the probability of healing after no eradication in duodenal ulcer was 20%;
the probability of healing of oesophagitis with antisecretory treatment was 25%;
the probability of healing of functional dyspepsia with antisecretory treatment was 30%; and
the probability of healing of gastric cancer with surgery was 17%.

All other probability values associated with the alternative strategies (score and scope, test and scope, test and treat, and empirical antisecretory treatment) were reported in the paper.

In terms of the diagnostic accuracy of the tests, the sensitivity and specificity values were, respectively, 95% and 90% for the UBT, 85% and 90% for the RUT, 95% and 95% for histology, and 74% and 70% for the score system.

Measure of benefits used in the economic analysis
The summary benefit measure was the rate of asymptomatic patients one year after the end of the treatment. This was estimated using a modelling approach.

Direct costs
The analysis of the costs was carried out from the perspective of the health care system. It included the costs associated with visits to a primary care practitioner, the diagnostic tests and drug treatments. The unit costs were presented separately from the quantities of resources used for several items. Hospital costs came from the accounting system of the Hospital of Viladecans in Barcelona, Spain. The drug costs were estimated from reference list prices. Resource consumption was estimated on the basis of authors' opinions that were likely to reflect Spanish treatment patterns. Discounting was not relevant as the costs were incurred during a 1-year time horizon. The costs were inflated to 2003 prices using an inflation rate of 3%.

Statistical analysis of costs
No statistical analyses of the costs were performed.

Indirect Costs
The indirect costs were not included in the economic evaluation.

**Currency**
Euros (EUR).

**Sensitivity analysis**
Several one- and two-way sensitivity analyses were carried out to assess the robustness of the cost-effectiveness estimates to variations in the clinical and economic inputs of the model. Lower and upper bounds of the costs were derived from the tariff system used to reimburse activity of public hospitals in Catalonia (lower bound) and from schedule fees used to reimburse activity by private insurers (higher bound). Ranges of values for the clinical inputs were mainly derived from the literature. A sub-group analysis, in which patients older or younger than 45 years were considered, was also performed.

**Estimated benefits used in the economic analysis**
The rate of asymptomatic patients one year after the end of the treatment was 38.4% with endoscopy, 34.7% with score and scope, 35.5% with test and scope, 35.3% with test and treat, and 28.5% with empirical therapy.

In all the sensitivity analyses (except for the case of a very high value for healing with eradication treatment) endoscopy remained the most effective strategy and the ranking of the other strategies remained unvaried.

**Cost results**
The total costs per patient were EUR 75.89 with empirical treatment, EUR 105.85 with score and scope, EUR 152.91 with test and treat, EUR 157.53 with endoscopy, and EUR 202.82 with test and scope.

The ranking of the five alternative strategies did not vary in most of the sensitivity analyses.

**Synthesis of costs and benefits**
Average and incremental cost-effectiveness ratios (CERs) were calculated to combine the costs and benefits of the alternative strategies.

In the base-case, the average CER was EUR 266.29 with empirical treatment, EUR 305.04 with score and scope, EUR 433.18 with test and treat, EUR 410.24 with endoscopy, and EUR 571.32 with test and scope.

The incremental analysis suggested that the test and treat strategy and the test and scope strategy were dominated (i.e. they were both more expensive and less effective than at least one alternative strategy). The incremental CER was EUR 483.15 for score and scope with respect to empirical treatment, and EUR 1,396.85 for endoscopy with respect to score and scope.

The results of the base-case analysis remained unaltered in most of the sensitivity analyses. In effect, the strategy of score and scope was the most cost-effective alternative under most scenarios, followed by endoscopy.

**Authors' conclusions**
Among the possible strategies for the management of dyspepsia, endoscopy was the most effective option while a strategy of score and scope was the most cost-effective intervention.

**CRD COMMENTARY - Selection of comparators**
The choice of the comparators was appropriate since all available strategies for the management of patients with dyspepsia were examined and were described in detail. However, fewer details of the score and scope strategy were
reported. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness data used to populate the decision model were obtained from published studies. However, it was unclear whether these studies were identified selectively as the methods and conduct of a systematic review were not reported. Limited information on the design of the primary studies was provided and details of patient samples and follow-up were not given. Therefore, it was difficult to assess the validity of the primary studies. The issue of heterogeneity among the primary estimates was not investigated. The issue of uncertainty was addressed in the sensitivity analysis where key clinical inputs were varied.

Validity of estimate of measure of benefit
The summary benefit measure was specific to the disease considered in the study. It cannot be compared with the benefits of other health care interventions. The impact of the strategies on quality of life was not addressed.

Validity of estimate of costs
The costs included were consistent with the perspective adopted in the study. The authors stated that the inclusion of indirect costs would have been interesting, but their impact on the preferred strategy (i.e. score and scope) should have been minimal in comparison with the other strategies. Some information on the unit costs and quantities of resources used was presented, thus enhancing the possibility of replicating the cost analysis in other settings. The sources of all the costs data were reported. Alternative sources of costs were used in the sensitivity analysis. However, the costs were treated deterministically. The price year was reported, which will facilitate reflation exercises in other time periods.

Other issues
The authors stated that many studies have examined the cost-effectiveness of strategies for the management of dyspepsia and have concluded that a test and treat strategy and antisecretory treatment are the preferred options. However, other studies have shown that endoscopy is the most cost-effective strategy. It should also be borne in mind that a strategy based on endoscopy has the further advantage of detecting gastric cancer.

The authors pointed out some limitations of their analysis. First, clinical data used in the model indicated a high prevalence of disease, which might not reflect other settings. However, the sensitivity analysis showed that the model results were not sensitive to the prevalence of disease. Second, given the short time horizon, relapses and other diagnostic approaches could not be modelled. The authors stated that the use of a longer timeframe would have required the use of many assumptions, which might have added further uncertainty to the decision model. Third, the analysis assumed full compliance with drug therapy, which might not be realistic in a real-world setting. Similarly, the risks associated with the strategies under examination were not modelled.

The issue of the generalisability of the study results was not explicitly addressed, but the authors stated that the use of alternative sources of costs improves the external validity of the analysis. In general, it was not clear which threshold was used to determine the most cost-effective strategy. The authors stated that score and scope provided better value for money compared with endoscopy, but did not justify this conclusion.

Implications of the study
The authors recommended stratifying patients according to a scoring system and referring those patients at higher risk of organic dyspepsia to endoscopy first.

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Other publications of related interest


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