Analisis coste-efectividad de estrategias de diagnostico-tratamiento del ulcus peptico asociados a Helicobacter pylori en atencion primaria [Cost-effectiveness analysis of strategies for primary care diagnosis and treatment of Helicobacter pylori-related peptic ulcers]

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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
Three strategies for the management of patients with acute peptic ulcer associated with Helicobacter pylori (HP) were considered in the analysis. Diagnosis-treatment-diagnosis: first, patients undergo breath test to diagnose the presence of HP; second, an eradication treatment is used for those testing positive; third, a further diagnostic test is carried out to verify eradication (strategy 1). Diagnosis-treatment: patients undergo breath test to diagnose the presence of HP and a subsequent eradication treatment is used for those testing positive, without any further diagnostic test (strategy 2). No diagnosis-empirical treatment: all patients are administered an eradication treatment, without the performance of a diagnostic test (strategy 3).

Type of intervention
Diagnosis; Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised adult patients (aged over 18 years), suffering from an endoscopically confirmed acute peptic ulcer, not related to use of non-steroidal anti-inflammatory drugs.

Setting
The setting was primary care. The study was carried out in Catalonia, Spain.

Dates to which data relate
The effectiveness evidence and data on resource use were derived from studies published from 1991 to 1998. The price year appears to have been 1997.

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

Modelling
A decision model based on Markov cycles was used to determine the costs and benefits of the three strategies. Three different models were constructed and three time cycles of 1, 5, and 10 years were considered.
Outcomes assessed in the review
The variables assessed from the literature were eradication rates with first- and second-line treatments, rate of cicatrixation, sensitivity and specificity of breath test, annual rate of relapse, annual rate of re-infection, prevalence of HP in patients with peptic ulcer. In the second analysis, the variables assessed were rates of eradication and cure of omeprazole, classic triple therapy based on bismuth subcitrate (CTT), omeprazole plus classic triple therapy (O+CTT), omeprazole plus amoxicillin plus clarithromycin (O+A+C), lansoprazole plus amoxicillin plus clarithromycin (L+A+C), and omeprazole plus metrodinazole plus clarithromycin (O+M+C).

Study designs and other criteria for inclusion in the review
One of the primary studies was a meta-analysis referring to 77 trials published in 1998. No details were provided about the remaining studies.

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
Seven primary studies were used to derive the effectiveness data.

Methods of combining primary studies
Narrative methods were used to combine primary studies.

Investigation of differences between primary studies
Not carried out.

Results of the review
The results of the review were:

The average eradication rates were 90% (range: 80% - 100%) with first-line treatments and 84% with second-line treatments.

Rate of cicatrixation was 95% (range: 90% - 100%).

Sensitivity and specificity of breath test were 95% (range: 90% - 100%) and 97% (range: 95% - 100%).

The annual rate of relapse was 70% (range: 50% - 80%).

The annual rate of re-infection was 5% (range: 0 - 20%).

The prevalence of HP in patients with peptic ulcer was 95% (range: 80% - 100%).

In the second analysis, the rate of cure with omeprazole was 93% (95% CI: 90% - 95%).
The rates of eradication and cure were:

90% (95% CI: 84% - 96%) and 95% (95% CI: 91% - 98%) with CTT;

89% (95% CI: 79% - 99%) and 94% (95% CI: 88% - 99%) with O+CTT;

82% (95% CI: 76% - 87%) and 91% (95% CI: 88% - 95%) with O+A+C;

79% (95% CI: 70% - 87%) and 86% (95% CI: 85% - 87%) with L+A+C; and

84% (95% CI: 80% - 88%) and 98% (95% CI: 95% - 99%) with O+M+C.

**Measure of benefits used in the economic analysis**
The number of symptom-free days was used as a benefit measure. It was derived from modelling and a 5% discount rate was used.

**Direct costs**
Unit costs and quantities of resources were reported separately. The costs included in the analysis were drug costs, physician visits, and breath test. Resource use varied according to the strategy adopted in the decision model and was derived from published studies. The estimation of costs was based on actual data derived from official Catalan tariffs in 1997. A 5% discount rate was used as the overall time horizon of the study was 10 years.

**Statistical analysis of costs**
No statistical analysis of costs was carried out.

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

**Currency**
Spanish pesetas (Pta).

**Sensitivity analysis**
Sensitivity analyses were carried out both to determine the impact of some model inputs on the analysis results and to take into account the uncertainty around some parameters. Effectiveness data were varied within the reported ranges, quantities of resources were varied on the basis of suggested doses, unit costs of physician visits and breath test reflected variations in tariffs. Finally, the discount rate was varied between 0 and 6%. It appears that one-way analyses were carried out.

**Estimated benefits used in the economic analysis**
The number of symptom-free days was 354.3 after one year, 1,611.2 after 5 years, and 2,873.6 after 10 years in all models.

In the second analysis, the number of symptom-free days was almost similar for all the combination therapies. The number of symptom-free days ranged from 354.1 to 354.4, but was 353.2 for omeprazole alone after one year; ranged from 1,610.6 to 1,611.3 for all the combination therapies, but was 1,606.1 for omeprazole alone after 5 years; and ranged from 2,872.7 to 2,874.0 with all the combination therapy but was 2,865.1 with omeprazole alone after 10 years.

**Cost results**
Costs per patient treated were Pta 22,588 with strategy 1, Pta 32,985 with strategy 2, and Pta 6,960 with strategy 3 after 1 year; Pta 27,741 with strategy 1, Pta 40,236 with strategy 2, and Pta 8,544 with strategy 3 after 5 years; and Pta 34,013 with strategy 1, Pta 49,129 with strategy 2, and Pta 10,263 with strategy 3 after 10 years.

In the second analysis, the cost per patient treated ranged from Pta 6,960 to Pta 17,699 for all the combination therapies, but was 21,851pts for omeprazole alone after one year; ranged from Pta 8,544 to Pta 22,130 for all the combination therapies, but was Pta 52,077 for omeprazole alone after 5 years; and ranged from Pta 10,263 to Pta 26,726 with all the combination therapies, but was Pta 80,693 with omeprazole alone after 10 years.

**Synthesis of costs and benefits**

An average cost-effectiveness analysis was carried out to combine costs and benefits. The average cost per symptom-free day was Pta 19.6 with strategy 3, 63.8 with strategy 1, and Pta 93.1 with strategy 2 after 1 year; Pta 5.3 with strategy 3, Pta 17.2 with strategy 1, and Pta 52.0 with strategy 2 after 5 years; and Pta 3.6 with strategy 3, Pta 11.8 with strategy 1, and Pta 17.1 with strategy 2 after 10 years.

Strategy 3 represented the most cost-effective treatment and this conclusion was confirmed in all sensitivity analyses.

In the second analysis, the cost per symptom-free day ranged from Pta 19.7 to Pta 50 for the combination therapies, but was Pta 61.9 for omeprazole alone after one year; ranged from Pta 5.3 to Pta 13.7 for the combination therapies, but was Pta 32.4 for omeprazole alone after 5 years; and ranged from Pta 3.6 to Pta 9.3 with all the combination therapies, but was Pta 28.2 with omeprazole alone after 10 years.

The cost-effectiveness of the eradication therapies over omeprazole alone (antisecretory therapy) was confirmed in the sensitivity analyses.

**Authors' conclusions**

The authors concluded that the empirical treatment of patients with peptic ulcer associated with Helicobacter pylori (where all patients are administered an eradication treatment, without the performance of a diagnostic test), proved to be the most cost-effective strategy. Among the available eradication therapies, the classic triple therapy based on bismuth subcitrate was the most convenient option, although the cost-effective ratios of the other therapies did not differ substantially.

**CRD COMMENTARY - Selection of comparators**

The reason for the choice of the comparators was clear. The three strategies combining diagnosis and treatment and the eradication therapies were selected as representing possible alternative interventions for the management of peptic ulcer associated with HP. You, as a user of this database, should assess whether they represent strategies and therapies currently adopted in your own setting.

**Validity of estimate of measure of effectiveness**

A systematic review of the literature was not carried out. The study design was reported only for one of the primary studies (a meta-analysis). Methods of combination of effectiveness data were not reported and it was not stated whether the authors considered the impact of differences between primary studies when estimating effectiveness.

**Validity of estimate of measure of benefit**

The benefit measure used in the economic analysis was the number of symptom-free days, which was obtained from modelling. It appears to have been appropriate and comparable with other interventions for the management of peptic ulcer associated with HP.

**Validity of estimate of costs**
It appears that all categories of costs relevant to the perspective adopted in the study were included in the analysis. Unit costs and quantities of resources were analysed separately. The price year was reported. Cost estimates were somewhat specific to the study setting and few sensitivity analyses were carried out.

**Other issues**
The authors made some comparisons of their findings with those from other studies. Several sensitivity analyses were carried out on key variables, but the issue of the generalisability of the study results to other settings was not addressed. The study considered patients suffering from acute peptic ulcer and this was reflected in the authors’ conclusions.

**Implications of the study**
The results of the analysis, favouring eradication therapy, imply that the performance of diagnostic tests may not be crucial and this is an important result given that, in the setting of primary care, the availability of appropriate diagnostic tools is limited.

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