Feasibility and cost-effectiveness of using magnification chromoendoscopy and pepsinogen serum levels for the follow-up of patients with atrophic chronic gastritis and intestinal metaplasia


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 investigated the use of magnification chromoendoscopy and pepsinogen testing for follow-up of patients with atrophic chronic gastritis (ACG) and intestinal metaplasia (IM). This intervention was compared with no follow-up.

Type of intervention
Diagnosis.

Economic study type
Cost-utility analysis.

Study population
The study population comprised patients in whom ACG or IM was diagnosed after biopsies performed in flat mucosal areas during upper gastrointestinal endoscopy. Patients were excluded according to the following criteria:

- the presence of intellectual disability preventing provision of accurate information;
- the likely inability to attend follow-up appointments;
- the presence of a serious and debilitating disease such as renal, liver or blood discrasia;
- the presence of other oncological disease;
- previous gastric surgery had been performed;
- pernicious anaemia diagnosis could not be excluded; and
- previous Helicobacter pylori (H. pylori) eradication therapy had been prescribed.

Setting
The setting was inpatient secondary care. The economic study was carried out in Portugal.

Dates to which data relate
The effectiveness data were derived from a study undertaken between 2001 and 2004 and studies published between 1995 and 2003. The price year was not reported.

Source of effectiveness data
The clinical and epidemiological data used in the economic evaluation were:
the proportion of patients with H. pylori infection;
the risk for extensive incomplete IM; and
the risk for dysplasia.

Modelling
A single-node decision tree with a Markov chain model was built to estimate the cost-effectiveness of a follow-up regimen for patients with ACG or IM in comparison with no follow-up.

Sources searched to identify primary studies
Effectiveness data for patients in the follow-up group were derived from a prospective cohort study conducted from 2001 to 2004 in a specialised tertiary hospital. Effectiveness data for patients in the no follow-up group were derived from published studies.

Methods used to judge relevance and validity, and for extracting data
Data for the follow-up group were derived from a prospective cohort study. A total of 136 individuals were enrolled in the study, with 100 patients being followed up over 3 years. The authors did not report how relevant studies used to derive the effectiveness of no follow-up were identified.

Measure of benefits used in the economic analysis
The measure of benefits used was the quality-adjusted life-years (QALYs) gained. Utility estimates were derived from a published systematic review of the literature (Kaptein et al. 2005, see 'Other Publications of Related Interest' for more bibliographic details). Discounting was relevant since the benefits could be gained over a 10-year period, but it was not performed.

Direct costs
The direct costs to the health care provider were included in the analysis. The costs of diagnostic procedures and therapeutic options (i.e. resection by endoscopy, surgery, or chemotherapy) were included according to stage at diagnosis. Also included were the costs of missed diagnosis or uncertainty analysis. The costs were defined based on Diagnosis Related Groups (DRG) data. The costs appear to have been incurred over a 10-year period. Discounting was relevant for this time horizon, but it was not performed. The authors reported the median costs. The price year was not reported.

Statistical analysis of costs
The costs were reported as point estimates (i.e. the data were deterministic).

Indirect Costs
Productivity costs were not included.

Currency
Euros (EUR).

Sensitivity analysis
A series of one-way sensitivity analyses was undertaken by varying the following:
the frequency and number of diagnostic procedures (i.e. endoscopy and/or PG test, on a yearly or 3-yearly basis);

the costs of endoscopy and the PG test;

treatment costs; and

cancer-associated survival and quality of life.

**Estimated benefits used in the economic analysis**
The median QALYs gained were 6.4 (minimum 4.9, maximum 7.5) in the follow-up group, compared with 2.5 (minimum 1.7, maximum 3.7) in the no follow-up group.

**Cost results**
For the follow-up group, a median of EUR 322.8 to EUR 1,336.8 would be spent, annually, for each patient with ACG or IM and negative PG results who was undergoing PG and endoscopy.

For patients with incomplete IM and positive PG results, a median of EUR 1,257.6 to EUR 3,078.80 would be spent annually.

For patients in the no follow-up group, median costs of EUR 7.4 to 134.8 were incurred.

**Synthesis of costs and benefits**
It was unclear how the costs and benefits were combined. The authors reported that a median of EUR 455 would be spent, annually, for each QALY per patient with ACG or IM, given a negative result on PG, followed with either PG annually or using both endoscopic and PG evaluation every 3 years.

A median of EUR 1,868 would be spent, annually, for each QALY per patient with extensive IM followed by simultaneously performed magnification chromoendoscopy and PG.

The authors reported that the factors that most influenced the results were quality of life after surgical resection and the cost of chemotherapy.

**Authors' conclusions**
The follow-up of patients with atrophic chronic gastritis (ACG) or intestinal metaplasia (IM) was both feasible and cost-effective.

**CRD COMMENTARY - Selection of comparators**
A justification was given for using no follow-up as the comparator. It represented current practice in the authors’ settings. You should decide if the comparator used also represents current practice in your own setting.

**Validity of estimate of measure of effectiveness**
The parameters were derived from a prospective cohort study and from published research. The authors provided appropriate details of the prospective cohort study, including duration of follow-up, patient sample, loss to follow-up and the main results. However, there were no details of the literature search used to populate parameters for the no follow-up group.

**Validity of estimate of measure of benefit**
The estimation of health benefit (QALYs) was derived appropriately using the decision analytic model. Benefits could be generated over a 10-year period. However, the authors did not perform any discounting. The utility values were derived from a published systematic review of the literature.
Validity of estimate of costs
The analysis of the costs was performed from the perspective of the health care provider paying for the diagnostic follow-up. Given that perspective, it appears that all the relevant categories of costs have been included in the analysis. The authors did not report many details of the costs included in the analysis, so it was unclear whether all the relevant costs were included. The cost data were derived from the authors’ settings, based on DRG information. Since the costs appear to have been incurred over a 10-year period, discounting was relevant but was not performed. The authors did not report the price year, which will hamper any future inflation exercises.

Other issues
The authors did not compare their findings with those from other studies. The issue of generalisability to other settings was not addressed. It is unclear from the article how the authors combined the costs and benefits. The authors’ conclusions reflected the scope of their analysis. The authors reported that their study participants were neither randomly selected nor defined over gold-standard; this might limit the internal validity of the results.

Implications of the study
The authors reported that their disease-based management model is available for external validation and improvement through the integration of other factors such as H. pylori and host variation, before its recommendation by health authorities.

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Other publications of related interest
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Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Chronic Disease; Cost-Benefit Analysis; Decision Trees; Disease Progression; Endoscopy, Gastrointestinal /economics /methods; Feasibility Studies; Female; Follow-Up Studies; Gastric Mucosa /pathology; Gastritis, Atrophic /blood /pathology; Humans; Male; Markov Chains; Metaplasia; Methylene Blue; Middle Aged; Pepsinogens /blood; Precancerous Conditions /blood /pathology; Prognosis; Quality-Adjusted Life Years; Risk Assessment /economics
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