Antibiotic therapy of Helicobacter pylori infection reduces healthcare expenditures related to duodenal ulcer

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
Antibiotic therapy of Helicobacter pylori infection in duodenal ulcer.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Adult patients (aged over 18 years) with active duodenal ulcer and confirmed H pylori infection.

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

Dates to which data relate
Dates relating to effectiveness and resource use data were obtained from a randomised study, the results of which were published in 1998. Cost data related to 1995-1996.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing was prospectively undertaken on the same patient sample as that used in the effectiveness analysis.

Study sample
No power calculations were reported. Of the 819 patients enrolled, 727 completed the study; 243 (out of 277 enrolled) received clarithromycin plus omeprazole, 248 (out of 279 enrolled) received omeprazole alone, and 236 (out of 263 enrolled) received ranitidine alone. Patients were randomised at each site in a 1:1:1 ratio to receive either clarithromycin 500 mg three times a day plus omeprazole 40 mg daily for 14 days followed by omeprazole 20 mg daily for an additional 14 days, or omeprazole alone 20 mg daily for 28 days, or ranitidine alone 150 mg twice daily for 28 days.

Study design
The study was a prospective, randomised, double-blind clinical trial, carried out at 132 sites in the USA. Mean duration of follow-up was 11.3 months for the clarithromycin plus omeprazole group, 11.3 months for the omeprazole alone group and 11.5 months for the ranitidine group. The drop-out rate was similar in all three treatment groups.

**Analysis of effectiveness**

The principle used in the analysis of effectiveness was treatment completers only. The main health outcomes used in the analysis were: the eradication rates for H pylori at 4-6 weeks after treatment and clinical success 1 year after therapy. Treatment was defined as having failed if the patient had received 12 days or more of anti-ulcer therapy during the follow-up period. Adverse events related to the study drug were also considered. The demographic characteristics of patients included in each of the three arms of the study were similar with respect to gender, ethnicity, and age.

**Effectiveness results**

The eradication rate 4-6 weeks after therapy was 68% (exact binomial 95% CI: 60.4%-70.1%) for the clarithromycin + omeprazole group, 7% (95% CI: 3.8%-11.4%) for the omeprazole alone group and 4% (95% CI: 2%-8.1%) for the ranitidine group. Clinical success at 1 year after therapy was 59% (95% CI: 52.8%-65.5%) for the clarithromycin plus omeprazole group, 35% (95% CI: 29.5%-41.8%) for the omeprazole alone group and 35% (95% CI: 29.1%-41.6%) for the ranitidine group. In terms of the above two clinical measures, the clarithromycin plus omeprazole group had significantly higher rates compared to the two other treatment groups. There were no serious adverse effects related to the study drug in any of the trial arms.

**Clinical conclusions**

The study demonstrated that patients treated with clarithromycin plus omeprazole experienced better clinical outcome. In terms of medical care, antibiotic therapy is generally well tolerated with little risk to the health of the patient and considerable potential benefit.

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

The authors did not provide any measure of benefit since the intervention was more effective in terms of clinical outcome.

**Direct costs**

Costs were not discounted given the short time frame of the study (1 year follow-up period). Quantities were reported separately from the costs. Healthcare resource utilisation data, including medications, physician fee, clinic and emergency room visits, diagnostic and therapeutic procedures and hospitalisations were collected from each patient during monthly telephone interviews. Medical, surgical and diagnostic services directed by physicians in the office, emergency room or hospital were coded, as appropriate, according to the Physicians' Current Procedural Terminology (CPT, 1995), The Diagnosis Related Group (DRG, 1995), or the International Classification of Diseases (ICD, 9th Revision). The code numbers were then converted into costs for each healthcare resource, using the Synergy Consolidated Data Warehouse, a database listing average costs associated with each outpatient medical claim for five managed healthcare organisations. The actual costs were incurred by the managed care organisations during a 1-year period (1995-1996). For the inpatient cost analysis, Synergy provided a 1995 state-wide Massachusetts database of cases reimbursed by health maintenance organisations. The ICD and DRG codes associated with the hospitalisations occurring during the 1-year follow-up period were matched to the same codes appearing in the 1995 managed care hospital inpatient database.

**Statistical analysis of costs**

Multivariate linear regression analyses were used to compare the costs between the two treatment groups: clarithromycin plus omeprazole versus omeprazole alone and clarithromycin plus omeprazole versus ranitidine alone. Separate analyses were performed for costs associated with different types of resource utilisation - cost being the outcome variable and the type of treatment being the primary predictor variable. Length of follow-up, gender, ethnicity
and age served as additional predictor variables.

**Indirect Costs**  
Not considered.

**Currency**  
US dollars ($).

**Sensitivity analysis**  
Not performed.

**Estimated benefits used in the economic analysis**  
Not applicable.

**Cost results**  
The total ulcer-related healthcare costs for clarithromycin plus omeprazole treatment group was $93,068, compared to $215,979 for omeprazole alone and $258,757 for ranitidine alone. The p-values for the comparisons between the intervention group versus the omeprazole group were (p<0.001) and for the intervention group versus the ranitidine group were (p=0.001).

**Synthesis of costs and benefits**  
Costs and benefits were not combined since the use of the intervention was the dominant strategy.

**Authors' conclusions**  
In a managed care environment, therapy with clarithromycin and omeprazole to eradicate *H pylori* in patients with duodenal ulcer disease would result in significant cost savings secondary to a reduction in the utilisation of healthcare resources.

**CRD COMMENTARY - Selection of comparators**  
Antisecretory therapy using agents such as omeprazole or ranitidine, as a conventional therapy, was regarded as the comparator. You, as a database user, should consider if this applies to your own setting.

**Validity of estimate of measure of benefit**  
The effectiveness results are likely to be internally valid given the use of a randomised design. However, the fact that the effectiveness analysis was not conducted on an intention-to-treat basis may represent a weakness in the effectiveness results. The study was a cost-consequences analysis.

**Validity of estimate of costs**  
Quantities were reported separately from the costs. Adequate details of methods of cost estimation were given. No important direct medical cost items appear to have been omitted. Cost results may not be generalisable to other settings or countries.

**Other issues**  
The authors' conclusion seems to be reasonably justified. The issue of generalisability to other settings or countries was
not addressed. Appropriate comparisons were made with other studies.

**Implications of the study**
This study validates treatment of H pylori infection in patients with duodenal ulcer disease.

**Source of funding**
Dr Sonnenberg's research funded by a grant from the Centers for Disease Control and Prevention, Atlanta, GA. Clinical study supported by Abbott Laboratories, Abbott Park, IL.

**Bibliographic details**

**PubMedID**
10345967

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adolescent; Adult; Anti-Ulcer Agents /economics /therapeutic use; Clarithromycin /economics /therapeutic use; Double-Blind Method; Drug Costs /statistics & numerical data; Drug Therapy, Combination; Drug Utilization; Duodenal Ulcer /complications /economics; Health Care Costs /statistics & numerical data; Helicobacter Infections /complications /drug therapy /microbiology; Helicobacter pylori /isolation & purification; Humans; Managed Care Programs /economics; Omeprazole /economics /therapeutic use; Prospective Studies; Ranitidine /economics /therapeutic use; United States

**AccessionNumber**
21999000363

**Date bibliographic record published**
31/08/2000

**Date abstract record published**
31/08/2000