Meta-analysis: comparative efficacy of different proton-pump inhibitors in triple therapy for Helicobacter pylori eradication

CRD summary
This review compared the efficacy of different proton-pump inhibitors (omeprazole, lansoprazole, rabeprazole and esomeprazole) in standard triple therapy for Helicobacter pylori eradication. The authors concluded that there appears to be no difference in the efficacy of different proton-pump inhibitors. The authors' conclusions are likely to be reliable.

Authors' objectives
To compare the efficacy of different proton-pump inhibitors (PPIs) in triple therapy for Helicobacter pylori (H. pylori) eradication.

Searching
MEDLINE was searched in September 2002; the search terms were reported. The authors also handsearched abstracts submitted to the American Gastroenterological Association congresses from 1995 to 2002 and abstracts from the European Helicobacter pylori Study Group congresses between 1996 and 2002. The reference lists of retrieved papers were checked for additional relevant studies and the authors’ personal databases were also reviewed. The authors carried out the search in English, French and Spanish.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) that provided baseline patient characteristics and inclusion and exclusion criteria to allow adequate evaluation were eligible for inclusion.

Specific interventions included in the review
Studies that assessed at least two different PPIs in twice-a-day standard triple therapy for 7 to 14 days, that only differed in terms of the type of PPI (omeprazole, lansoprazole, pantoprazole, rabeprazole or esomeprazole), were eligible for inclusion. Triple therapy also had to include a combination of two of the following: clarithromycin or amoxicillin and metronidazole or tinidazole. The included studies assessed rabeprazole 20 mg, lansoprazole 30 mg, omeprazole 20 mg and esomeprazole 20 mg. The duration of treatment was either 7 or 10 days.

Participants included in the review
Studies of patients who had H. pylori, confirmed before treatment by rapid urease test, histology or urea breath test, were eligible for inclusion.

Outcomes assessed in the review
Cure of H. pylori infection was the outcome of interest. Studies that assessed H. pylori status by histology or urea breath test to confirm eradication at least 4 weeks after the end of treatment were eligible for inclusion.

How were decisions on the relevance of primary studies made?
Two reviewers independently assessed studies for inclusion in the review.

Assessment of study quality
The included studies were assessed for validity using the criteria proposed by Chalmers et al., which evaluated the design, implementation and analysis of RCTs. The maximum possible score was one point. The authors did not state how the papers were assessed for validity, or how many reviewers performed the validity assessment.
Data extraction
Two reviewers independently extracted the data from the included studies, and a third reviewer checked the data extraction. Any disagreements were resolved by consensus. Odds ratios (ORs) and associated 95% confidence intervals (CIs) for H. pylori eradication were extracted from each study, both in an intention-to-treat (ITT) format and a per protocol format, where available. Where studies did not specify the use of ITT analysis, it was assumed the analysis was per protocol.

Methods of synthesis
How were the studies combined?
Pooled ORs with 95% CIs were calculated for studies comparing the same drugs, using a fixed-effect model.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test.

Results of the review
Fourteen RCTs (n=3,199) were included in the review. Six of the included studies were only reported as abstracts.

The included studies ranged in quality from a score of 0.26 to 0.60, on a scale from 0 to 1.

There was no statistically significant difference in eradication rate between omeprazole and lansoprazole (6 studies; ITT: OR 0.91, 95% CI: 0.69, 1.21). There was no evidence of significant heterogeneity.

There was no statistically significant difference in eradication rate between omeprazole and rabeprazole (4 studies; ITT: OR 0.81, 95% CI: 0.58, 1.15). There was no evidence of significant heterogeneity.

There was no statistically significant difference in eradication rate between omeprazole and esomeprazole (2 studies; ITT: OR 0.89, 95% CI: 0.58, 1.35). There was no evidence of significant heterogeneity.

There was no statistically significant difference in eradication rate between lansoprazole and rabeprazole (3 studies; ITT: OR 0.77, 95% CI: 0.48, 1.22). There was no evidence of significant heterogeneity.

Authors’ conclusions
There appeared to be no difference in the efficacy of different PPIs when used in standard triple therapy for H. pylori eradication.

CRD commentary
The review question was clear, with inclusion criteria stated in relation to the study design, participants, interventions and outcome of interest. The search strategy was restricted to one electronic database and handsearches. The authors sought studies published in more than one language, thus minimising language bias. In addition, unpublished data were sought by searching abstracts submitted to conferences, which minimises the potential for publication bias. Two reviewers independently assessed studies for inclusion in the review and extracted the data, thus reducing the potential for error or reviewer bias. The validity of the included studies was assessed using appropriate criteria. Adequate details of the included studies were presented in relation to the intervention, outcome assessment and main deficiencies in terms of quality; however, details of the participants were not provided. Heterogeneity was assessed and the meta-analysis appears appropriate. The authors’ conclusions are likely to be reliable.

Implications of the review for practice and research
The authors did not state any implications for practice or further research.
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