Efficacy of lansoprazole in eradicating Helicobacter pylori: a meta-analysis

Authors' objectives
To assess the efficacy of lansoprazole in eradicating Helicobacter pylori and healing peptic ulcers.

Searching
The authors searched MEDLINE and also scanned the bibliographies of articles for additional relevant studies (search terms not stated). Only full-text published articles (1993 to 1996) were included although five published abstracts were included for the triple-therapy comparison of lansoprazole versus another proton pump inhibitor (PPI). Only English language studies were included.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs).

Specific interventions included in the review
Comparisons of:

1. The efficacy of lansoprazole monotherapy (30 or 60 mg/day for 6 to 8 weeks) with combination therapy with lansoprazole and amoxicillin (1, 2, or 3 g/day for up to 4 weeks) or clarithromycin (400 or 600 mg/day for up to 8 weeks).

2. The efficacy of lansoprazole plus amoxicillin or clarithromycin (dual therapy) with treatment regimens comprising lansoprazole, amoxicillin or clarithromycin, and metronidazole (500 mg/day for 2 weeks) or tinidazole (1 g/day for 2 weeks) (triple therapy), or lansoprazole, amoxicillin, colloidal bismuth (480 mg/day for 2 weeks) and tinidazole (quadruple therapy).

Participants included in the review
Patients undergoing treatment for ulcers and the eradication of H. pylori.

Outcomes assessed in the review
Total healing rates for gastric, peptic or duodenal ulcers and eradication rate of H. pylori.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
No formal assessment of quality was undertaken.

Data extraction
The authors do not state who, or how many of the authors, performed the data extraction. Data were extracted for the categories of number of patients, ulcer site (gastric or duodenal), study design, treatment regimen (reported in detail), rate of ulcer healing (% of patients) after treatment, and rate of H. pylori eradication (%).

Methods of synthesis
How were the studies combined?
A pooled odds ratio (OR) was calculated with 95% confidence intervals (CIs). Gastric and duodenal ulcers were considered separately.

How were differences between studies investigated?
Homogeneity was tested by using the chi-square statistic.

To evaluate the influence of a single study on the calculation of the total OR, an analysis of the total response was performed by excluding the data referring to each single study and including the remaining data. Considering that no marked differences emerged on the basis of the total OR calculation, data from all the studies are included in the presentation.

Results of the review
Fourteen RCTs were included of which five were abstract publications. Nine RCTs were included of mono- versus dual-therapy interventions with 601 participants.

Seven studies, involving a total of 531 participants, compared lansoprazole with lansoprazole plus amoxicillin 1-3 g/day. Two studies, involving a total of 68 patients, compared the efficacy of lansoprazole alone with the combination of lansoprazole and clarithromycin 400-600 mg/day.

Two studies, involving a total of 105 participants, compared combination therapy with lansoprazole plus one, two, or three antibacterial agents.

Five RCTs were included reviewing triple therapy with dansoprazole versus omeprazole with over 650 participants (exact number not stated).

Lansoprazole has a high degree of efficacy in eradicating H. pylori, above all when used within treatment schemes including amoxicillin or clarithromycin, and metronidazole or tinidazole. This efficacy is comparable to that of other PPIs.

Results for monotherapy versus dual therapy (7 studies of lansoprazole alone versus lansoprazole plus amoxicillin) found gastric and duodenal ulcer healing rates were similar and not statistically significant; gastric ulcer healing with monotherapy 90.8% versus dual therapy 88.5% (OR = 0.8; 95% CI: 0.3, 1.9) and duodenal ulcer healing with monotherapy 95.7% versus dual therapy 97.0% (OR = 1.5, 95% CI: 0.4, 5.7). An additional two studies of dansoprazole alone versus lansoprazole plus clarithromycin found gastric ulcer healing using monotherapy 89.3% versus 92.5% for dual therapy (OR = 1.6; 95% CI: 0.3, 9.3). Total eradication of H. pylori using monotherapy for gastric ulcers was 13.3% versus 45.9% for dual therapy (OR = 6.2; 95% CI: 2.9, 13.7) and duodenal ulcer eradication with monotherapy was 8.3% versus 58.3% for dual therapy (OR = 13.6, 95% CI: 6.9, 26.7). An additional two studies of dansoprazole alone versus dansoprazole plus clarithromycin found gastric ulcer eradication using monotherapy 0% versus 27.5% for dual therapy (OR not calculated).

Results for dual therapy versus triple- or quadruple-therapy (2 studies) found peptic ulcer healing rates were 96.4% for dual therapy versus 99% for triple- or quadruple-therapy (OR = 1.8, 95% CI: 0.1, 23.0), chi-square = 0.51. Total eradication of H. pylori using dual therapy versus triple- or quadruple-therapy (2 studies) found combined gastric and duodenal eradication rates were 57.1% for dual therapy versus 91.8% (OR = 8.5; 95% CI: 2.9, 24.5), chi-square 0.90, for triple-or quadruple therapy.

Authors' conclusions
Triple therapy allows the eradication of H. pylori in more than 85% of cases in patients with peptic ulcer. In addition, there is a substantial comparability of the efficacy of dansoprazole and omeprazole when they are used together with other anti-infective agents. Thus, dansoprazole appears to offer an option in the eradication of H. pylori.

CRD commentary
The authors have clearly stated their research question but not their inclusion and exclusion criteria. The literature
search is good but there is the risk of publication bias since the authors may have missed studies published outside the United States through restricting the searches to two databases and only English language publications and by not attempting to locate unpublished studies.

The quality of the included studies was not formally assessed and the authors have not reported on how the articles were selected, or how many of the reviewers were involved in the data selection and extraction.

The data extraction is reported in tables and text and the statistical pooling was appropriate. There were tests for heterogeneity and the authors have discussed the many methodological and data limitations of the review. The authors conclusions appear to follow from the results but should be viewed with caution.

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

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