Levofloxacin-based triple regimens were better than standard quadruple regimens for second-line eradication of *Helicobacter pylori*


**Question**
In patients with *Helicobacter pylori* infection that was not eradicated after initial triple therapy, are 10-day levofloxacin-based triple regimens more effective than standard 7- or 14-day quadruple regimens for second-line eradication?

**Design**
Randomized (allocation concealed*), [unblinded]†,* controlled trial with 6-week follow-up.

**Setting**
Gemelli Hospital, Rome, Italy.

**Patients**
280 patients (mean age 48 y, 52% women) who had endoscopically confirmed nonulcer dyspepsia and a positive test result for *H. pylori* and in whom an eradication attempt with standard triple therapy had failed. Follow-up was 94%. All patients were included in the analysis.

**Intervention**
70 patients each were allocated to 4 treatments: 1) a 10-day course of once-daily levofloxacin, 500 mg; twice-daily amoxicillin, 1 g; twice-daily rabeprazole, 20 mg (LAR); 2) a 10-day course of once-daily levofloxacin, 500 mg; twice-daily tinidazole, 500 mg; and twice-daily rabeprazole, 20 mg (LTR); 3) a 7-day course of 4 times daily tetracycline, 500 mg; 3 times daily metronidazole, 500 mg; 4 times daily bismuth salt, 120 mg; and twice-daily rabeprazole, 20 mg (7TMBR); or 4) a 14-day course of TMBR (14TMBR).

**Main Outcome Measures**
*H. pylori* eradication. Secondary outcomes included incidence of side effects.

**Main Results**
Analysis was by intention to treat. Patients who received LAR or LTR regimens had higher rates of *H. pylori* eradication than did those who received the 7TMBR or 14TMBR regimens (Table). The 14TMBR group had more overall side effects (Table), particularly taste impairment (vs LAR) and bloating (vs LTR). The LAR and LTR groups did not differ from the 7TMBR group for side effects (Table).

**Conclusion**
In patients with *Helicobacter pylori* infection in whom triple therapy had previously failed, 10-day levofloxacin-based triple regimens were more effective and had fewer side effects than standard 10- or 14-day quadruple regimens.

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*See Glossary.
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**Commentary**
Currently, the recommended second-line treatment for *H. pylori* infection is quadruple therapy consisting of a proton-pump inhibitor, bismuth salt, metronidazole, and tetracycline for a minimum of 7 days. Although the reported eradication rate varies from about 57% to 90% (1, 2), the complicated nature of this regimen limits its clinical usefulness.

Levofloxacin-based triple therapy has been investigated as an alternative second-line treatment. The reported eradication rate, which varies from 63% to > 90%, is similar to that of quadruple therapy. In the study by Nista and colleagues, levofloxacin-based triple therapy was more efficacious and better tolerated than quadruple therapy. In contrast, a recent study found that levofloxacin-based triple therapy was inferior to quadruple therapy (eradication rate 63% vs 83%) (3). In addition, previous studies did not report excessive adverse events with quadruple therapy. How could one account for such a discrepancy? Documenting that a new therapy is superior to an older therapy, a trial must be either extremely large, or have poor results with the standard quadruple therapy (eradication rate 63% to 69%) coupled with very good results for the new levofloxacin-based triple therapy (eradication rate 90% to 94%). Overall, this study confirmed that levofloxacin-based triple therapy is efficacious and well-tolerated. Whether it is superior to quadruple therapy needs to be determined by meta-analysis. Finally, by emphasizing the importance of drug compliance with first-line therapy, which is a crucial factor in treatment success, the need for second-line treatments may be reduced.

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**References**