

# Review: Eradication therapy supplemented by probiotics increased eradication rates and reduced side effects in *H. pylori* infection

Tong JL, Ran ZH, Shen J, Zhang CX, Xiao SD. Meta-analysis: the effect of supplementation with probiotics on eradication rates and adverse events during *Helicobacter pylori* eradication therapy. *Aliment Pharmacol Ther.* 2007;25:155-68.

**Clinical impact ratings:** Gastroenterology ★★★★★☆ Infectious Disease ★★★★★☆☆

## QUESTION

In patients with *Helicobacter pylori* infection, do probiotics improve eradication rates and reduce side effects of anti-*H. pylori* treatment?

## METHODS

**Data sources:** PubMed, EMBASE/Excerpta Medica, Science Citation Index, and Chinese Biomedical Database (all to October 2006); Cochrane Controlled Trials Register (Issue 2, 2006); reference lists of retrieved articles; abstracts of major gastroenterological meetings; and authors in the field.

**Study selection and assessment:** Randomized controlled trials (RCTs) published in English or Chinese that compared an eradication regimen consisting of proton pump inhibitors and 2 antibiotics plus probiotics with the same eradication regimen plus placebo or no additional treatment in patients of any age who had never been treated for *H. pylori* infection. Eradication was confirmed  $\geq 4$  weeks after therapy by histologic testing or  $^{13}\text{C}$ -urea breath test. Studies evaluating these regimens as second-line treatment for previous eradication failure were included. 14 RCTs ( $n = 1671$ ) met the selection criteria. Quality of individual studies was assessed with the 5-point Jadad scale.

**Outcomes:** *H. pylori* eradication rates and side effects.

## MAIN RESULTS

Meta-analysis of 11 RCTs assessing eradication rates showed greater improvement with probiotic supplementation than with the eradication regimen alone (Table). In 2 RCTs ( $n = 208$ ) that studied patients with eradication failure, probiotic supplementation also improved eradication rates (odds ratio 2.47, 95% CI 1.16 to 5.29). Probiotics reduced side effects overall and the individual symp-

toms of diarrhea, epigastric pain, nausea, and taste disturbance (Table).

## CONCLUSION

In patients with *Helicobacter pylori* infection, probiotic supplementation improves eradication rates and reduces side effects of anti-*H. pylori* treatment.

*Source of funding:* Shanghai Leading Academic Discipline Project.

*For correspondence:* Dr. Z.H. Ran, Shanghai Jiao Tong University, Shanghai, China. E-mail: z-ran@online.sh.cn. ■

### Eradication regimen with vs without probiotics in *H. pylori* infection at $\geq 4$ weeks\*

Outcomes	Number of trials (n)	Weighted event rates		RBI (95% CI)	NNT (CI)
		Probiotics	No probiotics		
Eradication rate	11 (1074)	85%	75%	13% (6.8 to 18)	11 (8 to 20)
<b>RRR (CI)</b>					
Total side effects	7 (625)	22%	38%	44% (24 to 59)	6 (5 to 11)
Diarrhea	8 (997)	6.1%	16%	62% (44 to 75)	11 (9 to 15)
Epigastric pain	7 (608)	16%	23%	32% (2.3 to 55)	14 (8 to 187)
Nausea	7 (608)	16%	25%	35% (9.3 to 55)	12 (8 to 43)
Taste disturbance	5 (418)	25%	46%	47% (8.7 to 73)	5 (3 to 25)

\*Abbreviations defined in Glossary; weighted event rates, RBI, RRR, NNT, and CI calculated from control event rates and odds ratios in article using a fixed-effects model.

## COMMENTARY

The review by Tong and colleagues adds to the growing evidence that probiotics may be beneficial in a variety of gastrointestinal diseases. Probiotics are attracting increasing attention because aspects of human health may relate to the balance of endogenous bacterial flora in the gastrointestinal tract, and factors that disrupt this balance may cause disease. Evidence from RCTs has suggested that probiotics may be effective in reducing symptoms of both acute infective diarrhea and antibiotic-associated diarrhea (1).

There are some concerns surrounding this review. As with many other systematic reviews in this area, a tendency exists to evaluate all probiotics together for a given disease. This notion is biologically implausible. All antibiotics are not equally effective in eradicating *H. pylori*, and probiotics probably differ in their efficacy in enhancing the activity of eradication regimens. It is also unclear whether probiotics have a direct effect in increasing eradication of *H. pylori* or whether the effect is mediated by increased compliance with antibiotics.

The review was well done, but the evidence identified has some weaknesses. 6 of 14 included RCTs were of poor quality (Jadad score  $< 3$ ). Also, larger trials showed less of an effect on *H. pylori* eradication. Although this imbalance did not reach formal statistical significance, publication bias and other small study effects have been noted in systematic reviews of probiotics in other areas (2).

On balance, this systematic review is interesting, but caution should be exercised in overinterpreting the results. More data would be desirable to inform treatment.

Paul Moayyedi, MD  
McMaster University  
Hamilton, Ontario, Canada

## References

- Huebner ES, Surawicz CM. Probiotics in the prevention and treatment of gastrointestinal infections. *Gastroenterol Clin North Am.* 2006;35:355-65.
- McFarland LV. Meta-analysis of probiotics for the prevention of antibiotic associated diarrhea and the treatment of *Clostridium difficile* disease. *Am J Gastroenterol.* 2006;101:812-22.