Comparative Effectiveness of Lactobacillus Reuteri Supplementation in Eradicating Helicobacter Pylori Infection: a Meta-Analysis of Randomized Controlled Trials

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INTRODUCTION

Helicobacter pylori (H. pylori) infection is a worldwide disease causing many disease. The rate of H. pylori eradication therapy declined in recent decades owing to the escalating antibiotic resistance. Thus, it is needed to apply new agents to improve the efficacy of H. pylori eradication. Lactobacillus reuteri (L. reuteri) have been demonstrated to reduce H. pylori bacterial load and suppress the binding of H. pylori to gastric epithelialium.

AIM

The aim of our research is to explore the effectiveness of L. reuteri supplementation for helping H. pylori eradication.

METHOD

A systematic search of studies on L. reuteri for combination in H. pylori eradication was conducted up to December, 2020. Our investigations were limited to randomized controlled trials (RCTs). The odds ratio of H. pylori eradication rate of L. reuteri supplementation versus placebo was treated as the primary outcome, whereas the standardized mean difference (SMD) of gastrointestinal symptom rating scale (GSRS) of L. reuteri supplementation versus placebo after the end of H. pylori eradication comprised the secondary outcome.

RESULTS

The meta-analysis included eight randomized controlled trials comprising 511 participants in total (Table 1). The pooled odds ratio of H. pylori eradication rate in the L. reuteri supplementation arm compared with the placebo arm was 1.55 (95% confidence level [CI]: 1.03 to 1.55, $p=0.037$), indicating a improvement in L. reuteri for combination in H. pylori eradication. The quantitative analysis showed a significantly lower GSRS of L. reuteri supplementation versus placebo after the end of H. pylori eradication (SMD: -0.83; 95% CI: -1.15 to -0.51, $p=0$).

Table 1. Clinical features of the included studies

Study	Age	Total cases (exp/cont)	H. pylori infection diagnosis (initial/rechecking)	Eradication regimen (duration)	Lactobacillus Reuteri (duration)	Follow-up time	%Eradication (exp/cont)	Gastrointestinal Symptom Rating Scale (exp/cont)
Lionetti E (2006)	Children (3.3–18 years)	40 (20/20)	Histology, RUT, 13C-UBT/13C-UBT	Sequential therapy (10 days)	L. reuteri ATCC 55730 2x10⁸ CFU/day (20 days)	8 weeks	85%/80%	3.2±2/5.8±3.4
Francavilla R (2008)	Adults (35–68 years)	40 (20/20)	Histology, RUT, 13C-UBT, HpSA/13C-UBT, HpSA	Sequential therapy (10 days)	L. reuteri ATCC 55730 10⁸ CFU/day (28 days)	4 weeks	88%/82%	7.9±4.1/9.7±8.7
Scaccianoce G (2008)	Adults (19-71 years)	33 (17/16)	Histology/	Standard triple therapy (7 days)	L. reuteri ATCC 55730 2x10⁸ CFU/day (7 days)	4-6 weeks	53%/62%	NA
Ojetti V (2012)	Adults (18-65 years)	90 (45/45)	13C-UBT/13C-UBT	Standard triple therapy (7 days)	L. reuteri ATCC 55730 3x10⁸ CFU/day (2 weeks)	6 weeks	80%/62%	NA
Emara MH (2014)	Adults (18–60 years)	70 (35/35)	Histology, RUT, HpSA/13C-UBT	Standard triple therapy (14 days)	L. reuteri DSM 17938 and ATCC PTA 6475 2x10⁸ CFU/day (4 weeks)	4 weeks	74.3%/65.7%	4.8±2.4/9.0±5.3
Francavilla R (2014)	Adults (18-65 years)	88 (44/44)	Histology, RUT, 13C-UBT/13C-UBT	Standard triple therapy (7 days)	L. reuteri DSM 17938 and ATCC PTA 6475 2x10⁸ CFU/day (96 days)	8 weeks	75%/65.9%	4±3.1/6.8±2.9
Shahraki T (2016)	Children (5–14 years)	50 (25/25)	Histology, HpSA/13C-UBT	Standard triple therapy (14 days)	L. reuteri DSM 17938 and ATCC PTA 6475 10⁸ CFU/day (4 weeks)	4 weeks	88%/76%	NA
Poonyam P (2019)	Adults (18-65 years)	100 (50/50)	Histology, RUT, Culture/13C-UBT	Bismuth containing quadruple therapy (7-14 days)	L. reuteri DSM 17938 and ATCC PTA 6475 2x10⁸ CFU/day (7-14days)	4 weeks	82%/80%	NA

CFU colony-forming unit; HpSA H. pylori stool antigen test; RUT rapid urease test; 13C-UBT 13C-urea breath test; Exp/cont experiment/control

Figure 1. Eradication rates with or without L. reuteri.
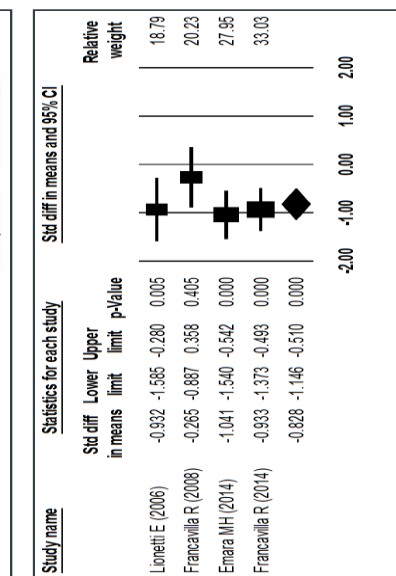
Figure 2. Gastrointestinal symptom rating scale with or without L. reuteri.

CONCLUSIONS

Lactobacillus reuteri supplementation significantly give a rise to the improvement of H. pylori eradication therapy and reduce the incidence of gastrointestinal symptoms.
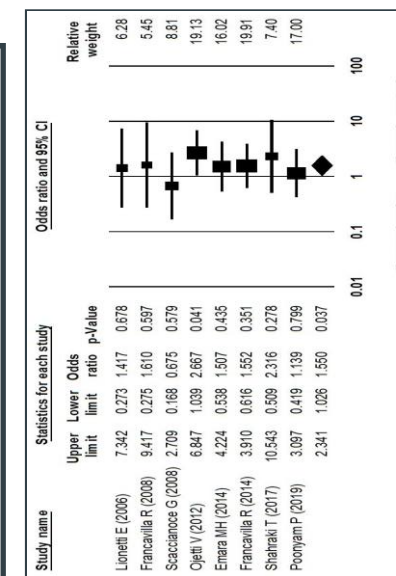
REFERENCES

1. Yu M et al. Efficacy of Lactobacillus-supplemented triple therapy for H. pylori eradication: A meta-analysis of randomized controlled trials. PLoS One. 2019 Oct 2;14(10):e0223309
2. Shavakhi A, et al. The effects of multistrain probiotic compound on bismuth-containing quadruple therapy for Helicobacter pylori infection: a randomized placebo-controlled triple-blind study. Helicobacter. 2013; 18:280–84.
3. Yang YJ, et al. Lactobacillus acidophilus ameliorates H. pyloriinduced gastric inflammation by inactivating the Smad7 and NFkappaB pathways. BMC Microbiol. 2012; 12: 38.

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