

Clinical Study on Probiotics Combined with Quadruple Therapy for Drug-Resistant *Helicobacter pylori* Infection

Wenyuan Yang*

Faculty of Medicine, University of Cyberjaya, Cyberjaya, Malaysia

Email address:

2112-4728@st.cyberjaya.edu.my (Wenyuan Yang)

*Corresponding author

Abstract

Helicobacter pylori (*H. pylori*) is one of the most prevalent chronic bacterial infections worldwide, affecting approximately 4.4 billion people (nearly 50% of the global population), and has been classified as a Group I carcinogen for gastric cancer by the World Health Organization; however, the rising antibiotic resistance of this pathogen has seriously compromised the efficacy of conventional eradication regimens, with clarithromycin and levofloxacin resistance rates in China reaching 50.83% and 47.17%, respectively, and the eradication rate of traditional therapy declining from over 80% to below 60%. This review aims to systematically evaluate the efficacy of probiotics combined with bismuth-containing quadruple therapy for drug-resistant *H. pylori* infection and to clarify the underlying regulatory mechanisms and optimal clinical strategies. Evidence was synthesized from published multicenter randomized controlled trials and epidemiological surveillance data, covering more than 20 studies with over 5,000 cases, together with mechanistic analyses of probiotic actions including competitive colonization, secretion of antimicrobial metabolites, interference with quorum sensing, and modulation of host immunity and intestinal microecology. The results showed that the eradication rate of the probiotic-combined group reached 94%–97.62%, markedly higher than the 72%–80.95% observed with quadruple therapy alone, while the incidence of adverse reactions decreased from 19.05% to 4.76%, with particular benefits in children, elderly patients, and those who failed initial treatment. Probiotics improved eradication rates by approximately 10%–20%, and multi-strain composite preparations administered at 10^9 – 10^{10} CFU daily for 10–14 days, separated from antibiotics by at least 2 hours, were associated with the best outcomes. In conclusion, probiotic-supplemented quadruple therapy significantly improves eradication, reduces adverse effects, and enhances treatment adherence and quality of life in drug-resistant *H. pylori* infection, representing a promising optimization of current eradication strategies, although standardized strains, dosages, and treatment courses together with long-term safety data from high-quality trials remain urgently needed.

Keywords

Helicobacter Pylori, Probiotics, Eradication Therapy