

Review: *Lactobacillus* is safe and effective for treating children with acute infectious diarrhea

Van Niel CW, Feudtner C, Garrison MM, Christakis DA. *Lactobacillus* therapy for acute infectious diarrhea in children: a meta-analysis. *Pediatrics*. 2002 Apr;109:678-84.

QUESTION

In children with acute infectious diarrhea (ID), is treatment with *Lactobacillus* safe and effective for improving clinical outcomes?

DATA SOURCES

Studies were identified by searching MEDLINE, EMBASE/Excerpta Medica, the Cochrane Controlled Trials Register, DARE, and CINAHL from 1966 to 2000, and AMED, MANTIS, the Complementary and Alternative Medicine Citation Index, and AltHealthWatch from 1985 to 2000. Search terms used were diarrhea, gastroenteritis, or rotavirus combined with competitive inhibition, *Lactobacillus*, probiotic, yogurt, or yoghurt. Bibliographies of relevant papers were scanned, and key investigators were contacted.

STUDY SELECTION

Randomized controlled trials (RCTs) were selected if they involved *Lactobacillus* treatment of ID in children, clinical outcomes were reported, the treatment group received *Lactobacillus* and the control group received a

suitable placebo, the *Lactobacillus* and control groups were indistinguishable, and data assessors were blinded to participant treatment group. Studies in which patients had recently received antibiotics were excluded.

DATA EXTRACTION

Data were extracted on study and participant characteristics, strain of *Lactobacillus*, definition of diarrhea, infectious pathogens, adverse effects, and such outcomes as duration and frequency of diarrhea.

MAIN RESULTS

26 studies were identified, and 9 studies were included. 8 studies involved only hospitalized children. In all 9 studies, children received at least oral rehydration solution in addition to *Lactobacillus* or control. Meta-analysis showed that children who received *Lactobacillus* had a shorter duration (mean reduction 0.7 d, 95% CI 0.3 to 1.2 d; 7 studies) and less frequent diarrhea on day 2 (mean reduction in number of stools 1.6/d, CI 0.7 to 2.6/d; 3 studies) than did those who received a control intervention.

Subgroup analyses showed that *Lactobacillus* reduced the duration of diarrhea more than did control interventions in 5 studies done in developed countries (mean reduction 0.8 d, CI 0.1 to 1.5 d), in 6 studies that used only live *Lactobacillus* preparations (mean reduction 0.8 d, CI 0.3 to 1.3 d), and in studies that included children with ID of all causes (not just rotavirus) (mean reduction 0.5 d, CI 0.1 to 1.0 d). Adverse reactions consistent with signs and symptoms of ID were generally similar in children who received *Lactobacillus* and those who received a control intervention.

CONCLUSION

In children with acute infectious diarrhea, treatment with *Lactobacillus* is safe and effective for reducing the duration and frequency of diarrhea.

Source of funding: Agency for Health Care Research and Quality.

For correspondence: Dr. C.W. Van Niel, University of Washington, Seattle, WA, USA. E-mail cvanniel@u.washington.edu. ■

COMMENTARY

The use of probiotics is well-accepted. Although the exact mechanism by which this treatment accelerates recovery from infectious diarrhea is not known, its use is medically sound. In this meta-analysis by Van Niel and colleagues, treatment with *Lactobacillus* is effective for accelerating the recovery from infectious diarrhea. The effect size was a decreased duration of diarrhea of 0.7 days and a reduction of 1.6 stools on day 2 of treatment.

Because the estimates of the effect of *Lactobacillus* therapy are statistically significant, should we use *Lactobacillus* regularly in treating gastroenteritis in children? Several considerations should be made before accepting a universal recommendation based on the results of this meta-analysis. It is important to note that different types of lactobacilli may have different effect sizes. Furthermore, Van Niel and colleagues combined the results of *Lactobacillus* GG, *L. reuteri*, *L. acidophilus*, and *L. bulgaricus*, which may not be appropriate. Marked differences exist in the amounts of bacteria given to patients in different trials, in the different preparations of *Lactobacillus*, and in the amounts that are commercially available in different food products. In this meta-analysis,

a clear dose-response relationship was found. Thus, in practice, doses should contain $\geq 10^{10}$ colony-forming units of *Lactobacillus* and be given ≥ 2 times daily.

Van Niel and colleagues concluded that *Lactobacillus* is safe when given to children with diarrhea. However, only 391 patients were exposed to *Lactobacillus* in the studies included in this meta-analysis. In the elderly, individual cases of serious infections caused by *Lactobacillus* have been reported (1). I would agree with Van Niel and colleagues that the studies available so far are encouraging, but more data are needed before a universal recommendation of the use of *Lactobacillus* can be made.

*Matti Uhari, MD, PhD
University of Oulu
Oulu, Finland*

References

1. Rautio M, Jousimies-Somer H, Kauma H, et al. Liver abscess due to a *Lactobacillus rhamnosus* strain indistinguishable from *L. rhamnosus* strain GG. *Clin Infect Dis*. 1999;28:1159-60.