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

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

QUESTION: In children with acute infectious diarrhoea (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 1985–2000. Search terms used were diarrhoea, 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

Randomised 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 diarrhoea, infectious pathogens, adverse effects, and such outcomes as duration and frequency of diarrhoea.

Main results

26 studies were identified, and 9 studies were included. 8 studies involved only hospitalised 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 diarrhoea 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 diarrhoea 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 diarrhoea, treatment with *Lactobacillus* is safe and effective for reducing the duration and frequency of diarrhoea.

COMMENTARY

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

Because the estimates of the effect of *Lactobacillus* treatment 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 *et al* 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 *et al* concluded that *Lactobacillus* is safe when given to children with diarrhoea. 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 *et al* 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.

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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.

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