Localicio, Mónica; González, Silvia; Apella, María C.; Bru de Labanda, Elena; Oliver, Guillermo

Probiotic bacteriotherapy in chronic infantile diarrhea

Interciencia, vol. 27, núm. 7, julio, 2002, pp. 365-368

Asociación Interciencia
Caracas, Venezuela

Available in: http://www.redalyc.org/articulo.oa?id=33907005
PROBIOTIC BACTERIOTHERAPY IN CHRONIC INFANTILE DIARRHEA

Mónica Locascio, Silvia González, María C. Apella, Elena Bru de Labanda and Guillermo Oliver

SUMMARY

A probiotic therapy based on the administration of a dairy product containing Lactobacillus casei and Lactobacillus acidophilus was used against chronic diarrhea of 170 infants aging from 4 months - 4 years. The mean period during which the children suffered from diarrhea before the start of the probiotic treatment was of about 50 days. After 4 days of therapy the clinical symptoms had been eliminated. Until the end of the study none of the patients suffered a relapse. Bacterial counts in the feces suggested that the probiotic lactobacilli had restored the normal intestinal lactobacillus flora. The fermented product tested in this work can be considered a beneficial food.

Introduction

Good health implies an equilibrium between bacterial populations in the gastrointestinal tract. Disturbance of this equilibrium will lead to intestinal disorders (Gebbers and Laiuse, 1982) e.g. diarrhea. For three decades, members of the German Medical Association for Microbiological Therapy have used vaccines prepared with bacteria from common human flora as a therapeutic measure in chronic and recurrent infections. The main indications for this kind of therapy were catarrhal infections of the respiratory system, intestinal disorders, allergies and skin diseases as well as several less well-defined syndromes (Rusch et al., 1980). However, for a long time, starting at the end of the nineteenth century (Metchnickoff, 1907) lactobacilli, e.g. Lactobacillus casei and Lactobacillus acidophilus, are known to inhibit growth of pathogenic intestinal bacteria and therefore they are considered to be potential biotherapeutic agents against pathogens (González et al., 1993; Apella et al., 1992, Romero et al., 1990). Protective immunity is suggested to arise from intestinal mucosa (Nader de Macías et al., 1992, 1993). Only after the pathogen overcomes the non-specific host defense mechanisms, specific host defense mechanisms are activated and will produce antibodies, mainly IgA's (Perdigón et al., 1992). L. casei is able to stimulate phagocytosis both by the cell wall and the peptidoglycan, whereas it does not...
Producen cambios en IgA. L. acidophilus, en el otro lado, produce un aumento en los niveles de IgA sin modificar la inmunidad (Mora de Ambrosini et al., 1998). Un extraestromal lectina-like substance es caracterizado en L. casei, cuando se extracta, no se ve una interacción con el sistema inmunológico caracterizado en L. casei, cuando se cultiva. En este trabajo se seleccionaron niños con diarrea crónica, a los que se les administró un producto lácteo fermentado con L. casei. Los resultados obtenidos sugirieron que los lactobacilos probióticos habían normalizado la flora láctica intestinal. El producto lácteo fermentado en este trabajo puede ser considerado un alimento beneficioso.
Statistical analysis

Significant differences were tested using the Tukey HSD-test (Minitab Student R12; Rossman and Chance, 1998).

Results and Discussion

The data obtained from sequential ingestion of fermented milk by children (0-4 years old) suffering chronic diarrhea are presented in Figure 1. Lactobacillus counts in feces began before the first administration of fermented milk and are shown in Figure 1a. Lactobacillus concentrations obtained during and after probiotic treatment are shown in Figures 1b and 1c respectively. Since long-term probiotic therapy with rather high concentrations of lactobacilli might change the intestinal microflora, lactobacilli in feces were counted. Before therapy more intensively showed counts of 10^4 and 10^6 lactobacilli/g (Figure 1a). By day 7 after the first supplementation period, the frequency peak was highest at fecal counts of 10^7 lactobacilli/g (Figure 1b). These data confirm that at least a part of the ingested lactobacilli pass the stomach. At the 8th day after the completed therapy the frequency peak was highest at fecal counts of 10^9 lactobacilli/g (Figure 1c). These results strongly suggest that in general the probiotic lactobacillus flora has restored the normal levels of lactobacillus flora. The presence of lectin-like substances in bacteria of the genus Lactobacillus has been rarely reported (Morata de Ambrosini et al., 1997; Mukai et al., 1992). These substances would play a critical role in the bacterial attachment to the gastrointestinal epithelium, and under these conditions the immune stimulation would be enhanced.

The mean period during which the infants suffered diarrhea just before the beginning of the probiotic treatment was of 51 ±33 days (N= 170; range 30-200 days). In all infants the probiotic therapy was very effective, since clinical symptoms were eliminated within the first period with probiotic supplementation. The therapeutic effect was seen after 4.1 ±1.6 days (N= 170; range 2-7 days). These results agree largely with those of Rusch et al. (1982), who proved the safety and efficacy of probiotic therapy in numerous case-reports. After the probiotic therapy till the end of this study none of the patients suffered again from diarrhea. This post-therapy period ranged from 34 days (last patient) to 630 days (first patient) with a median of 250 days. This observation could be explained by the remaining immune stimulating effect found, for both whole cells and cell walls of L. casei, after oral administration (Perdigón et al., 1992; Morata de Ambrosini et al., 1998).

Univariate repeated measure (F-test) was 90.43 and its related significance's probability was p=0.9·10^{-15}. Since the F-test was strongly significant, multiple comparisons (Tukey HSD-test) were used to determine the statistical significant differences between measures performed before, during and after treatment. Statistical significant differences were found between a) during and before treatment (p=0.2·10^{-4}) and b) after and before treatment (p=0.2·10^{-4}). No significant differences were found between after and during treatment (p=0.47). So, mean initial lactobacillus flora differs significantly from the mean flora during or after probiotic bacteriotherapy.

Some patients with high initial lactobacillus counts (up to 10^6-10^7 UFC/g) also showed chronic diarrhea. Probably in these patients physiological deficiencies of the small bowel were involved; nevertheless, the positive probiotic effect in these patients is not well understood. The effectiveness of the therapy may be explained on the basis of adhesion and immunologic properties of our lactobacilli. The binding of the lectin-like structures to specific carbohydrates would explain the adhesion phenomenon of lactobacilli to epithelial cells (Morata de Ambrosini et al., 1997). The hypothesis that these bacteria stimulate immune activities is justified by the results of well-controlled animal studies (Romero et al., 1990; Perdigón et al., 1992). Perdigón et al. (1998) demonstrated that feeding mice with L. casei, L. acidophilus or a mixture of both strains, produce a remarkable immunostimulatory effect on the host, both on the lymphocytic and reticuloendothelial systems. Production of secretory IgA is important because it constitutes the first line of defense against microbial pathogens (Tomasi and Bienenstock, 1968; Tomasi et al., 1980).

The results presented, together with those obtained in previous studies using the same probiotic product in order to prevent diarrhea (González et al., 1990) or to treat diarrhea due to post-gastroenteritis syndrome (González et al., 1995), show that levels of 10^6 lactobacilli/g feces strongly contribute to immunization (Mayr et al., 1979). Our probiotic therapy confirms that daily consumption of high amounts of viable microorganisms alters the intestinal environment (Zoppi et al., 1982). A successful probiotic ought not only to enhance the immune response, but also to be free from adverse side effects. Although further research is needed to elucidate the mechanism by which L. casei and L. acidophilus eliminate infantile diarrhea, clinical applications of our oral probiotic dairy product are possible.
ACKNOWLEDGMENTS

This work was supported by the National Research Council of Argentina, grants from CIUNT (D-220) program and from a SanCor-Cerela-Conicet joint venture.

REFERENCES


Apella MC, González SN, Nader de Macías ME, Romero NC, Oliver G (1999) Inhibition of enteropathogenic *E. coli* strains by fermented milk containing *Lactobacillus casei*. *J. Food Prot.* 62: 132-133.


