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The Effect of Probiotic Lactobacillus Reuteri on Reducing the Period of Restlessness in Infants with Colic

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ABSTRACT

BACKGROUND AND OBJECTIVE: Abdominal colic during infancy is a common complaint of parents within the first three months after the child's birth. As the intestinal microflora in these infants is different from non-colic newborns, we aimed to determine the effects of probiotics on the balance of intestinal microflora and reducing restlessness in infants with colic.

METHODS: This randomized clinical trial was performed on 44 breastfed infants (20-60 days old), with a birth weight of > 2500 g, suffering from colic, based on Wessel's definition. These infants received 1-5 drops of placebo (label 1) per day for five consecutive days. Afterwards, they were administered 2-5 drops of Lactobacillus reuteri (label2) (17938 DSM) per day for 14 consecutive days. The parents were contacted twice on a daily basis and the duration of cramps and restlessness in infants was recorded and evaluated (IRCT=2014012713489).

FINDINGS: Among 44 infants, 36 cases completed the study. The mean period of restlessness after 5 days of receiving placebo and L. reuteri was 275±142.8 and 172±88.3 min, respectively ($p<0.001$). Also, after 14 days of L. reuteri administration, the mean period of restlessness was 106±53.67 min.

CONCLUSION: The results showed that probiotic L. reuteri reduced crying and restlessness duration in infants with colic.

KEY WORDS: *Lactobacillus, Lactobacillus Reuteri, Colic, Infant Colic, Probiotic..*

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Introduction

Abdominal colic duringinfancy is a common complaint of parents within the first three months after the child's birth. According to previous research, the prevalence of colic has been estimated at 5-19%; however, in some studies, which applieddifferent methods, the prevalence rate has been estimated at 40-50% (1,2).

Moreover, according to a previous study in Iran, the incidence rate of colic was calculated to be20% (3). Infant colic syndrome was first defined in 1954 by Wessel as severe, persistent crying and restlessness, associated with facial flushing, lasting at least three hours per day, three times a week withinthree weeks to three months after birth (4,5). Some evidence suggests that gas-producing organisms are greater in number in the intestine of infants with colic. Moreover, some alterations occur in theintestinal microbial balancein these infants (6-8). Researchers have used probiotics to balance the intestinal flora ofinfants suffering from colic. In fact, probiotics can be used to stimulate systemic and mucosal immunity in the host intestine (9, 10).

Therefore, in recent years, particular attention has been paid to the treatment of digestive problems by probiotics. Lactobacillus reuteri (L. reuteri) is the most common microorganism, used in probiotic treatments. Common probiotics include L. delbrueckii, bulgaricus, L. acidophilus, L. casei, L. fermentum, L. plantarum, L. brevis, L. lactis, and L. reuteri (11). L. reuteriis one of the endogenous Lactobacillus species, inhabiting the human gastrointestinal tract. This substance has been used for many years as a probiotic in dietary supplements for adults. Recent studies have demonstrated that long-term use of these supplements can be beneficial and safe for infants, as well (12).

The results of a previous study showed that L. reuteri possesses inhibitory effects on visceral pain and reduces inflammation byincreasing visceral hypersensitivity through the enteric nerves (13). The aim of this study was to evaluate the effect of probiotic L. reuterion periods of restlessnessin infants suffering from colic.

Methods

This clinical trial (IRCT: 2014012713489)was conducted on 44 breast-fed infants (aged 20-60 days, weight > 2500g), with complaints of crying and restlessness indicating colic, based on Wessel's criteria (4).Based on the clinical evaluation, these infants had no history of underlying medical diseases and had not used antibiotics or anti-colic medicines during the study period. Also, for the purpose of screening, urinary infections, which cause restlessness, were assessed via urinary analysis.

The infants received 1-5 drops of placebo(label 1) per day for five consecutive days. Afterwards, they were administered 2-5 drops of L. reuteri (label 2) (17938 DSM, made by BioGaia Co.) per day for 14 consecutive days. The parents were contacted twice on a daily basis and the duration of cramps and restlessness in infants was recorded and evaluated. For data analysis, parametric t-test was performed, using SPSS. $p<0.05$ was considered statistically significant.

Results

Among 44 infants, 7 cases were excluded from the study due to the parents' lack of consent and development of bronchiolitis, leading to hospitalization (one case). Finally, 36 infants remained in the study. In total, 26 newborns (72.2%) were male and 10 infants (27.8%) were female. The mean age of infants at the beginning of the study was 35.78 ±10.98 days (range of 20-55 days) (table 1). The mean period of restlessnessin infants was 274±142.8 min after five days of receiving placebo and 172±88.3 min afterfive days of receiving L. reuteri ($p<0.001$). Also, after 14 days of treatment with probiotic L. reuteri, the period of restlessnesswas 106.93±53.67 min. During the administration of probiotic solution, there was no

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significant correlation betweenthe period of agitation and neonatal/maternal demographic characteristics such as infant's gender, weight at the time of study, mother's educational level (e.g., less than high school diploma or higher), mode of delivery (i.e., cesarean section and vaginal delivery) and maternal parity (i.e., multiparityor primiparity) (table 2).

Table 1. Demographic characteristics of the studied infants (N=36)

The studied variables		Mean±SD
Age (day)		35.78±10.98
Maternal parity		1.5±0.56
Gender N(%)	Male	26(72.2)
	Female	10(27.8)
Mode of delivery N(%)	Vaginal delivery	10(27.8)
	Cesarean section	26(72.2)
Mother's educational level N(%)	Less than high school diploma	8(22.2)
	High school diploma or higher	28(78.8)

Table 2. Comparison of the period of restlessness, based on subjects'demographic characteristics while usingthe medicines

The studied variables		Period of agitation Mean±SD	P-value
Gender	Female	116.43±60.56	0.1
	Male	113.15±57.11	
Mother's education	< High school	84.95±26.47	0.54
	High school ≥	122.38±61.17	
Maternal parity	Primiparous	108.45±62.70	0.54
	Multiparous	120.33±51.6	
Mode of delivery	Vaginal delivery	113.20±45.16	0.95
	Cesarean section	114.39±62.05	

Discussion

This study showed that five days after receiving the probiotic solution, the agitation time significantly reduced in infants with colic,as compared to the beginning of the study. Since the case and control groups were identical in this study, the effects of maternal diet, allergy to cow's milk protein, socioeconomic status and infant home-care were minimized. Also, by shortening the period of receiving placebo and L. reuteri, the effect of time on the process of colic was minimized. In this regard, Savino et al.compared the use of simethiconeand probiotic L. reuteriin infants with colic and showed that probiotics have a greater impact on colic symptoms in infants (14). A study by Anabreeset al. also showed that breastfedinfants with colic can benefit from the positive effects of probiotic supplements (15).

Moreover,Sarvino et al. introduced certain strains of L. reuteri (strains 55730 and 17938 DSM) as useful therapeutic agents. It should be mentioned that the 55730 strain wasused as oral drops, with a dosage of 5-10 drops every three days fora period of 20 days(16, 17). The mechanism leading to the reduced period of restlessnessby the use of L. reuteri supplements ininfants with colic may be related tothe negative effects of this probioticon the growth of intestinal pathogenic bacteria, which may play a role in the presentation of colic. In this regard, Jones et al. showed that Lactobacillus can lead to the synthesis of cytokines and reuterinas anantimicrobial compound (18); this effect had been also reported by Christensen (19).

Contrary to the results reported in this study, Sung et al. evaluated the effectsof Lactobacillus and placebo drugson the treatment of colic in a randomized trial.The results showed that during one month of treatment, the probiotic group was restless 49 min longer than the placebo group (20). In conclusion, the results of the present study suggest that L. reuterisolution can reduce the period of agitationin infants with colic.However, further research is required on this subject

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