Clinical Study of Lactase Additives in the Treatment of Lactose Intolerance in Preterm Infants

Yun (Duveronica) Zhang
Gao Cheng District People's Hospital, Shijiazhuang, Hebei, China

Abstract: Objective: to investigate the clinical effect of lactase additive in the treatment of lactose intolerance (LI) in preterm infants. Methods: 100 cases of preterm infants with LI admitted to our hospital from August 2023 to June 2024 were selected and randomly divided into the control group (n = 50) and observation group (n = 50). The control group was treated with normal breast milk, and the observation group was treated with lactase additive on the basis of the control group. The clinical symptoms, developmental status, levels of nutrition adverse reactions of the children in the two groups were compared. RESULTS: After 2 weeks of treatment, the incidence of abdominal distension, diarrhea, and spitting up in the observation group was lower than that in the control group, and the increase in body mass, growth in length, and growth in head circumference was higher than that in the control group ($P < 0.05$). After 2 weeks of treatment, the serum calcium level of both groups was higher than that before treatment, and the serum AKP level was lower than that before treatment ($P < 0.05$). During the treatment period, no obvious adverse reactions occurred in both groups of children. CONCLUSION: Lactase additive is effective in the treatment of LI in preterm infants, which can significantly alleviate the clinical symptoms of lactose intolerance, promote their growth and development, and has a high level of safety, which is worthy of clinical popularization and application.

***Keywords*:** Lactase additive; Probiotics; Preterm infants; Lactose intolerance;

1. Introduction

The use of lactase additives in the treatment of preterm infants is still in the exploratory and validation stage, and many key nodes, such as clinical efficacy, optimal dosage, and safety considerations, need to be overcome. It is urgent to conduct rigorous and systematic clinical research, which can not only fill the gap of evidence in this field and provide a scientific basis for precise clinical treatment, but also build a solid theoretical and practical foundation for the innovation of nutritional management strategies for preterm infants, which is expected to improve the prognosis of thousands of preterm infants and escort their healthy growth[1].

2. Information and Methods

2.1 General information

One hundred cases of LI (lactose intolerant) preterm infants admitted to our hospital from August 2023 to June 2024 were selected as the study subjects, and they were equally divided into the control group and the observation group according to the method of randomized numerical table, with 50 cases in each group[2].

LI diagnostic criteria: All the enrolled children were diagnosed according to the established diagnostic process of lactose intolerance in our hospital, and the diagnostic criteria of lactose intolerance was determined by hydrogen breath test, combined with the typical gastrointestinal symptoms such as abdominal distension, diarrhea, and intestinal hyperpronunciation after breastfeeding. The minimum gestational age of the children in the control group was 28 weeks and the maximum was 34 weeks, with an average gestational age of 33.37±0.12 weeks; the gestational age of the children in the observation group ranged from 29 weeks to 34 weeks, with an average gestational age of 33.45±0.15 weeks. Further breakdown of the gestational age distribution showed that in the control group, there were 5 children with a gestational age of 28-30 weeks, 17 children with a gestational age of 31-32 weeks, and 28 children with a gestational age of 33-34 weeks, while in the observation group, there were 6 children with a gestational age of 29-30 weeks, 16 children with a gestational age of 31-32 weeks, and a total of 28 children with a gestational age of 33-34 weeks.

2.2 Treatment Programs

Control group: The preterm infants in the control group were fed with the usual feeding program, giving special formula for preterm infants or breast milk, without adding lactase additives. According to the feeding guideline for preterm infants,

the initial feeding amount is determined according to the gestational age, weight and age of the child, usually starting from a small amount and gradually increasing slowly, for example, for preterm infants with a birth weight of 1000-1500g, the initial feeding amount is about 1-2 ml/kg, every 2-3 hours, and then increase by 1-2 ml/kg per day according to the tolerance condition, and monitor the infants' vital signs, feeding tolerance condition (including lactase additives) closely in the process of feeding.

Observation group: The preterm infants in the observation group were added lactase additive on the basis of regular feeding. Pawiso lactase drops were selected. The lactase additive was mixed evenly into each milk according to the prescribed dosage (determined according to the amount of milk of the children, generally 0.25mL of lactase was added to every 100 ml of milk), and then stirred thoroughly and mixed well, and then fed to the children when the temperature of the milk was suitable (about 37℃), to ensure that the lactase enzyme could play its full role[3].

2.3 Observation indicators

2.3.1 Clinical symptoms

Clinical symptoms are the most intuitive way to reflect changes in the condition of preterm infants with lactose intolerance, and it is important to closely monitor the three key indicators of bloating, diarrhea, and spitting up. Prior to the start of treatment, the healthcare team needed to record the symptoms of the two groups of preterm infants in a comprehensive and detailed manner. In the case of abdominal distension, a professional nurse will use a soft ruler to gently encircle the most distended area of the child's abdomen early in the morning while the child is fasting and lying down, measuring the circumference of the abdomen to the nearest millimeter and feeling the abdominal tension by palpation.

2.3.2 Developmental status

The growth and development status of preterm infants is the core element to measure the advantages and disadvantages of the treatment program, and the three indicators of body mass, length, and head circumference can be called the “development barometer”. The collection of basic data before treatment needs to be careful and prudent. Body mass measurement is done with a strictly calibrated electronic scale for infants with an accuracy of 0.1g, which is measured early in the morning after the child has fasted, urinated and defecated, and the measurement ensures that the surface of the scale is stable and the child's body position is natural and stretches out.

2.4 Statistical methods

The SPSS25.0 statistical software package was utilized to process the data. Measurement data that were normally distributed were expressed as mean ± standard deviation ($x \pm s$), and independent samples t-test was used for comparison between the two groups; count data were presented as rate (%), and χ^2 test was used for comparison between the groups.

3. Results

3.1 Clinical symptoms

After 2 weeks of treatment, the incidence of abdominal distension, diarrhea, and vomiting in the observation group was lower than that in the control group ($P < 0.05$). See Table 1.

Table 1: Comparison of clinical symptoms between the two groups

Groups	n	bloat		diarrhoea		vomit	
		Before Treatment	After 2 weeks of treatment	Before Treatment	After 2 weeks of treatment	Before Treatment	After 2 weeks of treatment
Observer group	50	23(61.78)	6.4(21.45)	15.9(43.68)	2.9(7.33)	19(54.29)	2.98(6.34)
control group	50	22(59.92)	14，7(42.86)	13.67(41.22)	11.8(27.12)	20(57.14)	7.9(21.21)
t	0.055	4.242	0.156	5.321	0.177	3.167	
P	0.756	0.024	0.529	0.028	0.590	0.023	

3.2 Developmental status

After 2 weeks of treatment, the increase in body mass, length growth and head circumference growth of the observation group were higher than those of the control group ($P<0.05$). See Table 2.

Table 2: Comparison of the developmental status of the two groups

Groups	n	Increase in body mass (g)	Length Increase (cm)	Head circumference growth (cm)
Observer group	50	245.10±13.27	2.34±0.19	0.88±0.35
control group	50	234.43±19.08	2.05±0.22	0.77±0.25
t	7.124	3.478	2.210	
P	0.032	0.065	0.019	

4. Discussion

Lactose is absorbed in the intestine after being broken down by lactase into glucose and galactose, which is an important component of the glycolipids that make up the brain and neural tissues, and is of key significance to the neurological development of preterm infants. Retention of undigested lactose in the intestine can lead to changes in intestinal osmolality, reducing the absorption of other nutrients and affecting the overall nutritional status of preterm infants. In this study, the addition of lactase additives can help the decomposition and absorption of lactose, maintain the normal osmotic pressure in the intestinal tract, and create favorable conditions for the absorption of nutrients, thus indirectly promoting the growth and development of preterm infants.

References

[1] CHA Xinyi, WANG Yiwen, MAO Pengliang, et al. Effectiveness and safety of lactase additives for lactose intolerance in preterm infants: a prospective, multicenter, randomized controlled study[J]. Journal of Clinical Pediatrics,2023,41(01):34-41.

[2] Chang Y-L. Effects of lactase additive-assisted feeding on fecal pH and reducing sugar positivity in lactose-intolerant preterm infants[J]. China Medical Engineering,2022,30(04):134-136.

[3] Yao S .The Value of Yogurt and Its Function in Health Care[C]//Eliwise Academy.Proceedings of the 2nd International Conference on Biological Engineering and Medical Science(part2).North Cross School Shanghai;,2022:7.