The study of early intravenous nutrition therapy in very low birth weight infants

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Abstract: To analyze the clinical effect of early intravenous nutrition therapy for very low birth weight infants. 80 cases of very low birth weight infants referred to our hospital from June 2013 to June 2015 were randomly and evenly divided into two groups. The infants in group A were treated with early intravenous nutrition, while with late parenteral nutrition for those in group B. The intravenous nutrition time, proportion of body weight loss, time consumption for recovery to birth weight and full enteral nutrition and complication rate between the two groups were compared. We found that there were significant differences in the intravenous nutrition time, proportion of body weight loss, and time consumption for recovery to birth weight and full enteral nutrition between the two groups ($P<0.05$). Moreover, the complication rate of group A was 7.5%, which was 17.5% lower comparing with 25.0% in group B ($P<0.05$). Thus, we conclude that early intravenous nutrition therapy in very low birth weight infants is effective and safe and further promotion and application of this therapy is worthy.

Keywords: Early intravenous nutrition, very low birth weight infants, recovery.

INTRODUCTION

Very low birth weight infants are the infants who weigh less than 1500g, have organ hypoplasia and are greatly influenced by various diseases with high mortality (Zhuo *et al*., 2010, Jin, 2012). Very low birth weight infants are less viable, because lacking of intrauterine reserve, poor ability to adapt to the outside world after birth, and high resolution status of the body caused by complications (Beken *et al*., 2014, He *et al*., 2012). In addition, there will be some defects in their brain development. After birth, the neural cells of infants are still in state of growing, nutrition deficiency can cause serious harm to the central nervous system. Therefore, it is essential to improve health and life quality for very low birth weight children through early nutrition provision. In the past, only glucose as an energy source was provided to the infant patients after birth, which could not meet their energy requirements. In recent years, the survival rate of very low birth weight infants increased gradually, which is contributed by the application of nutritional support therapy(Li *et al*., 2015). Due to the organ hypoplasia of very low birth weight infants, nutrition supplement during treatment should be adequate and in time, which plays a pivotal role in the improvement of their prognosis and quality of survival (Vlaardingerbroe *et al*., 2012). Numerous studies showed that intravenous nutrition therapy could supply the energy needed by development and metabolism of very low birth weight infants (Bulbul *et al*., 2012, Tang and Li, 2011). However, some reports indicated that early lacking of nutrition damaged health of the preterm infants irreversibly, which mean that even late nutritional supplement could not improve the physical condition and mental retardation (Yuan, 2015; Chen, 2012).

In our study, very low birth weight infants treated in our hospital from June 2013 to June 2015 were considered as the study objects to analyze the clinical effect of early intravenous nutrition therapy. Regarding associated reports are as follows.

MATERIALS AND METHODS

Ethical approval

This study is conducted according to the standards of Good Clinical Practice and in compliance with local regulations. Oral and written informed consent forms are obtained from the parents of all patients prior to treatment.

The clinical data

From June 2013 to June 2015, a total of 80 very low birth weight infants were referred to the pediatric center of Linyi People's Hospital. All of the infants have no digestive system malformations, cyanotic congenital heart disease and congenital metabolic diseases (Liu, 2016). They were divided into two groups randomly, each group involved 40 cases. There were 24 males and 16 females in Group A, 25 males and 15 females in group B. The value of gestational age, mean age, birth weight and mean weight in group A was 28-34 weeks, (30.2±2.4) weeks, 995-1500g and (1140±220) g, respectively, while that was 28-34 weeks, (30.4±2.2) weeks, 990-1500g and

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Table 1: Comparison of related indicators of the two groups

Indicator	Group A (n=40)	Group B (n=40)	t	p
Intravenous nutrition time (d)	11.2±4.5	15.7±5.2	4.1386	<0.05
Proportion of body weight loss (%)	7.7±1.5	10.6±3.3	5.0598	<0.05
Recovery time to birth weight (d)	8.2±2.4	11.6±3.0	5.5971	<0.05
Recovery time to full enteral nutrition (d)	22.8±5.6	31.5±6.7	6.3013	<0.05

Table 2: Comparison of complications of the two groups

Group	Number of cases	Cholestasis	Hyperbiliru-binaemia	Hyperglycemia	Incidence rate (%)
A	40	1	1	1	7.5
B	40	3	4	3	25.0
x^2	--	--			4.5006
p	--	--			<0.05

(1148±216) g in group B. The clinical data of group A and group B has no significant difference (P>0.05), which indicated comparability.

Methods

Infants in group A were treated with intravenous nutrition within 24h after birth, 20% fat emulsion and 6% pediatric amino acid, which initial dose was 1.5g / (kg• d), and the daily increment was 0.5g / (kg• d) till up to 3.0g / (kg• d). While in group B with about 5%-10% glucose within 3 days after birth and same intravenous nutrition of group A after 3d. The infants without infection and severe asphyxia were in minimal feeding within 24h after birth. The routine gastric catheterization was conducted. And the amount of intravenous nutrition was reduced gradually with increased milk intake. Once oral milk calorie was up to 292.6 kJ / (kg• d), intravenous nutrition provision would be terminated and transited to full enteral nutrition.

Observed indicators

The intravenous nutrition time, proportion of body weight loss, and recovery time to birth weight and full enteral nutrition of the both groups were recorded. Moreover, during parenteral nutrition therapy, complications such as cholestasis, hyperbilirubinemia, hyperglycemia were observed, wherein cholestasis was judged by clinical symptoms of jaundice and lighter stool as well as the criteria of conjugated bilirubin (DBIL) above 26μmol(Jiang *et al*., 2014, Duan and Chen, 2013), and hyperbilirubinemia was determined based on "Pediatrics" diagnostic criteria (Zhang, 2014).

STATISTICAL ANALYSIS

The statistical software SPSS17.0 was used to analyze all the data. The measurement data was presented as mean value ± standard deviation and compared with *t* test. However, if presented as the percentage (%), x^2 test would be adopted. P<0.05 means statistical difference in the comparison.

RESULTS

Comparison of related indicators of the two groups

As shown in table 1, there was significant difference between group A and B of the intravenous nutrition time, proportion of body weight loss and time consumption for recovery to birth weight and full enteral nutrition (P <0.05).

Comparison of complications of the two groups

Table 2 indicated the complication rate of group A was 7.5%, which was lower than that of group B of 25.0%, with significant statistical difference (P <0.05).

DISCUSSION

A large number of studies suggested intravenous nutrition therapy was not only an important way to overcoming inadequate nutritional intake in very low birth weight infants, but also the key act to save lives of very low birth weight infants and improve their life quality. In this study, fat emulsion and amino acids were supplied to very low birth weight infants within 24h after birth, a sufficient amount of intravenous nutrition would be achieved within 72h(Wang *et al*., 2010). During the treatment, nutrient concentration should not be too high, and the liquid volume held within the scope of daily demand; while the calories supply was relatively abundant to reduce body negative nitrogen balance significantly. The results demonstrated after the early intravenous nutrition therapy, intravenous nutrition time and recovery time to birth weight and full enteral nutrition were shorten, and proportion of body weight loss was reduced, which had statistical difference with group B (P < 0.05), suggesting the obvious effect of early intravenous nutrition therapy. In addition, as well as early intravenous nutrition therapy, certain micro milk feeding should be supplied at the same time to very low birth weight infants. The milk supply may promote mature gastrointestinal function and enhanced intestinal tissue and cell development in infants, but also help improve the secretion and activity of gastrointestinal tract enzyme (Zeng *et al*., 2012).

Meanwhile, micro-feeding facilitated the acceptance of intestine nutrition, strengthened gastrointestinal function to shorten the intravenous nutrition time and recovery time to full enteral nutrition The complications such as cholestasis, hyperbilirubinemia, hyperglycemia were observed in both groups after intravenous nutrition therapy, and the complication rate of group A was 7.5%, which was lower than that of group B of 25.0%, with significant statistical difference ($P<0.05$). It can be seen the early intravenous nutrition therapy has a high safety to very low birth weight infants. In this regard, it should be applied in clinic to provide maximum nutrients supply for the very low birth weight infants, in order to improve their health and life quality effectively.

In summary, early intravenous nutrition therapy in very low birth weight infants can availably improve the malnutrition, which has significant effect on reducing the proportion of body weight loss, shortening intravenous nutrition time and recovery time to full enteral nutrition and lowering relevant complication rate. Hence, early intravenous nutrition therapy with high efficacy and safety is considered as an important regimen for very low birth weight infants.

CONCLUSION

According to the data the results above, we conclude that early intravenous nutrition therapy in very low birth weight infants is effective and safe and further promotion and application of this therapy is worthy.

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