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ORIGINAL ARTICLE

Analysis of related factors of transient hypothyroidism in premature infants

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ABSTRACT

Aim: In this paper, the related factors of transient hypothyroidism in premature infants were discussed, the incidence of THOP was observed, and the risk factors were analyzed to guide future work.

Methods: From January 2017 to January 2018, 117 premature infants admitted to neonatology Department of the First Affiliated Hospital of Bengbu Medical College were selected and diagnosed with THOP in 48 cases, including 31 males and 17 females.< 1 500 g 17 cases, 1 500 ~ 2 500 g 70 cases, > 2 500 g 30 cases; Gestational age ≤32 weeks 30 cases, 33 ~ 34 weeks 37 cases, 35 ~ 36 weeks 50 cases.

Results: The incidence of THOP in different gestational age groups was statistically significant (P < 0.05).The incidence of THOP in different weight groups was statistically significant(P < 0.05).The differences of asphyxia, RDS and gestational hypertension in premature infants were statistically significant (P < 0.05), while the differences of intracranial hemorrhage, polycythemia, sepsis and hypoglycemia were not statistically significant (P > 0.05).

Conclusion: Gestational age ≤32 weeks and gestational hypertension were independent risk factors for THOP.

Key words: transient hypothyroidism; correlative factors; premature infants

INTRODUCTION

Transient hypothyroxinemia of prematurity (THOP) is a common condition in premature infants due to immature development, especially transient abnormalities of the hypothalamus-pituitary-thyroid system [1-3].Transient hypothyroidism in premature infants refers to the temporary decrease of tetriodothyronine (T4) and triiodothyronine (T3) in blood, and the normal or decreased level of thyrotropin (TSH) [4].Recent studies have shown that a lack of thyroid hormone during brain development can cause a decrease in intellectual development [5].The screening of congenital hypothyroidism (CH)in newborns has been implemented for many years in China, and there have been legislative provisions, while THOP in premature infants has not been widely recognized in China. In order to understand its morbidity and risk factors, the author summarized the postnatal routine screening of T3,T4 and TSH for premature infants hospitalized in NICU from January 2017 to June 2018, observed the incidence of THOP, and analyzed its risk factors to guide future work.

METHODDOLOGY

A total of 117 premature infants from January 2017 to 2018 admitted to First affiliated hospital of Bengbu Medical University were selected Out of which 48 were confirmed with diagnosis of THOP, including 31 males and 17 females. .< 1500g17 cases, 1500 ~ 2500g70 cases, > 2500g30 cases; Gestational age ≤32 weeks 30 cases, 33 ~ 34 weeks 37 cases, 35 ~ 36 weeks 50 cases.

Random sampling was done: All subjects were sampled 2ml of venous blood on the 7th day after birth, and thyroid function was determined by electrochemical luminescence method. The detection instrument was Roche type 1601 biochemical analyzer, and the reagent was provided by Roche. The reference values for the diagnostic criteria were: blood T4 < 77Noml /L, T3 < 1.3 Noml /L, TSH < 20mU/L.

Statistical method: Chi-square test t-test Logistic regression analysis. All the data were analyzed by SPSS 25.0 statistical software, and the count data were expressed as the number of cases (percentage), and χ^2 test was performed. Measurement data were represented by $\bar{x} \pm s$ and tested by t or Z;P <0.05 indicated that the difference was statistically significant.

RESULTS

Detection rate: A total of 117 premature infants were tested in this study, and THOP positive accounted for 48 cases, with a detection rate of 41.03%.

Correlation between THOP and gestational age: There was a statistically significant difference in the incidence of THOP in different gestational age groups (P < 0.05).The positive rate of THOP at gestational age ≤32 weeks was higher than that of the 33-34 week group and the 35-36 week group, with statistically significant difference (P < 0. 05). The difference in the positive rate

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between the 33-34 week group and the 35-36 week group was not statistically significant (P > 0. 05).See table 1.

Correlation between THOP and birth weight: There was a statistically significant difference in THOP incidence among different weight groups (P < 0.05).The positive rate of THOP in the group < 1 500 g was higher than that in the group 1 500 ~ 2 500 g and ≥2 500 g, with statistically significant difference (P < 0.05). There was no statistically significant difference between 1 500 ~ 2 500 g and ≥2 500 g (P > 0.05).Are shown in table 2.

Univariate anova was performed for each of the possible related factors, and the results showed that there were statistically significant differences in asphyxia at birth, RDS and gestational hypertension (P < 0.05), while there were no statistically significant differences in intracranial hemorrhage, polycythemia, septicemia and hypoglycemia (P > 0.05).See table 3.

Multivariate logistic regression analysis of risk factors for THOP occurrence: Birth weight, gestational age, asphyxia, (Respiratory distress syndrome)RDS, and gestational hypertension were included in the equation. The results showed that gestational age ≤32 weeks and gestational hypertension were independent risk factors for THOP (P < 0.05).See table 4.

Table 1 Relationship between THOP occurrence and gestational age

Gestational age (week)	n	Positive THOP	Incidence rate (%)	Statistical treatment	
				Comparison between groups	χ^2
≤32	30	23	76.67	1：2	12.993
33~34	37	12	32.43	1：3	19.448
35~36	50	13	26.00	2：3	0.430

χ^2=21.546, P=0.000 (＜0.05)

Table 2 Relationship betweenTHOP occurrence and birth mass

Weight (g)	n	Positive THOP	Incidence rate (%)	Statistical treatment	
				Comparison between groups	χ^2
＜1500	17	14	82.35	1：2	12.030
1500~2500	70	25	35.71	1：3	11.902
≥2500	30	9	30.00	2：3	0.306

χ^2=14.342, P=0.001 (＜0.05)

Table 3 The occurrence of THOP is related to various factors

Group	N	Asphyxia	Intracranial hemorrhage	Rds	Polycythemia	Septicemia	Hypoglycemia	Gestational hypertension
normal	69	15	12	10	3	40	5	5
THOP group	48	21	5	16	4	29	7	17
χ^2		6.438	1.109	5.814	0.799	0.070	1.656	14.713
P		0.011	0.618	0.016	0.371	0.791	0.198	0.000

Table 4 Multivariate Logistic regression analysis of THOP children

Variable	B	SE	Wald	P	OR	95% CI
gestational age ≤32 weeks	2.158	0.519	17.250	0.000	3.125	3.125-23.944
gestational hypertension	2.028	0.594	11.640	0.001	2.370	2.370-24.347
constant	-1.305	0.282	21.422	0.000		

Note: Assignment of dependent variable: 0= normal group 1=THOP Group Independent variable is classified variable: birth weight: 0=≥1500, 1= < 1500, gestational age: 0=≥33 weeks, 1=≤32 weeks

DISCUSSION

In recent years, with the rapid development of perinatal medicine and neonatal medicine, the survival rate of premature infants with low birth weight has been significantly increased, and premature infants with transient hypothyroidism have been gradually paid attention to, becoming one of the major endocrine diseases of newborns. Due to thyroid dysplasia in premature infants, especially the immature thalamic-pituitary-thyroid system, the thyroid hormone level in premature infants is lower than that in term infants, and they are prone to temporary hypothyroidism. Thyroxine plays an extremely important role in body metabolism and nervous system development. THOP, although transient, can increase the risk of growth and development, especially developmental defects in the central nervous system. The incidence rate reported abroad is as high as 30% ~ 85% [1,6], and the data in this group show that the incidence rate is 41.03%, which is consistent with the foreign reports. Logistic regression analysis of the data in this group showed that the OR values of neonatal respiratory distress syndrome and gestational hypertension were both > 1, suggesting that these two factors were risk factors for THOP. Reuss[7] et al. believed that THOP was associated with increased oxygen demand and prolonged mechanical ventilation time in premature infants,

which was consistent with the results of this group of data.Paul et al. [8] reported that THOP in premature infants is closely related to intraventricular hemorrhage, and severe THOP can increase the risk of intraventricular hemorrhage and death.The data in this group did not show that THOP was related to intraventricular hemorrhage, which may be related to the small number of cases in this group.

This study showed that gestational age ≤32 weeks was closely associated with THOP, which may be associated with small gestational age and low birth weight in most premature infants.A large number of studies have shown that RDS is related to THOP [1,9,10], which is consistent with this study. It has been reported that neonatal asphyxia has a great impact on thyroid function [11]. Yang Xiuzhen et al reported that hypoxia can cause thyroid tissue destruction, and thyroid function change is the result of hypoxia on body damage [12].This study is consistent with other studies showing that gestational hypertension combined with placental insufficiency may affect thyroid function in premature infants [13].It indicates that antepartum, prenatal, postpartum anoxia will affect the function of newborn thyroid gland.MLReuss et al. [7] showed that hypoglycemia, hypocalcemia, acidosis and septicemia were not independent risk factors for THOP, and the incidence of infection and hypoglycemia in this group was not different between the THOP group and the normal group, suggesting that these diseases were not risk factors for THOP.

Transient hypothyroidemia, although self-limited and recoverable after a few weeks, is difficult to predict with certainty for its duration. In addition, even short-term hypothyroidism in the neonatal period can cause brain damage [14]. However, whether treatment is needed is still controversial [15]. However, in view of the importance of the development of the nervous system, it is necessary to conduct reasonable treatment.

In conclusion, this study suggests that premature infants with gestational age ≤32 weeks and mothers with gestational hypertension and other risk factors should undergo thyroid function examination in a timely manner to facilitate early treatment and prevent the possibility of long-term adverse reactions of the nervous system.

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