

The benefits of preterm neonate development by early replacement therapy with L-thyroxine

- longitudinal prospective study



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Objectives:

In premature neonates, hypothyroidism or thyroid sick syndrome is frequently diagnosed, which is a result of the immaturity of the gland itself and the hypothalamic-pituitary-thyroid axis. The necessity of rapid adaptation to extrauterine life, generation of high thermal energy, and accelerated development of the central nervous system is the cause of the increased demand for thyroid hormone.

The aim of our study is to determine the benefits of early l-thyroxine substitution therapy in premature neonates and to determine the optimal dose of the drug. The prospective, longitudinal studies were conducted during 7 years in 134 premature neonates with low and very low body weight at delivery.

Methods:

82 children with a reduced ft4 level received l-thyroxine therapy at the doses of 5-7 µg/kg b.w./day since the second week of life. The control group comprised 52 children with normal TSH, in whom the level of thyroid hormones were determined four weeks and later after birth; afterwards, they received l-thyroxine therapy. The physical and mental development was compared. The mental development and IQ was assessed in the Wechsler Intelligence Scale for Children in the seventh year of life.

Results:

Birth weight class	Group I N=82	Pregnancy duration [weeks]	TSH [mU/l]	ft4 [pmol/l]	Group II N=52	Pregnancy duration [weeks]	TSH [mU/l]	ft4 [pmol/l]
LBW	37	30-35	0.000-12.651	0.0-8.2	25	30-35	0.000-11.423	0.0-7.2
VLBW	25	28-35	0.000- 7.824	0.0-8.1	19	29-35	0.000- 8.534	0.0-7.9
ELBW	20	26-31	0.000-3.12	0.0-6.7	10	25-31	0.000-4.22	0.0-7.4
mean			0.518±8.451	6.8±0,7			0.654±10.231	7.4±0,9
Normal ranges			0.49-15.00	9.1-23.8			0.49-15.00	9.1-23.8

	Sitting time [months]			Walking time [months]			IQ		p
	Group I	Group II	p	Group I	Group II	p	I Group	II Group	
Total	9.6±1.4	12.2±2.3	0.009	15.5±2.5	18.6±2.7	0.002	103.6±20.1	83.3±21.3	0.003
LBW	8.9±0,9	11.4±2.16	0.004	14.5±1.3	17.6±2.4	0.005	107.2±22.7	89.1±23.5	0.002
VLBW	10.0±1.5	13.0±2.5	0.012	15.4±2.2	18.7±2.3	0.004	99.3±23.7	83.3±13.4	0.007
ELBW	10.3±1.7	12.7±1.5	0.021	18.0±3.8	21.0±3.1	0.004	99.0±11.8	62.0±19.0	0.001

The preterm born neonates were observed to have a more rapid body weight gain in the first period of life after administration of l-thyroxine. In this group, all infants acquired the motor functions statistically significantly earlier in comparison to the infants from the group with delayed treatment. In the seventh year of life, the IQs were significantly higher (103.6±20.1) in group I treated since the second week of life in comparison to group II (83.3±21.3).

Conclusions:

The early replacement therapy with l- thyroxin in doses 5-7 µg/kg bw/day initiated in the second week of life may improve physical development in the newborn period and long-term mental development in preterm-born children

References:

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