Relevance of the repetition of normal hTSH in premature babies

Ivone Carvalho, Carmen Sousa, Helena Fonseca, Lurdes Lopes and Laura Vilarinho
Portuguese Newborn Screening Unit.Genetics Department, National Institute of Health Dr. Ricardo Jorge, Porto – Portugal.

Introduction

Congenital hypothyroidism (CH) is an endocrine disease that is characterized by disturbances in thyroid function and changes in psychomotor development. High concentrations of hTSH (thyroid stimulating hormone) in the newborns blood are the first manifestation of CH, being this used for Newborn Screening (NBS) proposes.

In newborns of low birth weight (<1500 g), in particular, those born prematurely (<30 weeks), is advised that NBS should be repeated, in a new sample collected two weeks after birth.
Results from the revaluation of newborns whose immaturity of the hypothalamic-pituitary-thyroid could mask CH, leading to false negative results.

hTSH is analyzed in all NBS and hTSH and T4 (tiroxine) for confirmation of elevated values.
Between 2009 and 2010 the strategy for CH NBS was based only on hTSH evaluation, with a cut-off of 20.0 µU/mL. Only in 2011 the hTSH cut-off is 10.0 µU/mL.

Methods

-Since 2009-2011

-302,511 newborns screened on blood samples on filter paper using AutoDELFIA® Neonatal hTSH method

-15,261 premature babies were analyzed

Results

Sample	Weight (g)	Screening	1st Confirmation		2nd Confirmation	
		TSH (µU/mL)	TSH (µU/mL)	T4 (µg/dL)	TSH (µU/mL)	T4 (µg/dL)
1 (2009)	**727**	11.2	**56.1**	**<1.5**	—	—
2 (2009)	**1420**	18.9	**85.5**	**7.1**	—	—
3 (2009)	**575**	10.4	6.0	3.4	**10.3**	**3.5**
4 (2010)	**688**	6.9	10.2	4.9	**236.9**	**3.0**
5 (2010)	**906**	6.5	1.6	5.7	**1.4**	**5.7**
6 (2010)	**1865**	7.2	**47.3**	**2.0**	—	—
7(2011)	**767**	1.36	15.2	4.8	**1.5**	**5.1**
8 (2011)	**1200**	4.1	21.3	4.6	**48.1**	**5.7**
9 (2011)	**574**	3.0	14.2	5.9	**3.9**	**6.7**

Normal values:
hTSH <20.0 µU/mL (2009-2010)
hTSH <10.0 µU/mL (2011)
T4 (6.5-17.0) µg/dL

Results and discussion

During this period a total of 15,261 premature newborns were analyzed, and from these a second sample was received in only 1,149 suspected premature babies. This screening approach, allowed the detection of nine premature newborns with CH that would be missed if the screening was based only in the initial NBS sample. The treatment was started in these patients and are been evaluated.

This study highlights the importance of sending the second sample in every preterm newborns, to decrease false negative results. Children not treated early are affected in varying degrees of mental and growth retardation, deafness and other serious metabolic symptoms.