Neonatal reference values for thyroid hormones and validation of dried blood spot measurements in the neonatal period

Published: 18-11-2015
Last updated: 15-04-2024

1. To establish reference intervals for thyroid hormones in plasma at the time of the neonatal screening (day 3-7 of life).2. To establish reference intervals for thyroid hormones in plasma around the 14th day of life.3. To compare the...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Hypothalamus and pituitary gland disorders
Study type	Observational invasive

Summary

ID

NL-OMON46842

Source
ToetsingOnline

Brief title
Neonatal thyroid hormone reference intervals

Condition

- Hypothalamus and pituitary gland disorders

Synonym
Congenital hypothyroidism / Inadequate thyroid hormone production from birth

Research involving
Human

Sponsors and support

Primary sponsor: Academisch Medisch Centrum

Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Congenital hypothyroidism, First recall, Neonatal screening, Reference values

Outcome measures

Primary outcome

1. Concentrations of plasma thyroid hormones in healthy neonates at the time of the neonatal screening (day 3-7 of life).

2. Concentrations of plasma thyroid hormones in healthy neonates around the 14th day of life.

3. Concentrations of thyroid hormones measured in dried blood spot at the time of the neonatal screening.

Secondary outcome

4. Preference of parents for a venous blood collection or heel stick in the neonatal screening.

Study description

Background summary

The Dutch neonatal screening program for congenital hypothyroidism is unique. However, we still have little insight into the thyroid function during the neonatal period. Directly following birth TSH concentrations increase following the so-called 'postnatal TSH surge'. Consequently, FT4 concentrations also increase dramatically in the first few days of life, after which both TSH and FT4 gradually fall during the neonatal period. Due to the gradual decline of hormones after the TSH-surge, thyroid hormone concentrations in the neonatal period can't be compared to those in adulthood. A reliable reference interval for these first weeks is still lacking. This makes it challenging to make a correct diagnosis following an abnormal result in the neonatal screening. Additionally, the Dutch screening uses a T4/TBG-ratio measured in a dried blood spot as parameter for plasma FT4 concentrations. The use of this ratio in the

neonatal screening has never been validated. The association between the T4/TBG-ratio in the dried blot spot and the serum FT4 concentration at the same moment has never been investigated.
With more insight in the thyroid function during the neonatal period, and into the relationship between the T4/TBG-ratio in the bloodspot and the serum FT4 concentration, we can improve the screening sensitivity, and detect and treat neonates with abnormal screening results more efficiently.
Meanwhile, other European countries perform the neonatal screening using a venous blood collection. Now the Dutch screening will be expanded with more diseases, and it remains a challenge to take enough blood via a heelstick, a switch from heelstick to a venous collection should be considered. If it appears that parents prefer one method of collecting blood from their child, this should be taken into consideration when deciding whether the Dutch screening should switch to venous collection as well.

Study objective

1. To establish reference intervals for thyroid hormones in plasma at the time of the neonatal screening (day 3-7 of life).
2. To establish reference intervals for thyroid hormones in plasma around the 14th day of life.
3. To compare the concentrations of thyroid hormones measured in plasma to those measured in dried blood spot at the time of the neonatal screening.
4. To evaluate which method of blood collection parents prefer for the neonatal screening.

Study design

A cross-sectional observational study.

Study burden and risks

Parents and/or legal representatives of subjects will be asked for an additional venous blood collection from the subject during the routine screening program heel puncture. Subjects will be invited to the hospital at 2 weeks after birth for a second venous blood collection. Risks involved with blood collection are minimal, and may include pain, bleeding and bruising. After the study is completed, parents will be asked to fill in a questionnaire regarding their preferences for method of blood collection in the neonatal screening.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Children (2-11 years)

Inclusion criteria

• Age 3-7 days at neonatal screening.
• Neonatal screening needs to be performed in or around the AMC or OLVG
• Subject*s legal representatives are able and willing to give informed consent.

Exclusion criteria

• Known maternal thyroid disease
• Daily maternal use of medication influencing neonatal thyroid function
• Prematurity (gestational age <37 weeks)
• Neonatal illness requiring hospitalization
• APGAR score less than 7 at 5 minutes

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	30-08-2016
Enrollment:	120
Type:	Actual

Ethics review

Approved WMO Date:	18-11-2015
Application type:	First submission
Review commission:	METC Amsterdam UMC
Approved WMO Date:	12-04-2016
Application type:	Amendment
Review commission:	METC Amsterdam UMC
Approved WMO Date:	21-06-2016
Application type:	Amendment
Review commission:	METC Amsterdam UMC
Approved WMO Date:	06-01-2017
Application type:	Amendment
Review commission:	METC Amsterdam UMC
Approved WMO Date:	02-07-2018

Application type:	Amendment
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL48105.018.15