Reference interval of TSH in the first trimester of pregnancy and its relationship to further thyroid examinations

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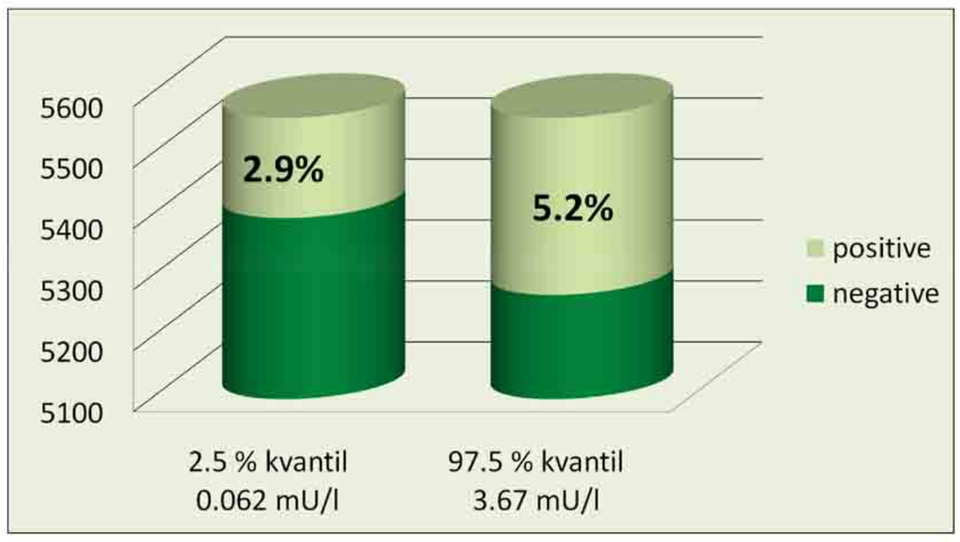
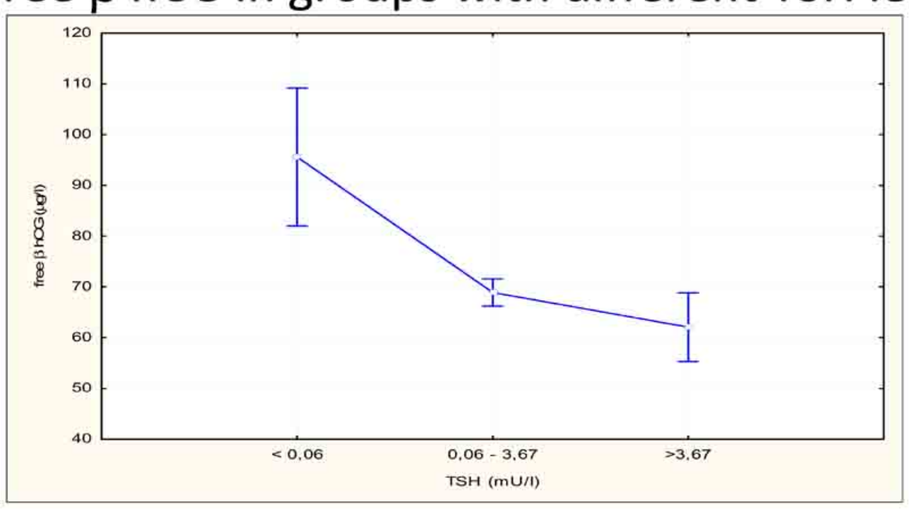
Introduction

Many changes in the functioning of the thyroid gland occur during pregnancy and some diseases of the thyroid gland can affect both the pregnant woman and the fetus. It has been clearly proven that even slight hypothyroidism affects not only the course of pregnancy, but the neuropsychological development of the child. Presence of anti-TPO during pregnancy also alerts to the danger of development of postpartum tyreoiditidis; about 50% of anti-TPO positive women have some thyroid dysfunction after delivery, so it is necessary to follow-up these women.

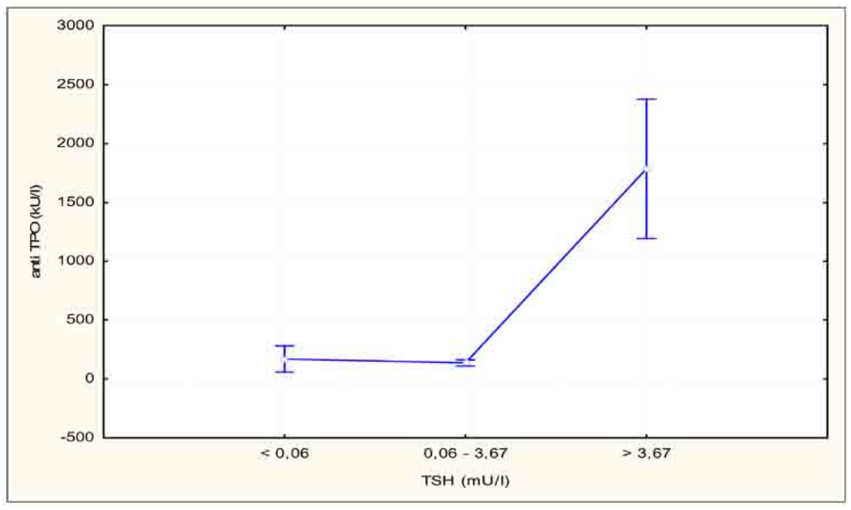
TSH reference interval and positivity in pregnancy



Free β hCG in groups with different TSH level



Anti TPO in groups with different TSH level



Conclusion

TSH

The reference interval for **TSH** was determined to be **0.06 - 3.67 mU/l** and for **FT4 9.8 - 23.43 pmol/l** was used.

A **raised** concentration of **TSH** was found **in 5.14%** of women; and a **suppression of TSH** was found **in 2.90%** of women

anti-TPO

The limit for **anti-TPO positivity** was determined to be **143 kU/l.**

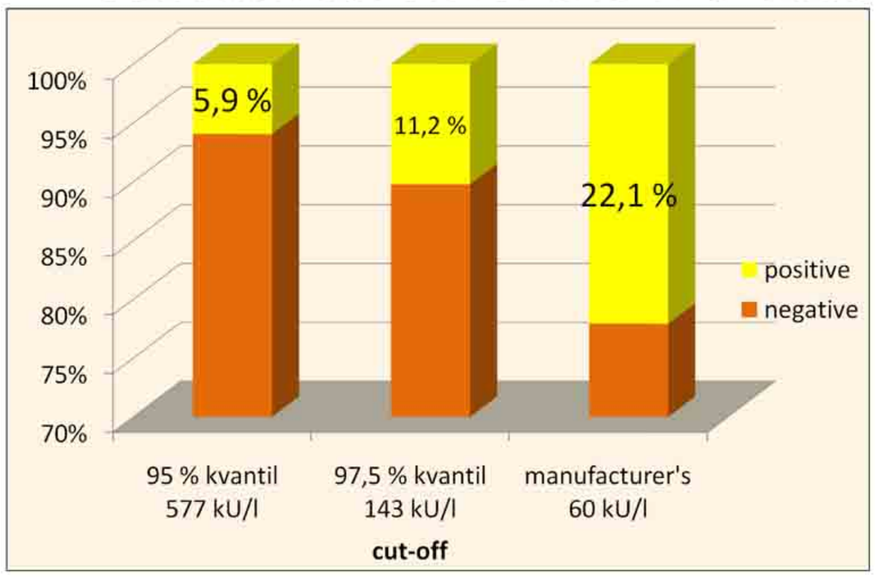
11.5% of pregnant women were found **anti-TPO positive**. Serum concentrations of FT4 were lower in TPOAb positive as compared to TPOAb negative women and differences of FT4 in euthyroid women with suppressed, normal and elevated TSH were found.

In Czech Republic, case finding screening is able to disclose only about 20% of asymptomatic mild or deep hypothyroidism or women with positive anti TPO in pregnancy. The need of general screening of pregnancy thyroid failure in Czech Republic is evident. Moreover the investigation of TSH, FT4 and anti TPO together is necessary.

Reference intervals

Determination of the specific reference intervals for TSH, FT4, and anti-TPO during pregnancy is one of the basic requirements when implementing a general examination of the thyroid gland in early pregnancy. Reference intervals for different methods and manufacturer's may vary, they have been established using pools of nonpregnant normal sera and with different antibodies. Such reference ranges are not valid during pregnancy. For evaluation of the reference intervals for pregnant women was calculated from selected group in accordance with the recommendations of the NACB.

Selection cut off for anti TPO antibodies



Reference intervals and cut-off

Method	Producer	Intervals for 1st trimester of pregnancy
TSH	0,37 – 5,0 mIU/l	0,06 – 3,67 mU/l
FT4	9,8 – 23,1 pmol/l	9,80 – 23,43 pmol/l
anti-TPO	< 60 kU/l	< 143 kU/l

Study group

7,530 pregnant women (in their 9th – 11th week of pregnancy, 99% Caucasian) who were undergoing their first trimester prenatal screening
The average age was 31.3 (+/- 4.6) years.
Serum were assayed for TSH and anti-TPO. FT4 was determined only in the case of TSH or anti-TPO out of the reference interval.

All participating pregnant women gave informed written consent wit this subsequent investigation.

Methods

ADVIA® Centaur™ Siemens

automated random-access immunoassay
TSH – sandwich imunoanalysis
with direct chemiluminometric technology

anti-TPO and FT4 - competitive imunoanalysis

with direct chemiluminometric technology

Reproducibility:
– TSH: 5 - 7% for levels of 0.43 – 15.00 mU/l
– anti-TPO: 10% for the level of 70 kU/l a 7% for the level of 170 kU/l
– FT4: 7 - 9% for levels of 10.1 – 33.0 pmol/l

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