

Model nákladové efektivity plošného screeningu poruchy funkce štítné žlázy v těhotenství pro Českou republiku

Cost-effectiveness model of universal screening for thyroid disorders in pregnancy for the Czech Republic

Disertační práce

English Abstract

Introduction: Subclinical hypothyroidism affects approximately 5% of pregnant women in the Czech Republic and is associated with a number of health risks for both mother and child. The negative effects can be prevented by effective and safe hormone replacement therapy. Although subclinical hypothyroidism can be diagnosed solely by blood tests, only 45% of pregnant women in the Czech Republic are currently tested. Thyroid function screening (thyrotropin; TSH) can be accompanied by thyroid autoimmunity testing (anti-thyroid peroxidase antibodies; anti-TPO) to predict increased risk of postpartum thyroiditis.

Aims: The aim is to model the cost-effectiveness, budgetary impact and impact on routine practice of the introduction of universal TSH screening (versus the current state of things) and an addition of the universal anti-TPO screening (versus TSH screening alone).

Method: The cost-benefit ratio, budget impact, and impact on routine practice were modelled using a decision tree for implementation of the TSH test and a nested decision tree for the addition of the anti-TPO test with a horizon of 12 months postpartum. The model was parameterized based on systematic literature reviews and the national pilot screening program. Cost-effectiveness was primarily assessed relative to a willingness-to-pay threshold of 1 200 000 CZK per year of life in perfect health. Results were validated using one-way deterministic sensitivity analysis, probabilistic sensitivity analysis (PSA) based on a second-order Monte Carlo simulation, and alternative scenario analysis. The cost-effectiveness of further research was quantified using the expected value of perfect information (EVPI).

RESULTS: The introduction of TSH screening with a program penetration of 95% was cost-effective (427513 CZK per 1 year of life of a mother). PSA showed that 78% of simulations were cost-effective. Annually, 44 to 90 miscarriages and 30 to 78 preterm births could be prevented. The introduction of universal TSH screening in the first trimester of pregnancy for all women in the country would be associated with annual budget impact ranging from 8788628 to 18990544 CZK and would burden endocrinologists' offices with 1875 to 2723 new patients per year. The low EVPI suggests that further research would not be cost-effective.

The introduction of anti-TPO test to TSH screening would be cost-effective across several scenarios compared with TSH screening alone (355288 CZK per year of the mother's life). However, the evidence base for the effectiveness of this measure is low and implementation would be associated with a significant budget impact (29317140 to 53464736 CZK per year). The high EVPI suggests that rather further research would be cost-effective.

Conclusion: We recommend the implementation of universal TSH screening in the first trimester of pregnancy. We recommend further research into the efficacy of anti-TPO screening.