

Thyroid screening as first-trimester pregnancy markers for Gestational Diabetes Mellitus ?

Zagorka Milovanović^{1,2}, Dejan Filimonović^{1,2}, Nataša Karadžov Orlić^{1,2}.

¹Faculty of Medicine, University of Belgrade Serbia;

²University Clinic for gynecology and obsteric "Narodni Front", Beograd, Serbia

ABSTRACT

The clinical utility of many biochemical first-trimester pregnancy markers and their ability to predict subsequent gestational diabetes mellitus (GDM), draw scientists' attention in many current studies in fetomaternal medicine. There is a mutual influence between diabetes mellitus and thyroid dysfunction, which are the two most common endocrinopathies in pregnancy. The aim of this study was to evaluate the utility of thyroid screening parameters, such as thyroid-stimulating hormone (TSH) and thyroid antibodies in GDM prediction.



GDM screening, and prediction of glucose homeostasis deterioration, is the way to predict long term consequences of glucose metabolism impairments, in the mother and in the child.

That is the fight for normal pregnancy, mother's and child health.

INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance resulting in hyperglycaemia that occurs for the first-time during pregnancy. International Diabetes Federation (IDF) data from 2021 indicated that the prevalence of hyperglycaemia in pregnancy is 16.7%, 80.3% of which is gestational diabetes mellitus or 14%.

The trend of the pandemic spread of DM has not bypassed the population of pregnant women.

According to the latest recommended diagnostic criteria, of the World Health Organization (WHO) and the International Association of Diabetes and Pregnancy Study Groups (IADPSG) from 2013 for hyperglycaemia in pregnancy, it was expected that the GDM prevalence would rise significantly.

Thyroid dysfunction is the second most common endocrine disorder in women, with an overall incidence of about 4% (2,5-10%) in the pregnant population with hypofunction being significantly more prevalent.

According to available literature data, hypothyroidism prevalence in pregnant women is 2.2–5%, with subclinical hypothyroidism occurring in 3–13% depending on the area and screened population.

The most common cause of hypothyroidism is autoimmune thyroiditis. The frequency of antithyroid antibodies in euthyroid pregnant women is about 10% (2–18%), while the antibodies can be found in 30–60% of hypothyroid pregnant women.

Both disorders are associated with numerous short- and long-term complications in the mother, foetus, and neonate.

Considering the close connection, between endocrine organs' function, we tried to recognize and predict possible disorders of one organ function by screening the function of another organ.

We researched, if the universal screening of thyroid function in the first trimester of the pregnancy, may predict forthcoming deterioration of the glucose metabolism.

METHODS AND MATERIALS

In a prospective clinical trial, pregnant women were screened for thyroid function, by checking TSH, and thyroid antibodies during the first trimester of pregnancy and underwent the OGTT in the second trimester. Increased TSH levels with normal free thyroxine (fT4) were considered subclinical hypothyroidism SCH. The titers of thyroid peroxidase antibody (anti-TPO Ab) at >35 IU/mL and thyroglobulin antibody (anti-Tg Ab) at >115 IU/mL were considered as antibodies present.

RESULTS

According to the OGTT results, the number of pregnant women with GDM, showed the expected growth trend, was 19% in this study population. Two groups of pregnant women were compared, one with GDM and the other without. Increased TSH levels and the presence of thyroid antibodies positively correlate with the risk of GDM. TSH levels were significantly higher in pregnant women with GDM, $p=0.027$. Using the cut-off $TSH > 2.5 IU/mL$, 25.65% of the pregnant women were diagnosed with subclinical hypothyroidism, compared with 7.39% when applying the last American Thyroid Association diagnostic cut-off of $TSH \geq 4.0 IU/mL$. In this study, 25.6% of pregnant women met the diagnostic criteria for autoimmune thyroiditis. Hashimoto's thyroiditis was significantly more common in GDM patients, $p < 0.001$. The anti-TPO Ab was detected in 19.6% of pregnant women, and the anti-Tg Ab in 15.2%. In the GDM group the anti TPO Ab was detected in 40%, while the anti Tg Ab was found in 26.67%.

Parameters	GDM Group (n = 45)	Non-GDM Group (n = 185)	p Value
age (years) (MV ± SD)	33.47 (±3.86)	31.82 (±4.62)	0.028
body height (MV ± SD) (cm)	168.22 (±4.61)	168.74 (±6.75)	0.540
b.w. at the pregnancy start (MV ± SD) (kg)	66.67 (±9.82)	64.90 (±13.19)	0.401
b.w. at delivery (MV ± SD) (kg)	78.98 (±11.27)	77.41 (±11.48)	0.422
weight gain (MV ± SD) (kg)	12.80 (±6.39)	12.92 (±4.79)	0.904
BMI (MV ± SD) (kg/m ²)	23.72 (±3.65)	22.79 (±4.14)	0.171

Data presented as MV ± SD; MV: mean value; SD: standard deviation; GDM: gestational diabetes mellitus; b.w.: body weight; BMI: body mass index

Parameters	GDM (n = 45)	Non-GDM (n = 185)	p Value
Glucose fast. (mmol/L) (MV ± SD)	4.79 (±0.53)	4.37 (±0.37)	
Insulin fasting * (uIU/mL) M (IQ)	8.00 (5.3–11.5)	8.81 (6.6–11.8)	0.191
TSH (uIU/mL) (MV ± SD)	2.75 (±2.60)	1.75 (±1.10)	0.027
fT4 (pmol/L) (MV ± SD)	14.05 (±2.38)	14.98 (±2.40)	0.021

Data presented as MV ± SD; MV: mean value; SD: standard deviation; * Insulin levels expressed as M (IQ); M: median; IQ: interquartile range; GDM: gestational diabetes mellitus; TSH: thyroid stimulating hormone; fT4: free thyroxine.

Parameters	GDM Group (n = 45)	Non-GDM Group (n = 185)	p Value
TSH ≥ 4.0 uIU/mL N (N%)	8 (17.8%)	9 (4.86%)	0.007
TSH > 2.5 uIU/mL N (N%)	19 (42.2%)	40 (21.6%)	0.005

Data presented as N (number) N% (percentage) GDM: gestational diabetes mellitus; TSH: thyroid stimulating hormone

Parameters	GDM Group (n = 45)	Non-GDM Group (n = 185)	p Value
Hashimoto thyroiditis N (N%)	23 (51.10%)	36 (19.46%)	<0.001
Anti TPO Ab > 35 IU/mL N (N%)	18 (40.00%)	27 (14.59%)	<0.001
Anti Tg Ab > 115 IU/mL N (N%)	12 (26.67%)	23 (12.43%)	0.017

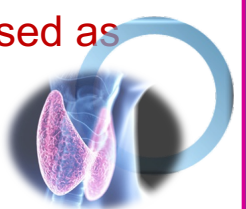
Data presented as number N and percentage (%); GDM: gestational diabetes mellitus; anti TPO Ab: anti-thyroid peroxidase antibodies; anti Tg Ab: anti-thyroglobulin antibodies.

Parameter	Odds Ratio	p Value
AGE (years)	1.100	0.017
TSH ≥ 4 uIU/ml	2.962	0.052
Anti TPO Ab > 115 IU/mL	3,627	0,001

TSH: thyroid-stimulating hormone; anti TPO Ab: anti-thyroid peroxidase antibodies; GDM: gestational diabetes mellitus.

CONCLUSIONS

TSH level of ≥ 4IU/mL, and presence of anti-TPO Ab > 35 IU/mL are significant predictors of gestational diabetes mellitus that may be used as additional first-trimester screening markers for GDM.



CONFLICT OF INTERES

We declare no competing interest

FURTHER INFORMATION

If you have any further information or question

Email ID: zaga_mi@yahoo.co.uk