

Research Article

Prevalence of postpartum thyroiditis in women with gestational diabetes mellitus in Ardabil: North West of Iran

Manouchehr Iranparvar-Alamdari, Hosein Ghorbani Behrooz*, Mostafa Alidousti

Department of Internal Medicine, Faculty of Medicine, Ardabil University of Medical Science, Ardabil, Iran

Received: 27 April 2016

Accepted: 14 May 2016

*Correspondence:

Dr. Hosein Ghorbani Behrooz,

E-mail: hoseinghorbanibehrooz@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Gestational diabetes is the most common metabolic disorder during pregnancy and postpartum thyroiditis is a destructive thyroiditis that can cause serious complications for the mother and her child. The purpose of this study was to determine the prevalence of postpartum thyroiditis in women with gestational diabetes.

Methods: In this cross-sectional study, 86 cases satisfy inclusion criteria and gestational diabetes mellitus (GDM) and were evaluated for postpartum thyroiditis with thyroid stimulating hormone (TSH), T4, anti-TPO, T3RU tests. The groups with and without thyroiditis were compared and data was analyzed by statistical methods.

Results: There were 17 patients (19.8%) with postpartum thyroiditis, of whom 4 patients (23.5%) had hyperthyroidism, 9 patients (52.9%) were in the age group of 21 to 30 years, and 9 patients (52.9%) had a family history of diabetes. Five patients (29.4%) with high anti-TPO level ($P=0.022$) and mean TSH and anti-TPO respectively, 2.8 (4.8) and 17.2 (35.9).

Conclusions: The results showed that higher level of anti TPO titer and family history of diabetes can be associated with a higher rate of postpartum thyroiditis, so it is recommended that postpartum thyroiditis to be examined in women with gestational diabetes who have these mentioned items.

Keywords: Gestational diabetes, Postpartum thyroiditis, Prevalence

INTRODUCTION

Gestational diabetes is the most common metabolic disorder during pregnancy that can cause serious complications for both mother and fetus.¹ Therefore, identifying risk factors for gestational diabetes is of high importance, because by knowing these factors screening programs can be conducted for susceptible women. Additionally, maternal and fetal complications can be prevented by early diagnosis and proper control of blood glucose levels.² Although, impaired glucose tolerance disappears after delivery in these patients; more than 70% of the patients are diagnosed with type 2 diabetes after 10 years.^{3,4} Postpartum thyroiditis is a destructive thyroiditis that can be induced one year after pregnancy via autoimmune mechanisms. Postpartum thyroiditis can also

occur after spontaneous or induced abortion.⁵ This complication can occur in one the following three forms: transient hyperthyroidism, transient hypothyroidism, or hyperthyroidism followed by hypothyroidism, and then return to the normal state.

The global incidence rate of postpartum thyroiditis varies from 1% to 17%.⁶⁻⁸ The higher values (up to 25%) have been reported for women with type 1 diabetes, values higher than this (42%) have been observed in women with a previous history of postpartum thyroiditis, and the values ranging from 40 to 60% have been recorded for women with normal thyroid function during pregnancy but positive antiTPO.^{6,7} Most women within one year after delivery return to euthyroid state, however, some remain hypothyroid forever.⁹⁻¹⁰ Manifestation of

postpartum thyroiditis can be a painless thyroiditis, yet how it appears is highly variable.

Approximately 20 to 30 percent of women with postpartum thyroiditis have hyperthyroid manifestations that usually begin one to four months after giving birth and last 2 to 8 weeks. Subsequently, hypothyroidism starts that continues from 2 weeks to 6 months and then recovers.¹¹⁻¹²

However, these individuals are prone to higher risk of permanent hypothyroidism in the future.^{11,13-14} Permanent hypothyroidism may be associated with the high concentration of initial TSH, anti-TPO titer, mother's age and baby's gender.¹¹⁻¹⁷

Signs and symptoms of hyperthyroidism include fatigue, weight loss, heart palpitations, heat intolerance, anxiety, restlessness and tachycardia.

Similarly, the signs and symptoms of hypothyroidism also involve low energy, cold intolerance, constipation and dry skin.¹¹ Some studies have also shown that hypothyroidism can also be associated with postpartum depression.^{17,18}

In addition, postpartum hypothyroidism can lead to a reduction in the volume of breast milk.¹⁹ Considering the importance of postpartum thyroiditis and its complications this study was conducted to investigate the prevalence of postpartum thyroiditis in women with gestational diabetes.

METHODS

This cross-sectional study was undertaken in endocrine clinic of Imam Khomeini, and obstetrics and gynecology clinic of Alavi hospital in Ardabil city, Iran. The sample of study included 86 pregnant women with GDM who were examined for postpartum thyroiditis in Imam Khomeini and Alavi hospitals.

Anti-TPO, T3RU, TSH, T4 tests were carried out on the patients to determine the value of Free T4 index, by ultra-sensitive ECL (electro-chemiluminescence), using kits and COBAS E411 made by Diagnostics Roche company in Germany.

A checklist concerning demographic data about women, their education, parity, previous pregnancies and abortion were used. The gathered data were analyzed in SPSS version 19 using Chi-square and T-test, and the descriptive statistics, and were presented in the form of tables and graphs.

In all tests, the significance level was set at 0.05. The exclusion criteria for patients in this study were the patient's unwillingness to participate in the study, having the history of thyroid disease, diabetes before pregnancy,

type 1 diabetes during pregnancy, and receiving drugs affecting thyroid function tests.

RESULTS

Of the total sample, 69 individuals (80.2%) had euthyroid, and 17 patients (19.8%) had postpartum thyroiditis, of which 7 patients (41.2%) had subclinical hypothyroidism. Hyperthyroidism was observed in 4 patients (23.5%) and hypothyroidism was seen in 13 patients (76.5%) (Figure 1).

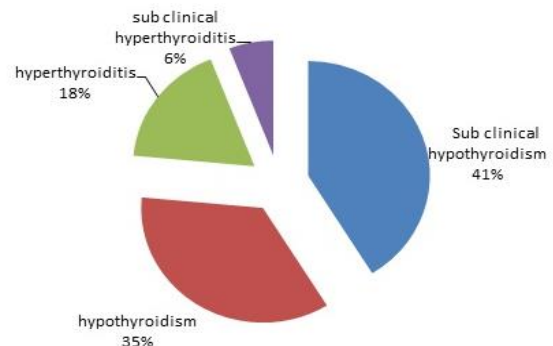


Figure 1: Type of thyroiditis in women with GDM.

The age range of patients was between 18 and 41 years and the mean age of the patients was 28.4 (5). The majority of patients i.e., 42 cases (48.8%) belonged to the age group of 21- 30 (Figure 2).

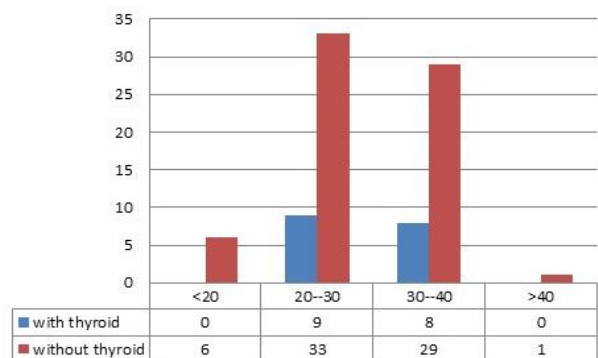


Figure 2: The thyroiditis condition after pregnancy by age.

And most of the women i.e., 31 cases (36%) were experiencing their first pregnancy. Of the patients participated in this study, 23 patients (26.7%) had a family history of diabetes, of which 20 (87%) had type 2 diabetes, and 3 patients (13%) had type 1 diabetes. Moreover, there was family history of thyroid disorder in 4 patients (4.7%) and abortions in 7 patients (8.1%). Of women with postpartum thyroiditis, 9 patients (52.9%) were in the age group of 20- 30 years, and most of the women without postpartum thyroiditis, i.e., 33 patients (47.8%) were in the age group of 21- 30 years (Table 1).

The results of statistical analysis showed that there was no significant relationship between age and postpartum thyroiditis. In the group with postpartum thyroiditis, 9 patients (52.9%) and in the group without postpartum thyroiditis, 14 cases (20.3%) had a family history of diabetes. This difference was statistically significant between two group ($P=0.006$). Only two patients (11.8%) of women with postpartum thyroiditis, had family history of thyroid disorder, and two patients (11.8%) of them had record of abortions. In regard to number of pregnancy, 4 patients (23.5%), 5 cases (29.4%), and 8 patients (47.1%) had postpartum thyroiditis, after their first, second, and third pregnancy, respectively.

Table 1: The compare mean of variables in two with and without thyroid group.

Variables	Group	Mean	SD	p-value
TSH	With GDM	4.8	2.8	0.001
	Without GDM	2.8	0.9	
Anti-TPO	With GDM	35.9	17.2	0.005
	Without GDM	20.3	12.5	
TT4	With GDM	114.4	55.7	0.69
	Without GDM	116.1	40	
T3RU	With GDM	1.02	0.4	0.38
	Without GDM	1.07	0.2	
FT4I	With GDM	131.1	11.1	0.62
	Without GDM	124.1	23.5	

Accordingly, there was no statistically significant relationship between the number of pregnancy and postpartum thyroiditis. The mean values of Anti-TPO and TSH were 2.8 (4.8) and 17.2 (35.9), respectively, which were significantly higher in patients with thyroiditis than those without thyroiditis ($P=0.005$, $P=0.001$) (Table 1).

The results showed that 5 patients (29.4%) of women with thyroiditis and 6 patients (8.7%) of women without thyroiditis had high level of anti-TPO that indicated a statistically significant difference ($P = 0.022$).

DISCUSSION

In this study, 86 patients with gestational diabetes were examined for postpartum thyroiditis out of which 17 patients out of which, i.e. (19.76%) patients, had postpartum thyroiditis. The results of this study were consistent with those of other studies that have reported the incidence rate of postpartum thyroiditis between 5.4% to 25%.^{11,20-25}

In this study, 7 patients (41.2%) had subclinical hypothyroidism, one person (9.5%) had subclinical hyperthyroidism, 6 patients (35.3%) had overt hypothyroidism, and 3 patients (17.6%) had overt hyperthyroidism.

Anti-TPO amount was high in 11 patients (12.8%). While 5 patients (29.4%) had postpartum thyroiditis, 6 patients

(8.7%) didn't have postpartum thyroiditis. Out of 5 patients with postpartum thyroiditis, 4 patients had overt hypothyroidism and 1 out of 5 patients had subclinical hypothyroidism. In this study it was shown that Anti-TPO with higher than normal amount is associated with a higher incidence of postpartum thyroiditis. And this correlation was statistically significant ($P=0.022$),

Stagnaro-green et al, in their study, demonstrated that the incidence of hyperthyroidism followed by hypothyroidism was 22%. And the prevalence of hypothyroidism alone was 48% of and that of thyrotoxicosis alone was 30 %. Sarvghadi et al in their study suggested high level of anti TPO titer as predictor of high risk of permanent hypothyroidism in the future.^{11,26}

In this study, of women with postpartum thyroiditis, 9 patients (52.9%), and of those who didn't have postpartum thyroiditis, 14 patients (20.3%), had a family history of diabetes. This difference was statistically significant ($P=0.006$). Of those with postpartum thyroiditis, two patients (11.8%) had family history of thyroid disorder, and 15 patients (88.2%) didn't have. Therefore, no statistically significant relationship was detected between the presence or absence of thyroid disorder in family, and postpartum thyroiditis ($P = 0.12$).

In a study conducted by Azizi F no meaningful relationship was found between family history of thyroid disease and postpartum thyroiditis. In addition, in the Othman's study it was also shown that there was no significant association between family history of thyroid disease and permanent hyperthyroidism.⁹ In Shahbazian's study also no relationship was determined between postpartum thyroiditis and personal or family history of thyroid disease.²³

In this study, two patients (11.8%) of women having postpartum thyroiditis had history of abortion, whereas 15 patients (88.2%) didn't have. Thus the presence or absence of abortion was not significantly related to postpartum thyroiditis ($P = 0.54$). In a study by Marqusee undertaken in America in 1997 over 5 women who had abortions, it was concluded that the abortion can increase thyroiditis.²⁷ Similarly, Othman showed that abortions can be associated with a higher incidence of permanent hypothyroidism after pregnancy.¹⁶

Similar to Shahbazian's study that didn't find any relationship between age and postpartum thyroiditis²³, this study couldn't detect any significant relationship between the different age ranges or the number of pregnancy and the higher incidence of postpartum thyroiditis ($P=0.36$, $P=0.59$).

But this is in contrast with findings of Azizi study that showed the age of 30 or above was associated with higher rates of postpartum thyroiditis, but didn't find any significant relationship between the number of pregnancy

and postpartum thyroiditis.⁹ Freidrich et al claimed that the greater number of pregnancy increases the risk of growth of thyroid autoantibodies. However, in another study run by Walsh in 2005, in Australia, unlike the previous study it was expressed that higher number of pregnancy doesn't raise the risk of thyroid dysfunction, though the study Othman showed that more cases of pregnancy can be associated with greater incidence of permanent hypothyroidism after pregnancy.^{16,28,29}

CONCLUSION

Considering the results of the present study, it was concluded that high Anti TPO and family history of diabetes can be associated with higher rates of postpartum thyroiditis. Thereupon, it is recommended that women with gestational diabetes to be examined for postpartum thyroiditis.

ACKNOWLEDGEMENTS

Authors are grateful to all persons for their valuable contribution.

Funding: By Ardabil University of Medical Sciences, Iran.

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

- Gary-Cunningham F, Norman F, Kenneth J, Larry C, Johns C, Katharine D. Willams obstetrics 21th ed- New York Mc Graw Hill. 2001;2:1359-79.
- American Diabetes Association. Report of the expert committee on the diagnoses and classification of diabetes mellitus. *Diabetes Care*. 2007;20:1183-97.
- Velkoska-Nakova V, Krstevska B, Dimitrovski CH, Simeonova S, Hadzi-Lega M, Serafimovski V. Prevalence of thyroid dysfunction and autoimmunity in pregnant women with gestational diabetes and diabetes type 1. *Prilozi*. 2010;31:51-9.
- Damm P, Kuhl C, Buschard K. Prevalence and predictive value of islet cell antibodies and insulin autoantibodies in women with gestational diabetes. *Diabetic Medicine*. vol. 2004;11(6):558-63.
- Carney LA, Quinlan JD, West JM. Thyroid disease in pregnancy. *Am Fam Physician* 2014 ;89:273-8.
- Nicholson WK, Robinson KA, Smallridge RC. Prevalence of postpartum thyroid dysfunction: a quantitative review. *Thyroid* 2006;16:573-82.
- Abalovich M, Amino N, Barbour LA, Cobin RH, De Groot LJ, Glinioer D, et al. Management of thyroid dysfunction during pregnancy and postpartum: an Endocrine Society Clinical Practice Guideline. *J Clin Endocrinol Metab*. 2007;92:S1-47.
- Stagnaro-Green A. Postpartum thyroiditis. *Best Pract Res Clin Endocrinol Metab* 2004;18:303-16.
- Azizi F. The occurrence of permanent thyroid failure in patients with subclinical postpartum thyroiditis. *Eur J Endocrinol*. 2005;153:367-71.
- Tachi J, Amino N, Tamaki H. Long term follow-up and HLA association in patients with postpartum hypothyroidism. *J Clin Endocrinol Metab*. 1988;66:480-4.
- Stagnaro-Green A. Approach to the patient with postpartum thyroiditis. *J Clin Endocrinol Metab* 2012;97:334-42.
- Lazarus JH, Hall R, Othman S, Parkes AB, Richards CJ, McCulloch B, et al. The clinical spectrum of postpartum thyroid disease. *QJM*. 1996;89:429-35.
- Lazarus JH, Ammari F, Oretti R. Clinical aspects of recurrent postpartum thyroiditis. *Br J Gen Pract* 1997;47:305-8.
- Stuckey BG, Kent GN, Ward LC. Postpartum thyroid dysfunction and the long-term risk of hypothyroidism: results from a 12-year follow-up study of women with and without postpartum thyroid dysfunction. *Clin Endocrinol (Oxf)*. 2010;73:389-95.
- Lucas A, Pizarro E, Granada ML. Postpartum thyroiditis: long-term follow-up. *Thyroid*. 2005;15:1177-81.
- Othman S, Phillips DI, Parkes AB, Harris B, Fung H, Darke C, et al. A long-term follow-up of postpartum thyroiditis. *Clin Endocrinol (Oxf)*. 1990;32:559-64.
- Lazarus JH, Othman S. Thyroid disease in relation to pregnancy. *Clin Endocrinol (Oxf)*. 1991;34:91-8.
- Harris B, Othman S, Davies JA. Association between postpartum thyroid dysfunction and thyroid antibodies and depression. *BMJ*. 1992;305:152-6.
- Miyake A, Tahara M, Koike K, Tanizawa O. Decrease in neonatal suckled milk volume in diabetic women. *Eur J Obstet Gynecol Reprod Biol*. 1989;33:49-53.
- Alvarez-Marfany M, Roman SH, Drexler AJ. Long-term prospective study of postpartum thyroid dysfunction in women with insulin independent diabetes mellitus. *J Clin Endocrinol Metab*. 1994;79:10-6.
- Bech K, Høier-Madsen M, Feldt-Rasmussen U. Thyroid function and autoimmune manifestations in insulin-dependent diabetes mellitus during and after pregnancy. *Acta Endocrinol (Copenh)*. 1991;124(5):534-9.
- Gerstein HC. Incidence of postpartum thyroid dysfunction in patients with type I diabetes mellitus. *Ann Intern Med*. 1993;118:419-23.
- Shahbazian HB, Sarvghadi F, Azizi F. Prevalence and characteristics of postpartum thyroid dysfunction in Tehran. *Eur J Endocrinol*. 2001;145:397-401.
- Gallas PR, Stolk RP, Bakker K. Thyroid dysfunction during pregnancy and in the first postpartum year in women with diabetes mellitus type 1. *Eur J Endocrinol*. 2002;147(4):443-51.
- Triggiani V, Ciampolillo A, Guastamacchia E. Prospective study of post-partum thyroid immune dysfunctions in type 1 diabetic women and in a

- healthy control group living in a mild iodine deficient area. *Immunopharmacol Immunotoxicol.* 2004;26(2):215-24.
26. Sarvghadi F, Hedayati M, Mehrabi Y. Follow up of patients with postpartum thyroiditis: a population-based study. *Endocrine.* 2005;27:279-82.
27. Marqusee E, Hill JA, Mandel SJ. Thyroiditis after pregnancy loss. *J Clin Endocrinol Metab.* 1997;82(8):2455-7.
28. Friedrich N, Schwarz S, Thonack J, John U, Wallaschofski H, Völzke H. Association between parity and autoimmune thyroiditis in a general female population. *Autoimmunity.* 2008;41(2):174-80.
29. Walsh JP, Bremner AP, Bulsara MK. Parity and the risk of autoimmune thyroid disease: a community-based study. *J Clin Endocrinol Metab.* 2005;90(9):5309-12.

Cite this article as: Iranparvar-Alamdari M, Ghorbani Behrooz H, Alidousti M. Prevalence of postpartum thyroiditis in women with gestational diabetes mellitus in Ardabil: North West of Iran. *Int J Sci Rep* 2016;2(6):116-20.