Original Article

The incidence of postpartum thyroiditis at first month postpartum

Husniye Baser[1], Salih Baser[2], Reyhan Ersoy[3], Yusuf Ergun[4], Gul Gursoy[5], Filiz Avsar[6], Bekir Cakir[7]

ABSTRACT

Objective: The aim of this study was to determine the incidence of Post Partum Thyroiditis (PPT) at first month postpartum.

Methodology: Fifty pregnant subjects were included. Control group was composed of 50 women who did not give birth in the recent year. Blood samples were obtained once in the control group and twice -at the third trimester and the first month postpartum-in the pregnant group.

Results: PPT occurred at first month postpartum in 3 of 50 pregnant women. The incidence of PPT at first month postpartum was 6%. Among the pregnant group, there was a statistically significant increase in the Anti-TPO and Anti-Tg levels within the first month postpartum compared to the ones in the third trimester. Also, all patients who experienced PPT were positive for Anti-TPO and Anti-Tg.

Conclusions: In our opinion, it will be useful to evaluate particularly the pregnants with positive thyroid auto-antibodies in early postpartum period.

KEY WORDS: Postpartum thyroiditis, Anti-thyroid peroxidase, Anti- thyroglobuline, thyroid dysfunctions.

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INTRODUCTION

Postpartum thyroiditis is defined as a transient hyperthyroidism, a subsequent transient hypothyroidim and reversal to euthyroid status approximately within a year, postpartum. Invariably, hyperthyroidism develops prior to hypothyroism and generally emerges at 2-6 months postpartum. Hypothyroidism may occur at any time between 3-12th months. The aim of the screening for PPT is to prevent the symptoms of hyper- hypothyroidism and permanent hypothyroidism, and to provide a close follow-up of these patients due to the risk of development of PPT during the subsequent pregnancy.

The reported incidences of PPT differ among populations because of the differences in features of study designs and the periods that screenings were performed, geographical and genetic factors of the region itself. The aim of our study was to investigate the incidence of PPT at early postpartum period among a randomized selected pregnant women group.

METHODOLOGY

Study group: Overall, fifty pregnant women with no history of any known thyroidal (hypothyroidism, hyperthyroidism, multinodular goitre, nodular goitre, undergoing thyroid surgery or radioactive

1. Husniye Baser,
2. Salih Baser,
3. Reyhan Ersoy,
Department of Endocrinology and Metabolism,
4. Yusuf Ergun,
Department of Obstetrics and Gynecology,
5. Gul Gursoy,
6. Filiz Avsar,
Department of Obstetrics and Gynecology,
7. Bekir Cakir,
Department of Endocrinology and Metabolism,
1,2,5: Department of Internal Medicine,
1,2,4,5: Ankara Education and Research Hospital,
3,6,7: Ankara Ataturk Education and Research Hospital,
Ankara, Turkey.

Correspondence:
Husniye Baser,
E-Mail: drhusniyebaser@yahoo.com.tr

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iodine treatment) and severe systemic disease were included in this study. The control group was formed of fifty women who did not give birth in the recent year and had no history of a known thyroidal and systemic disease. Local ethics committee approval was received. Informed written consent forms were taken from each case.

Obtaining serum samples: Serum samples were obtained for free triiodothyronine (fT3), free thyroxine (fT4), thyroid stimulating hormone (TSH), Anti- thyroid peroxidase (Anti-TPO) and Anti- thyroglobuline (Anti-Tg) once in the control group and twice - at the third trimester and the first month postpartum- in the pregnant group. Serum TSH levels were measured by a two- sited immunoenzyme assay, ST AIA-PACK TSH. TSH in the sera were linked by monoclonal antibodies and incubated with a fluorogenic substrate. By using sandwich method, TSH concentrations were measured and noted as μIU/ ml. fT3 and fT4 levels were measured by enzyme immunuassay and fluorosanse immunuassay-competitive methods, respectively. TOSOH AIA system analyses were performd for the measurement of both hormones.

Statistical Analyses: Analyses were carried out by SPSS (Statistical Package for the Social Sciences) for Windows 11.5. Chi-square with continuity correction or Fisher's exact chi-square tests were used to compare two groups in terms of qualitative data. Quantitative date were analysed with one- sample Kolmogorov-Smirnov test to evaluate whether they distribute normally or not. Independent samples t-test were used for groups with normal distribution and Mann-Whitney U test for abnormal distributions. The difference between the levels at the third trimester and first month postpartum were analysed using Wilcoxon signed rank test. Values with $p<0.05$ were accepted as statistically significant.

RESULTS

The mean age was 26.3±5.8 years (18-42 years), mean parity was 2.3±1.6 (1-9) in the pregnant group; and the mean age was 32.0±8.0 years (18-45 years), mean parity was 2.6±1.9 (0-7) in the control group. The compared data for thyroid function tests between pregnant and control groups are given in Table-I and the compared data for thyroid function tests between third trimester and first month postpartum are given in Table-II.

It was found that the mean TSH levels were significantly higher in pregnant–3rd trimester-group ($p=0.003$); compatibly, the mean fT3 and fT4 levels were significantly lower ($p<0.001$ and $p<0.001$, respectively) compared with controls'. There was no difference between first month postpartum and control groups in terms of TSH and fT3 levels ($p>0.05$). However, mean fT4 levels were significantly lower in pregnants compared to controls, statistically ($p=0.033$).

When the mean Anti-TPO levels of pregnant -3rd trimester- and control groups were compared, it was seen that there were no statistically significant differencies ($p>0.05$). However, the mean Anti-Tg levels of control group was significantly higher than the pregnants' -3rd trimester- ($p=0.009$).

Among the pregnants, the mean TSH levels were significantly lower ($p<0.001$), mean fT3 and fT4 levels were higher at first month postpartum compared to 3rd trimester ($p<0.001$ and $p<0.001$, respectively). Also, between the same groups, it was seen that there was a significant increase in mean Anti-TPO and Anti-Tg levels at first month postpartum ($p=0.019$ and $p<0.001$, respectively).

Within the pregnant group, three cases were detected to develope PPT at first month postpartum. Of these three, two (66.6%) were in thyrotoxic and one (33.4%) was in hypothyroidal state. During the follow- up of two thyrotoxic cases, hypothyroidism was detected at the 3rd month postpartum in one patient and at 4th month in the other. According to these data, the incidence of PPT at first month postpartum was calculated to be 6%.

Two of 47 cases with no PPT (4.3%) and all of 3 cases with PPT (100%) were positive for Anti-TPO antibodies. A significant correlation was detected between positive Anti-TPO antibodies and development of PPT ($p<0.001$). Also, 3 of 47 cases with no PPT (6.4%) and all of three cases with PPT (100%) were positive for Anti-Tg antibodies; and the correlation between Anti-Tg antibodies and development of PPT was found to be statistically significant ($p<0.001$).

Table-I: Compared data on thyroid functions of pregnants and controls.

	Pregnants at the the 3rd trimester (n= 50)	*Controls (n= 50)*	*p*
TSH (μIU/ml)	2.22 ± 0.96	1.66 ± 0.89	0.003
fT3 (pg/ml)	2.71 ± 0.39	3.15 ± 0.50	<0.001
fT4 (ng/dl)	0.93 ± 0.14	1.15 ± 0.13	<0.001
Anti TPO(U/ml)	20.04 ± 28.96	27.36 ± 51.01	>0.05
Anti Tg (U/ml)	27.83 ± 58.88	58.91 ± 86.35	0.009

TSH: Thyroid stimulating hormone
fT3: free triiodothyronine
fT4: free thyroxine
Anti-TPO: Anti- thyroid peroxidase
Anti-Tg Anti- thyroglobuline

There was a history of smoking in 7 of 47 cases with no PPT (14.9%), one of three cases with PPT (33%) and 11 of control cases (22%). No significant correlation was detected between smoking and thyroid disfunction (p>0.05). Having a look at the gender of fetuses, it was seen that 30 were male and 20 were female. Two cases with PPT were pregnant to a boy and one was carrying a girl. The correlation between the gender of fetus and development of PPT was statistically insignificant (p>0.05).

DISCUSSION

PPT is an autoimmune disease characterized by the lymphocytic infiltration of thyroid gland. It emerges within the first year postpartum and manifests by a transient thyrotoxicosis and subsequent hypothyroidism. With a variable prevalence, it is reported to be seen among 5-10% of general population. On the other hand, in a study performed at Liguria region of Italy in 2008, the prevalence of PPT was reported to be 18%.[1,2] In another study of 4394 pregnants, again in Italy, its incidence was found to be 3.9%; whereas a Spanish study declared their PPT incidence as 15.9%.[3,4] These variances might be due to different environmental and genetic risk factors.

It is considered that genetic susceptibility might have a role in the development of PPT. As in the other autoimmune diseases, various PPT ranges are detected all around the world due to changing genetic profiles of ethnical groups and correlation studies are carried on to elucidate any certain HLA type.

In this study, we aimed to investigate the frequency of the development of PPT at an early period postpartum among our fifty pregnant cases. We evaluated these fifty pregnants with no history of any known thyroid disease in terms of thyroidal functions at first month postpartum. In this group, we found three cases to develop PPT and designated the incidence of PPT at first month postpartum as 6%.

Iodine intake is considered as a risk factor for PPT[5], but it is yet controversial. As such in a country like Thailand where iodine intake is low, the prevalence of PPT is 1.1%; in regions like Italy known to have mild iodine deficiency it increases to ranges as 18%.[2,6] Also, it is reported that iodine supplementation does not prevent women with iodine deficiency to develop PPT.[7] Despite the iodine prophylaxis, Turkey is still a country that suffers from moderate-severe iodine deficiency.[8] But yet, we could not find any study on the relation between PPT and iodine deficiency in Turkey in the literature. As well, this is a cross-sectional study designed to investigate the incidence of PPT and it does not include the data about iodine status of the cases.

Table-II: Compared data on thyroid functions of pregnant group at the 3rd trimester and the first month postpartum.

	Pregnants(n= 50)		*p*
	The 3rd trimester	*The first month postpartum*	
TSH (μIU/ml)	2.22 ± 0.96	1.36 ± 1.26	0,000
fT3 (pg/ml)	2.71 ± 0.39	3.22 ± 0.53	0,000
fT4 (ng/dl)	0.93 ± 0.14	1.08 ± 0.17	0,000
Anti TPO (U/ml)	20.04 ± 28.96	48.27 ± 131.73	0,019
Anti Tg (U/ml)	27.83 ± 58.88	63.07 ± 133.54	0.000

TSH: Thyroid stimulating hormone
fT3: free triiodothyronine
fT4: free thyroxine
Anti-TPO: Anti- thyroid peroxidase
Anti-Tg Anti- thyroglobuline

Clinically, PPT is known to manifest by a transient thyrotoxicosis and a subsequent hypothyroidism. But transient hypothyroidism might be the only presentation. In a study by Kita et al on 1594 postpartum women, the incidence of PPT was reported to be 2.4%; and among PPT patients, 18% had only hyperthyroidism, 40% had only hypothyroidism and 42% had biphasic course.[9] In an Italian study carried out on 4384 pregnants, PPT was detected in 169 women (3.9%); and of these 82% were found to be in hypothyroidal status at first year postpartum.[3] Also in a Brazilian study of 284 patients, PPT was detected in 14 cases (5.3%) and it was seen that all PPT patients were in thyrotoxic status.[10] In our study, two of three PPT patients were found to be in thyrotoxic and one was in hypothyroid status. During the follow- up of thyrotoxic patients, hypothyroidism was detected at the 3rd month postpartum in one case and at 4th month in the other. In our opinion, we were able to detect the hyperthyroid period for we examined the patients in an early postpartum period. Because of the late examinations, patients are generally determined within the hypothyroid phase. Pregnant woman who develop PPT should be monitored at least for six months because they can usually return to euthyroid state spontaneously. However, this is a limitaiton in our study as results of longterm follow up of the patients is not available.

In the literature, there are studies demonstrating a strong correlation between the development of PPT and Anti-TPO positiveness.[4,5,11] The frequency of development of PPT among women who had high levels of Anti-TPO or Anti-Tg at the first trimester is reported to be 33-50%.[1] Additionally, it is pronounced that the possibility to develop PPT

increases as the thyroid antibody titers increase. By the progression of pregnancy, these titers decrease significantly and drop off to undetectable levels at the 3rd trimester in 25% of the pregnants who were found to be positive for antibodies in the first trimester. Typically, it is higher at the postpartum period than it is in the first trimester and returns to basal levels approximately within a year. In our study, five pregnant women (10%) were positive for Anti-TPO and three (60%) of these developed PPT. We found a statistically significant correlation between Anti-TPO and development of PPT. Also, there was a significant increase in mean Anti-TPO and Anti-Tg levels at first month postpartum, compared with the the 3rd trimester levels. The reason for detecting Anti-TPO positiveness in only 10% of all pregnants might be our evaluating them at the 3rd trimester, initially. We think that the decrease in antibody titers might be due to immunusupression dependent on pregnancy.

It is suggested that the recurrence rate of PPT in the subsequent pregnancy is 70%.[9,12] So, it becomes important to follow-up all women with positive Anti-TPO levels during their subsequent pregnancies. In our study, no cases had a prior history of PPT.

There are a few studies in the literature that investigate the effects of smoking and fetal gender on PPT risk.[9,13] Consistently, we found no correlation between PPT and smoking/ fetal gender.

In this study, the initial evaluation of thyroidal functions were carried out at the 3rd trimester; and it was seen that their fT3 and fT4 levels wee significantly lower compared with the control group'. On the contrary, these levels were found to be increased at first month postpartum. It is obvious that some changes in free thyroid hormon levels occur during pregnancy. At the first trimester, increases in thyroid hormon levels are observed due to TSH- like activity of hCG, increments in thyroxine binding globulin levels, enhancement of transplasental passage and renal iodine excretion. Since than, fT3 and fT4 levels start to drop off and might be under the normal ranges at the 3rd trimester.[14] The impaired thyroid functions at late pregnancy has been associated with reduction of thyroid hormon receptor expression.[15] Our findings are consistent with these data.

In conclusion, we determined the incidence of PPT at first month postpartum as 6%. Our PPT cases were positive for at least one antibody. We assume that evaluation of thyroid function tests in the first prenatal visit of a pregnant women might be beneficial in a country in which tyroid diseases are common such as Turkey. However in order to screen all pregnant women with tyroid function tests, we definetly need more literature support. Also, we find it necessary to pronounce that early postpartum evaluation of pregnants with positive thyroid antibodies might be useful in early diagnosis of PPT and therefore might reduce any associated morbidity.

Authors Contribution: Study was conceived and designed by Bekir Cakır, planned by Bekir Cakır, Filiz Avsar, Gul Gursoy and Yusuf Ergun, data collection was done by Husniye Baser and Salih Baser, draft writing was done by Husniye Baser, Salih Baser and Reyhan Ersoy.

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