The Journal of
OBSTETRICS AND GYNECOLOGY of India

J Obstet Gynecol India Vol. 59, No. 2 : March/April 2009 pg 156-159

Original Article

Postpartum thyroid dysfunction – Is there any relation with antepartum serum Thyroid Peroxidase (TPO) antibody status?

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Abstract

Objectives: To find out any possible relationship between the presence of thyroid antibody (antiTPO-Ab) in early antenatal period and the development of thyroid dysfunction at post partum period. *Methods :* Sixty three women of 16 to 18 weeks of pregnancy were screened and studied. The women were followed up till the sixth post partum month. Statistical analysis was done by Fisher's Exact test and Mann-Whitney U test. *Results:* Anti TPO-antibody positivity in antenatal women is 9.52%. TPO antibody positive women when compared with negative women showed significant differences in the development of post partum thyroid dysfunction (33.33% vs. 1.75%, P=0.022), mean serum TSH level (2.7 vs 1.72, P=0.01) and history of miscarriages (66.67% vs 14.03%, P=0.01). *Conclusions :* The risk of development post partum thyroid dysfunction increases significantly in women with positive TPO antibody and mean serum TSH level >2mU/1 measured in 16 to 18 weeks of pregnancy. Screening of women with other immunological disorders or history of miscarriage can be done during antenatal period.

Key words: postpartum thyroid dysfunction (PPTD), TPO-antibody, miscarriages

Introduction

Postpartum thyroiditis (PPT) is a syndrome of transient or permanent thyroid dysfunction occurring in the first year after delivery and based on an autoimmune inflammation of the thyroid. The prevalence of PPT varies from 1.1 to 16.7%, with a mean prevalence of 7.5% [1]. Postpartum thyroid dysfunction is accompanied by a significant elevation of circulating thyroid antibodies. Despite the strong association between thyroid antibodies and the development of PPT, only some 50% of the TPO antibody positive women develop PPTD. The occurrence of postpartum thyroid dysfunction in anti TPO antibody negative women is much less. The probability of developing persistent hypothyroidism after a PPT with hypothyroidism episode is 56% [2].

We conducted this study in a tertiary care hospital to find out any possible contribution of TPO antibody in early antenatal period (<20 weeks), on the development of postpartum thyroid dysfunction.

Paper received on 12/02/2008 ; accepted on 09/02/2009

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Methods

The present study was undertaken in the department of obstetrics and gynecology, in collaboration with departments of biochemistry and endocrinology from May 2005 where 63 consecutive pregnant women between 16 and 18 weeks of pregnancy were selected from booked antenatal cases attending the OPD and followed up in postnatal clinic up to six months. Screening of those pregnant women was done who were not having any type of known thyroid disorders beforehand. Serum free T_4, free T_3, TSH and TPO antibody levels were measured by chemiluminescent method during the antenatal period. Serum free T_4 and TSH levels were repeated at 6 weeks postpartum and at six weeks interval up to six months postpartum. Statistical analysis was done by statistical version 6 (Statsoft Incorporation, Tulsa, Oklahoma, USA; 2001). Categorical variables between the groups were compared by Fisher's Exact test; numerical variables between the groups were compared by Mann-Whitney U test. P value <0.05 was considered to be statistically significant.

Results

Total number of pregnant women screened for TPO antibody was 63; among them six were detected as anti TPO antibody positive. So, 9.52% antenatal cases were anti TPO antibody positive (Table 1).

In TPO antibody positive women 33.33% were less than 20 years of age. In 33.33% TPO antibody positive women, associated medical disorder was SLE. Postpartum thyroid dysfunction developed in three mothers. Among them TPO antibody positivity was 66.67% (2 cases out of 3).

Incidence of PPTD with respect to TPO antibody status is statistically significant (33.33% vs 1.75%, P value = 0.022 in TPO antibody positive and negative mothers respectively) (Table 2).

By using Mann-Whitney U test, mean serum TSH level was compared between TPO antibody positive and negative women (2.70 vs 1.72), where P value is =0.01 which is statistically significant (Table 3).

History of miscarriages in TPO antibody positive and negative mothers were found in 66.67% and 14.03% cases respectively, where P value (=0.01) is statistically significant (Table 4).

Discussion: Thyroid peroxidase antibody is expressed on the apical membrane of thyrocytes, directly facing the colloid, where it catalyzes iodide oxidation and iodination of tyrosyl residues of thyroglobulin. Postpartum thyroiditis is pathologically characterized by chronic lymphocytic infiltration.

Table 1. Incidence of TPO antibody positivity in antenatal women.

Number of antenatal women screened for TPO antibody status	TPO antibody positive women	Percentage
63	6	9.52

Table 2. Number of mothers developed PPTD with respect to TPO antibody status.

TPO antibody positive (n=6)		TPO antibody negative (n=57)		P value
Not developed PPTD	Developed PPTD	Not developed PPTD	Developed PPTD	
4(66.67%)	2(33.33%)	56(98.25%)	1(1.75%)	0.022

Table 3. Comparison of mean serum TSH levels between TPO antibody positive and negative women.

TPO antibody positive women	TPO antibody negative women	P value
2.7	1.72	0.01

Table 4. Previous history of miscarriage in relation to TPO antibody status.

TPO antibody positive (n=6)	TPO antibody negative (n=57)			P value
H/o miscarriage	No h/o miscarriage	H/o Miscarriage	No h/o miscarriage	
4(66.67%)	2(33.33%)	8(14.03%)	49(85.97%)	0.01

An analysis using decision tree model concludes that screening for PPT is likely to be reasonably cost effective and should be considered for inclusion as part of routine pregnancy care[3]. Lucas et al recommended evaluation at the 6th postpartum month to diagnose the majority of PPT women and indefinite follow up of hypothyroid PPT patients to detect permanent hypothyroidism[4].

Autoimmune thyroid disease is suppressed to some degree by the immunologic changes of pregnancy. The peripheral T-lymphocyte subset ratio (CD4/CD8) has been shown to be higher in TPO antibody positive women who developed post partum thyroid dysfunction compared with similar antibody positive women who did not. Thyroid peroxidase antibodies are present in 10% of the women at 14 weeks gestation[5]. In our study the percentage of anti TPO antibody positivity in antenatal mothers was 9.52%.

The thyroid dysfunction that occurs in up to 50% of the antibody positive women comprises 19% with thyrotoxicosis alone, 49% hypothyroidism alone, and the remaining 32% with both (i.e., biphasic)[6]. In the current study 66.67% of the mothers developed hyperthyroidism and 33.33% mothers developed hypothyroidism at six weeks postpartum and among them 33.33% of the mothers persisted as hypothyroid at six months postpartum (i.e. one in three cases) and presenting symptom were vague nonspecific.

PPTD occurs in 50% of the 10% of women who may be found to be anti TPO positive in early pregnancy[6]. PPTD has been described in a small number of women who do not have circulating thyroid antibodies. In the current study 33.33% of the TPO antibody positive women and 1.75% of the TPO antibody negative women developed PPTD during the study period which is statistically significant (P value is =0.022) (Table 2).

TSH below 2mU/l is commonly associated with relatively low titers of thyroid antibodies. When serum TSH is still within the normal range but between 2 and 4 mU/1 in early gestation, it is frequently associated with higher titers of thyroid antibodies[7]. In the current study, TSH level in majority of the TPO antibody positive women is >2mU/l. Mean TSH level, when compared between TPO antibody positive and negative women, the P value is =0.01, which is statistically significant (Table 3). So screening for the development of PPTD can be done to those antenatal mothers having serum TSH level >2mU/l as detection of TPO antibody cannot be done routinely due to cost factor.

Women at a high risk for postpartum thyroiditis are those with a personal or family history of autoimmune disease, and those with a previous postpartum episode[8]. In the current study history of miscarriages in TPO antibody positive and negative mothers were found in 66.67% & 14.03% cases respectively, where P value (=0.02) is statistically significant (Table 4). Postpartum thyroid dysfunction reoccurs in 75% of the women in a subsequent pregnancy[9].

Low thyroid reserve due to autoimmune thyroiditis is increasingly recognized as a serious health problem. 1) Thyroid autoimmunity increases the probability of spontaneous fetal loss. 2) Thyroid failure due to autoimmune thyroiditis - often mild and sub clinical – can lead to permanent and significant impairment in neuropsychological performance of the offspring. 3) Evidence is emerging that as women age, sub-clinical hypothyroidism as a sequel of postpartum thyroiditis predisposes them to cardiovascular diseases[10]. Women with a TSH greater than 10mU/l, or between 4 and 10mU/l with symptoms or attempting pregnancy, require thyroid hormone replacement[1].

Conclusion

TPO antibody positivity in the development of postpartum thyroid dysfunction was found significant when compared to TPO antibody negativity. Significant differences were also noted in serum TSH level between TPO antibody positive and negative women. The benefit of treating hypothyroidism and the importance of achieving euthyroidism before and during the

subsequent pregnancy can be done by the screening of women with history of miscarriage or other immunological disorders.

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