Thyroid Autoantibodies in Pregnancy and its Implications

Saji Vijayan[a], Jaico Paulose[a], Anitha S[b], Lathika K[b], Paulose K P[a]

a. Department of Medicine, SUT Hospital, Pattom, Thiruvananthapuram
b. Department of Obstetrics and Gynecology, SUT Hospital, Pattom, Thiruvananthapuram*

ABSTRACT

Published on 29th June 2010

Introduction: Inadequate thyroid hormone during pregnancy could adversely affect the child's intelligence.[1] In addition to playing an important role in the development of a growing fetus, proper thyroid hormone levels also help to minimize the chance of any thyroid disorders after delivery. Post partum thyroiditis usually presents 3-6 months after delivery. A prior history of thyroiditis, the presence of anti-thyroid antibodies and a previous history of post partum thyroiditis increases the risk of developing post partum thyroiditis.

Objective: The present study is aimed at evaluating the prevalence of anti-thyroid antibodies and subsequent post partum thyroiditis among pregnant women in an urban population in Kerala.

Materials and Methods: 262 pregnant women aged 19-40 yrs. who could be followed upto their delivery and post partum period were selected for the study.

Observations: Thyroid Autoantibodies were assessed (antithyroglobulin –ATG and antimicrosomal – TPO) in 262 pregnant women. Twenty nine percent of patients (76) had thyroid Autoantibodies; (53% of this group had only TPO positivity, 17% ATG positivity and 30% had both positivity). Of the 76 patients with antibodies positive, 5 were (7%) hypothyroid, while only one patient without antibodies (0.5%) was hypothyroid (difference significant P. value 0.008). Post partum thyroiditis developed in 5.2% of patients[4] with positive antibodies while the prevalence was only 0.5% (one patient) in antibodies negative patients – this difference was also statistically significant (P value 0.02).

Conclusions: The detection of thyroid autoantibodies will help to predict post partum thyroiditis at a later state in pregnant women.

Keywords: Thyroid function, Pregnant women, Autoantibody, Postpartum thyroiditis, Pregnant women

*See End Note for complete author details

INTRODUCTION

A healthy, well functioning thyroid gland is important to women in their childbearing years; Inadequate thyroid hormone during pregnancy could adversely affect the child's intelligence.[1] In addition to playing an important role in the development of a growing fetus, proper thyroid hormone levels also help to minimize the chance of any thyroid disorders after delivery.

One particular postpartum complication to be expected is post partum thyroiditis usually presenting 3-6 months after delivery. A prior history of thyroiditis, the presence of anti-thyroid antibodies and a previous history of post partum thyroiditis increases the risk of developing post partum thyroiditis.

According to the American Thyroid Association,[1] 5 to 7 percent of women worldwide develop this disease making it a relatively common disorder. According to various studies, the prevalence of post partum thyroiditis ranges between 1.1% and 16.7% with a mean prevalence rate of 7.2%.[2]

Since, about 90% of the women who develop post partum thyroiditis eventually develop Hashimoto's thyroiditis, the detection of anti-thyroid antibodies during pregnancy could help to predict which women are at risk for developing both disorders.

In addition to the increased risk of developing post partum thyroiditis, the presence of anti-thyroid antibodies during pregnancy has been linked to an increased incidence of infertility, miscarriage, and post partum depression.

OBJECTIVE

The present study is aimed at evaluating the prevalence of anti-thyroid antibodies and subsequent post partum

Corresponding Author:
Dr. Paulose KP, Chief Physician, Department of Medicine, SUT Hospital, Pattom, Thiruvananthapuram.
Mobile: 9526769777. Email: simlupaul@gmail.com

thyroiditis among pregnant women in an urban population in Kerala.

To our knowledge, no such study has been done before in Kerala.

The Patient Population

262 pregnant women aged 19-40 yrs. who could be followed upto to their delivery and post partum period were selected for the study. In addition to the routine clinical examination, history taking, US Abdomen and laboratory tests, serum anti-thyroid antibodies (thyroglobulin and thyroid peroxidase autoantibodies) and serum TSH values were also estimated in these patients. Also in cases where TSH was abnormal, free T3/T4 values were also estimated.

Enhanced chemiluminiscent - immuno assays were used for estimating hormone and antibody levels

The normal values of our laboratory were Serum TSH : 0.4 to 5.0iu/ml.

Serum Anti-peroxidase antibody (TPO Ab) : Normal upto 34 IU/dL (Also called antimicrosomal antibody), Serum Anti-thyroglobulin antibody (TG Ab.) : Normal upto 115 IU/dL.

The study period was 18months, from April 2005 to September 2006.All these patients had the regular antenatal check ups and were followed up through out their pregnancy and delivery. Pregnant women with no thyroid autoantibodies, were taken as controls. All subjects were then followed up for 6 months after delivery and those with relevant complaints suggestive of PPT were requested to attend the clinic for a thorough clinical check up, blood investigations and expert management.

RESULTS

I. Prevalence of Antithyroid antibodies:

Of the 262 patients screened, 15% (40) were in 1st trimester, 39% (101) were in 2nd trimester and 46% (121) were in 3rd trimester 76 patients (29%) had thyroid autoantibodies in this group of 262 patients. Among these 76 patients 53% (40) had thyroid peroxidase autoantibody positivity (TPO Ab) only; 17.0% (13) had thyroglobulin autoantibody positivity (TG Ab) only, and 30% (23) had both antibodies. (See Table 1).

Table 1. Prevalence of Antithyroid antibodies

Antibodies	Number	Percentage
Both +ve	23	30
TPO only	40	53
ATG only	13	17
Total	76	

II. Anti-thyroid antibodies and hypothyroidism.

Among the 76 patients with positive thyroid antibodies, TSH values were high in five (7%) ranging from 6.5 μ IU/ml. to >100μ IU/dL. Three patients had both antibodies positivity and one TPO positivity and one had TAG positivity. There was only one hypothyroid patient in the group without thyroid autoantibodies (0.5%). This difference was statistically significant (P value 0.008). Among the hypothyroids, 83% (5) had either one or both antibodies positivity.

III. Antithyroid antibodies, fetal loss and neonatal deaths:

Since anti-thyroid antibodies are linked with spontaneous abortions, fetal loss, miscarriages and infertility, we analysed the data on patients with history of spontaneous abortions and fetal loss.

Among those screened, 24% (62/262) had history of spontaneous abortions and / or fetal loss. And out of this, 26% 16) had one or both Antithyroid antibodies positive, 74% (46) had no antibodies, thus showing no relationship with the presence of thyroid autoantibodies and pregnancy wastage.

Thyroid function studies were done in 15 children born to mothers with positive antithyroid antibodies and interestingly all these babies had normal thyroid function tests.

IV. Post Partum Thyroiditis (PPT):

Follow up of these patients revealed 5 cases of PPT, an incidence of only 2% (5/262). Four patients (5.2%) from the study group (positive Ab) and 1 (0.5%) from the control group (negative Ab) developed PPT. This difference is also statistically significant (P value 0.02). 3 patients had symptoms suggestive of hyperthyroidism, 1 had symptoms of hypothyroidisim and one was euthyroid.

DISCUSSION

The first thyroid autoantibody discovered was antithyroglobulin antibody (ATG Ab) (1956). Later, antibodies to antigens present in the cytoplasm of thyroid follicular cells were detected in 1976. These "cytoplasmic" antigens were the same as the enzyme thyroid peroxidase and hence these antibodies are called thyroid peroxidase antibodies (TPO Ab.).[5,6] TPO Abs

appeared to be much more prevalent than TG Abs.

TPO Ab is related to various complications related to pregnancy, like Post Partum Thyroiditis, Fetal loss and Fetal thyroid dysfunction. Although symptoms are temporary and usually mild in PPT, each woman may experience symptoms differently. When the thyroid becomes inflamed, it will first emit large quantities of thyroid hormone into the blood stream (Hyperthyroidism phase). Once this initial phase passes, a woman either recovers completely or has sustained damage to her thyroid, thus developing hypothyroidism (underactive thyroid phase). Our study revealed 5 subjects (4 from the study group and 1 from the control group) with symptoms of post – partum thyroiditis, an overall incidence of 2% which is very low compared to other reports in the literature. However in the patients with positive antibodies (76) the incidence of PPT was 5.2% as compared to 0.5% in the patients with negative antibodies and this difference is statistically significant (P value 0.02).

Similarly 5 patients in the antibody positive group (5/76-7%) and one from the negative antibody group (1/126-0.5%) were hypothyroid. This difference was also statistically significant (P value 0.008). So also in patients who were hypothyroid, 83% 5/6) were having thyroid autoantibodies positivity. Although the presence of thyroid peroxidase antibodies is reported to be associated with spontaneous pregnancy loss, we did not find any relationship with pregnancy wastage and presence of thyroid autoantibodies in the present group of patients.

15 babies of born to mothers with high values of either or both thyroid autoantibodies were subjected to thyroid function studies (T3, T4, TSH) and all those babies had normal serum thyroid function tests. Due to economic constraints we could not do the thyroid autoantibodies in these babies.

Antithyroid peroxidase antibody is considered to be the best available screening tool for postpartum thyroiditis. It is widely available, economical, and reproducible. Studies evaluating thyroid peroxidase as a screening tool for PPT have revealed a sensitivity of 0.46 – 0.89, with a specificity of 0.91 – 0.98. The positive predictive value has varied from 0.40 –0.78.[4] Since there is a clear association with the presence of thyroid peroxidase and PPT ; the high percentage of patients (29%) with thyroid autoantibodies in this group of patients is indeed a matter of concern.

Moreover, this study also shows that the mere presence of maternal anti-thyroid antibodies doesn't necessarily imply thyroid dysfunction in the neonates.

Thus it is high time to screen and identify every pregnant woman who is at risk of developing post partum thyroiditis and hypothyroidism by estimation of the presence of thyroid autoantibodies.

END NOTE

Author Information

1. Saji Vijayan, Research Assistant, Department of Medicine, SUT Hospital, Pattom, Thiruvananthapuram
2. Jaico Paulose, Senior Resident, Department of Medicine, SUT Hospital, Pattom, Thiruvananthapuram
3. Anitha S, Registrar, Department of Obstetrics and Gynecology, SUT Hospital, Pattom, Thiruvananthapuram
4. Lathika K, Registrar, Department of Obstetrics and Gynecology, SUT Hospital, Pattom, Thiruvananthapuram
5. Paulose KP, Chief Physician, Department of Medicine, SUT Hospital, Pattom, Thiruvananthapuram-695004.

Conflict of Interest: None declared

Cite this article as: Saji Vijayan, Jaico Paulose, Anitha S, Lathika K, Paulose K P. Thyroid Autoantibodies in Pregnancy and its Implications. Kerala Medical Journal. 2010 Jun 29;3(2):38-40

REFERENCES

1. The American Thyroid Association Public Health Committee Statement. Thyroid. 1999 Sep 1;9(9):971–2.
2. Stagnaro-Green A. Postpartum thyroiditis. Best Practice & Research Clinical Endocrinology & Metabolism. 2004 Jun 1;18(2):303–16.
3. Roitt IM, Doniach D, Campbell PN, Hudson RV. Auto-antibodies in Hashimoto's disease (lymphadenoid goitre). Lancet. 1956 Oct 20;271(6947):820–1.
4. Amino N, Hagen SR, Yamada N, Refetoff S. Measurement of circulating thyroid microsomal antibodies by the tanned red cell haemagglutination technique: its usefulness in the diagnosis of autoimmune thyroid diseases. Clin Endocrinol (Oxf). 1976 Mar;5(2):115–25.
5. Libert F, Ruel J, Ludgate M, Swillens S, Alexander N, Vassart G, et al. Complete nucleotide sequence of the human thyroperoxidase-microsomal antigen cDNA. Nucleic Acids Res. 1987 Aug 25;15(16):6735.
6. McLachlan SM, Rapoport B. The molecular biology of thyroid peroxidase: cloning, expression and role as autoantigen in autoimmune thyroid disease. Endocr Rev. 1992 May;13(2):192–206.
7. Smallridge RC. Postpartum thyroid disease A model of immunologic dysfunction. Clinical and Applied Immunology Reviews. 2000 Mar 1;1(2):89–103.