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For further information about this article or if you need reprints, please contact:

A.R. Mansourian
Biochemistry and Metabolic
Disorder Research center,
Golestan University of Medical
Sciences,
P.O. Box 49175-533,
Gorgan, Iran

Tel: +98(171) 4425165
Fax: +98(171) 4425660

Serum Thyroid Hormone Level in Women with Nausea and Vomiting in Early Pregnancy

¹F. Shahmohammdi, ²A.R. Mansourian and ³H.R. Mansourian

The aim of this study was to establish the relationship between the serum Thyroid Stimulating Hormone (TSH) and thyroxin (T4) which reflect thyroid function assessment, with nausea and vomiting, among pregnant women in early pregnancy. In present study 60 pregnant women without nausea and vomiting compared with 60 pregnant women with nausea and vomiting during 2007-2008. Two groups of case and control were matched. Patients with nausea and vomiting did not have significant differences when compared with control subjects in TSH level, the data from this investigation indicated that, T4 level elevated among 34 subjects (56.6%) with nausea and vomiting compared to 20 subjects (33.3%) of women without nausea and vomiting. These data suggest that there is a role for elevated T4 in nausea and vomiting among pregnant women, in early pregnancy.

Key words: Pregnant women, nausea and vomiting, thyroid stimulating hormone, thyroxin

¹Department of Gynecology, Medical School, Islamic Azad University, Tehran, Iran

²Biochemistry and Metabolic Disorder Research Center, Gorgan Medical School, Golestan University of Medical Sciences, Gorgan, Iran

³Medical School, Islamic Azad University, Tehran, Iran

INTRODUCTION

Nausea and vomiting of pregnancy (NVP) is the most common medical condition of pregnancy, affecting up to 80% of all pregnancies to some degree. In most cases it subsides by the week 16 of pregnancy, although up to 20% of women continue to have symptoms throughout pregnancy. Severe NVP (hyperemesis gravidarum) affects <1% of women and in some severe cases can require hospitalization and rehydration of fluids. Women suffer not only physically but also psychologically, which has been documented in a number of studies. In addition, some women have decided to terminate their pregnancy rather than tolerate severe symptoms. Even less severe cases of NVP can have significant adverse effects on the quality of a women's life, affecting her occupational, social, domestic functioning and general well being (Sheehan, 2007). Hyperthyroidism is frequently encountered in hyperemesis gravidarum, but its relation to the cause of hyperemesis is unknown. The etiology of nausea and vomiting and its sever form, hyperemesis gravidarum, which in emergency cases require intravenous rehydration therapy, remain unclear. For many years there has been speculation that either Human Chorionic Gonadotropin (HCG), or, estradiol might be causative, HCG has been suspected chiefly based on the observation that its peak coincides the peak of nausea and vomiting. The pharmacological effect of estrogen including nausea and vomiting has also made it a likely candidate within the last decade biochemical hyperthyroidism associated with nausea and vomiting and its sever form hyperemesis gravidarum has been described and also attributed by some to HCG because of the known thyrotropic activity of this hormone (Verberg *et al.*, 2005; Haddow *et al.*, 2008). Thyroid disorder constitute one of the commonest endocrine problems found in pregnant women. The diagnosis of hyperthyroidism in pregnancy may be often challenging due to the fact that its symptoms mimic many of normal pregnancy complaint. Moreover, some forms of hyperthyroidism occur, exclusively during this period (Krysiak *et al.*, 2006).

Thyroid disorder are observed more frequently in women compared with men in particular during the childbearing period. It is therefore not unusual to encounter thyroid function abnormalities during a routine laboratory evaluation carried out for pregnant women, which can be one of the causative factor for nausea and vomiting during pregnancy. The aim of this present study was to investigate the role played by, Thyroid Stimulating Hormone (TSH) and thyroxin (T4), in nausea and vomiting, which is the most medical condition of pregnancy.

MATERIALS AND METHODS

In present study, 60 pregnant women, in their early pregnancy with nausea and vomiting as case and 60 matched pregnant women without any nausea and vomiting as control, were selected from patients referred to the Danesh medical diagnostic research center during 2007-2008 in Gorgan, the capital city of Golestan province located in the south-east of Caspian sea, in the north-east of Iran. Two milliliter of venous blood taken and serum was separated after centrifugation, following confirmation of pregnancy, a questionnaire was given to each women, which contain demographic questions and whether the pregnant women had nausea and vomiting. Hormonal determination of TSH and T4 were carried out on 60 case and 60 control pregnant women, using Enzyme-linked Immunosorbant Assay (ELISA) technique. The gathered data of TSH and T4 entered into the computer, SPSS-11.5 software were used to analyze the results and compare between two groups.

The normal range for TSH and T4 were 0.32-5.2 mIU L⁻¹ and 4.7-12.5 µg dL⁻¹, respectively. The T4 higher than 12.5 µg dL⁻¹ or TSH below 0.32 mIU L⁻¹ considered as hyperthyroidism.

RESULTS

In the first year, study hormonal determination of TSH and T4 of 60 pregnant women with nausea and vomiting as a case and 60 as pregnant women without any nausea and vomiting control subjects were determined. The information regarding thyroid function among the case and control subjects presented in (Table 1, 2).

Women with nausea and vomiting differed with respect to their Serum T4 level (Table 1). It means that 56.6% of case group had elevated T4 level Compared to 33.3% of Control group. There were not any meaningful differences regarding TSH level among case and control

Table 1: Serum T4 level among case (with nausea and vomiting) and controls pregnant women

T4 (µg dL ⁻¹)	Case (n = 60)	Control
>12.5 (elevated)	34 (56.6 %)	20 (33.3%)
4.7-12.5 (normal range)	26 (43.3%)	40 (66.6%)

Table 2: Serum TSH level among case (with nausea and vomiting) and controls pregnant women

TSH (mIU L ⁻¹)	Case	Control
<0.3 (suppressed)	6(10%)	6 (10%)
0.32-5.2 (normal range)	54(90%)	54 (90%)

Table 3: Mean Serum T4 and TSH level among case (with nausea and vomiting) and control pregnancy women

Case	TSH (mIU L ⁻¹)	T4 (µg dL ⁻¹)
Without nausea and vomiting	1.2	10.3
Without nausea and vomiting	1.4	11.3

group (Table 2). The results related to the thyroid function among women with nausea and vomiting and control groups are also presented in Table 3.

In the present study the mean age of case and control did not have any differences, (26.0 year versus 26.1 year). In this study about 80% of whole sample population had 1 to 2 gravid (50% with one and 30% with two gravid) and there was not any noticeable differences among case and control groups; Regarding parity 62 and 40% were in their first and second parity respectively, also there was not any noticeable differences among the case and control pregnant women.

The sample population in this study were in their early pregnancy, 81% in their 5 weeks of pregnancy and cases had mild to moderate nausea and vomiting (50, 22% mild and moderate, respectively) none of present cases had the sever form of nausea and vomiting which defined as, hyperemesis gravidarum.

DISCUSSION

Nausea and vomiting are common during pregnancy and when severe enough to require intervention, may develop into the syndrome known as hyperemesis gravidarum. when the diagnosis of hyperemesis is considered, a careful search for secondary causes is necessary. Among the list of secondary causes includes hyperthyroidism. Up to 90% of pregnant women experience NVP, the pathogenesis remains poorly understood with multifactorial theories proposed combining both biologic and psychological factors. Thyroid disease requires special care for pregnant women or those desiring pregnancy.

Biochemical hyperthyroidism is a common self-limited finding in pregnant women with nausea and vomiting and its sever form of hyperemesis gravidarum. Patients with these findings did not have clinical condition indicative of Grave's disease or thyroid antibodies, including TSH receptor antibodies, antimicrosomal antibodies and antithyroglobulin antibodies. In a study cohichis performed on the role of HCG on nausea and vomiting and its sever form, hyperemesis gravidarum it was argued that, HCG ultimately stimulate the thyroid gland and if nausea and vomiting is frequently seen among pregnant women with greater HCG concentration, it is due to hyperactivity of thyroid gland. In the later investigation it was also shown that the degree of thyroid stimulation as indicated by clinical test varied directly with the severity of nausea and vomiting over the range of symptoms from no nausea and vomiting to severe hyperemesis. Other study by Fantz *et al.* (1999) also indicated that thyroid dysfunction during pregnancy among some women cause sever

vomiting and the proper use of laboratory tests for the diagnosis of thyroid dysfunction in the pregnant women, seem to be necessary. In other study on the role of thyroid hormone in pregnant Chinese women, it was shown that also maternal age and all hormones were significantly different between the pregnant women with nausea and vomiting and the control group, however the analysis indicated that only age, thyroxine and thyroid stimulating hormone, were Significant independent variables, Panesar *et al.* (2001) concluded that human chorionic gonadotropin is not independently involved in the etiology of nausea and vomiting and its sever form hyperemesis gravidarum, but may be indirectly involved by its ability to stimulate the thyroid gland. In other study, in Italy it is shown that, transient hyperthyroidism of hyperemesis. gravidarum is a self-limiting hyperthyroidism occurring in the context of hyperemesis gravidarum, which consist of 40 to 70% of thyroid function abnormalities in pregnancy which is reported mainly responsible by elevation of human chorionic gonadotropin level (Caffrey, 2000). Hormonal profile of Kuwaiti women also indicated that thyroid hormones among pregnant women with nausea and vomiting and its sever form hyperemesis gravidarum significantly higher (Al-Yatama *et al.*, 2002).

Morning Sickness and thyroid function even in normal pregnancy among Chines women in early pregnancy demonstrated that, a significant increase in serum T4 and a decrease in serum TSH were observed relative to the level in nonpregnant controls, (Pansear *et al.*, 2001). On other hand there are some reports which disputed if, hyperemesis patients and pregnant women with mild nausea and vomiting differ from asymptomatic pregnant women with respect to thyroid function (Verberg *et al.*, 2005) but there are huge reports and evidences that show hyperthyroidism play an important role in causing nausea and vomiting and its sever form hyperemesis gravidarum (Glinoeer *et al.*, 1993; Verberg *et al.*, 2005; Goodwin *et al.*, 1992).

The results of present study are in agreement with the important role of hyperthyroidism in stimulating nausea and vomiting. According to our finding, when the thyroid hormone level of two groups of pregnant women with nausea and vomiting and without nausea and vomiting, are compared, it is found in particular that the case group differ from controls in respect to T4 serum level with regard to many reports which are mentioned in this article, we argue that hyperactivity of thyroid gland and production of higher level of thyroxin may be responsible for the nausea and vomiting during pregnancy, among our sample population. It should be

mentioned that hormonal change and metabolic demand even during normal pregnancy results in profound alteration in the biochemical parameters of thyroid function (Verberg *et al.*, 2005).

For the thyroidologist, pregnancy can be viewed as a prolonged physiological condition in which a combination of events concur to modify the thyroidal economy. Such events may act independently, synergistically, or even antagonistically to produce subtle or major thyroidal effects. Furthermore, these events take place at different time points during gestation, resulting in complex effects that may be seen only transiently or, by contrast, that persist until term (Verberg *et al.*, 2005). Present data demonstrated that the mean TSH concentration did not have significant differences among case and control group, but there was a noticeable change regarding about mean concentration of T4, (11.3 vs 10.3 $\mu\text{g dL}^{-1}$). In our sample population 34 women from case group presented with nausea and vomiting (56.6%) had elevated T4 level and among control 20 women (33.3%) had elevated T4 level, which indicated that elevation of thyroxin level among pregnant women in their early pregnancy, can be a factor in this problem. In our study we found that the suppressed TSH were found to be 10% among case and control group ($<0.32 \text{ mIU L}^{-1}$) and there was not any differences in this regard. the reason behind this observation may be due to level of hCG among our sample population, as far as the pregnant women in this study were in their early pregnancy mostly up to 5 weeks of gestatio and there was not enough time for the hCG. Hormone to reach its highest concentration to be able to stimulate the thyroid gland and ultimately suppress the TSH level. There are various reports, which indicated the TSH-like activity of hCG. The references which have been mentioned above explaining about the investigation carried out on the role of hCG in this regard, which reports about the role of chorionic Gonadotropin in transient hyperthyroidism of hyperemesis gravidarum, but in our study we worked on those pregnant women whom had only mild-moderate nausea and vomiting and almost none of them had sever form of nausea and vomiting therefore the reason for our observation, which did not show any change of TSH level among case and control may be due to the nature of disorder among pregnant women. Finally on the basis of our results. we can argue that in this study.

- The elevated T4 can be responsible for nausea and vomiting and our findings are in consistent with numerous reports which have already been published in various part of the world

- Also TSH were suppressed among some of our sample population in case and control groups, but because this study were mainly among the women in their early Pregnancy and due to low level of hCG hormone, we did not find significant change of TSH level, among cases and controls

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