ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

PREVALENCE & IMPLICATION OF THYROID DISORDERS AMONG WOMEN ATTENDING THE ANTENATAL CLINIC AT TERTIARY CARE CENTRE

KEY WORDS: thyroid disorders, Oligohydramnios, Hypothyroid, Hyperthyroid patients.

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ABSTRACT

Introduction : Undetected and untreated thyroid disorders are associated with adverse maternal and fetal outcomes. This study was designed to determine the prevalence of thyroid disorders among women attending the antenatal clinic and to diagnose and manage appropriately subclinical as well as overt thyroid disorders at early gestational age. **Materials And Methods:** This study involves screening 500 consenting eligible women during first trimester. The normal patients will serve as controls. The patients were classified as euthyroid, hypothyroid and hyperthyroid based on their TSH levels. Those with deranged TSH levels underwent T4 testing and they were further divided in to Hypothyroid & Hyperthyroid patients, these patients formed the study group. They were treated and followed up till the completion of their pregnancy. They underwent TSH testing at 16, 20 and 32 weeks their response to treatment and pregnancy outcome was noted and results analysed. **Result & Conclusion:** Inadequately treated thyroid disorder women in my study group had 3 fold higher risk of developing preeclampsia. There was a significant increase in the incidence of abortion or fetal growth restriction in the inadequately treated group. Oligohydramnios was found to occur more commonly in the inadequately treated group. Adequate treatment of hypothyroidism in pregnancy significantly reduces certain complications like miscarriages, pre eclampsia, IUGR, oligohydramnios, glucose intolerance, preterm labour, low birth weight babies, Thyroid dysfunction of PIH women significantly affected fetal placental circulation. Colour doppler ultrasound is highly specific to diagnose fetal hypoxia in PIH women with thyroid dysfunction group. Placenta of thyroid disorder group exhibits distinct morphological features. Such placenta are lighter, thinner and larger in diameter with greater number of cotyledons in comparison to normal placenta.

INTRODUCTION

Pregnancy can be viewed as a state in which a combination of events concurs to modify the thyroidal economy. There is change in the level of thyroxine-binding globulin, total thyroid-hormone level and change in the level of thyroid stimulating hormone (TSH) during normal pregnancy[1]. Thyroid dysfunction (TD) may be overlooked in pregnancy because of the nonspecific symptoms and hypermetabolic state of normal pregnancy.

Thyroid dysfunction has varied impact on pregnancy outcome. The risk of miscarriage is increased in autoimmune thyroid disease. Graves' disease (GD) can lead to pregnancy loss as well as fetal thyroid dysfunction.

The prevalence of hypothyroidism in pregnancy is around 2.5% according to the Western literature[2]. The prevalence of GD is around 0.1–0.4% and that of thyroid autoimmunity (TAI) is around 5–10%[3].

Evaluation of thyroid disease in pregnancy is important for gestational maternal health, obstetric outcome, and subsequent development of the child. The most frequent thyroid disorder in pregnancy is maternal hypothyroidism. It is associated with preeclampsia, preterm delivery and reduced intellectual function in the offspring.[4] There is a wide geographic variation in prevalence of hypothyroidism during pregnancy. It varies from 2.5% from the west to 11% from India.[5-8] Prevalence of hypothyroidism was found to be more in Asian countries compared with the west. Before the onset of fetal thyroid function, that occurs about 12 weeks of gestation; the fetus is dependent on the placental transfer of maternal thyroid hormone for normal development.

Therefore, maternal hypothyroidism early in the pregnancy causes decreased availability of thyroid hormone during the initial phase of normal brain development and consequently is associated with increased rates of abortion impaired neuropsychological development of fetus and congenital malformation and increase in perinatal mortality. Hyperthyroidism is much less common than hypothyroidism. It is seen in 0.5–2/1000 pregnancies and id remains untreated is associated with significantly higher frequency of obstetric complications such as preeclampsia, premature labor, low birth weight, fetal and perinatal loss. Sub-clinical hyperthyroidism (suppressed thyroid-stimulating hormone [TSH] alone) is seen in around 1.7% of pregnancies and is not associated with adverse outcomes. Thus, prompt identification of thyroid disorder and timely initiation of therapy in pregnancy is essential. Therefore, the present study was carried out to study the prevalence of undetected thyroid dysfunction during the first trimester of pregnancy.

MATERIAL AND METHOD

This prospective study was conducted on 500 women attending the ANC OPD at first antenatal visit in the Department of Obstetrics and Gynaecology, JLN Medical College, Ajmer in first trimester. This study was conducted from Jan 2019 to Dec 2019, after obtaining informed consent with duly filled proforma.

Inclusion Criteria:

All women attending OPD at first trimester in ANC (<13 weeks gestation), Singleton pregnancy.

Exclusion Criteria:

Women already diagnosed and on medication for thyroid dysfunction, Multiple pregnancy, Moderately obese (BMI >35), Women suffering from chronic renal or liver disease, Overt diabetes, Essential hypertension, Previous history of Thyroid surgery or use of radioiodine therapy.

LABORATORY ASSESSMENT

Blood sample will be taken with aseptic precaution. Plasma / serum will be separated and subjected to measurement of following biochemical parameters- FT_3 by Chemi luminescenc immuno assay(CLIA), FT_4 by Chemi luminescenc immuno assay(CLIA), S.TSH by Chemi luminescenc immuno assay(CLIA)

Laboratory reference range: FT_3 = 2.5-3.9 pg/Ml, FT_4 = 0.61-1.12 ng/dl, S.TSH = 0.34-5.60 μIU / ml

Trimester wise cut off values for TSH are (during pregnancy): First trimester: 0.1-2.5mIU/L, Second trimester: 0.2-3mIU/L, Third trimester: 0.3-3 mIU/L

CRITERIA FOR THYROID DYSFUNCTION

Overt Hypothyroidism:-Low FreeT3, FreeT4 along with elevated TSH. **Subclinical Hypothyroidism:-** FreeT3, FreeT4 in normal range along with TSH more than 2.5mIU/L. **Overt Hyperthyroidism:-** FreeT3, FreeT4 in increased range along with decreased TSH. **Subclinical Hyperthyroidism:-** FreeT3, FreeT4 in normal range along with TSH less than 0.1mIU/L. Using these cutoff values thyroid dysfunction during pregnancy is determined.

RESULT

Table 1- Pregnancy Outcome

PREG. OUTCOME	HYPO		HYPER		Total	Chi .Sq	P Value
	Adequately treated	Inadequately treated	Adequately treated	Inadequately treated			
Spontaneous abortion	0	2 (12.5%)	0	0	2	12.57	0.00039
GDM	0	1 (6.2%)	0	0	1		
PIH	0	2 (12.5%)	0	1	3		
Oligo hydramnios	0	1 (6.2%)	0	0	1		
Preterm	0	2 (12.5%)	0	0	2		
IUGR	0	1 (6.2%)	0	0	1		
LBW	1 (6.66%)	2 (12.5%)	0	0	3		
Total complications	1(6.6%)	11(68.75%)	0	0	12		
No complication	14(93.33%)	5 (31.25%)	1	0	20		
Total	15	16	1	1	33		

Table 2- Complications

Outcome	HYPO		HYPER		Chi sq	p
	Adequately treated	Inadequately treated	Adequately treated	Inadequately treated		
No complications	14 (93.33%)	5(31.25%)	1	0	12.57	0.00039
With complications	1 6.66%)	11(68.75%)	0	1		
Total	15(100%)	16(100%)	1	1		

Table 3- Comparison Of Pregnancy Outcomes Between Thyroid Disorder Group And Control

PREG. OUTCOME	Hypo	Hyper	Control	Chi sq	P
Spontaneous abortion	2(6.45%)		27(5.78%)	9.26	0.00233
GDM	1(3.23%)		19(4.07%)		
PIH	2(6.45%)	1(50%)	19(4.07%)		
Oligo hydramnios	1(3.23%)		15(3.21%)		
Preterm	2(6.45%)		32(6.85%)		
IUGR	1(3.23%)		19(4.07%)		
LBW	3(9.68%)		27(5.78%)		
Total complications	12(38.71%)	1(50%)	158(33.83 %)		
No complications	19(61.29)	1(50%)	309(66.17 %)		
Total	31	2	467		

DISCUSSION

The purpose of the study was to follow the pregnancy outcomes in pregnant women with hypothyroidism & hyperthyroidism to see whether they developed complications if left untreated and if adequate treatment altered the occurrence of complications.

The total numbers of pregnant women included in this study were 500. All women who have been diagnosed as hypothyroid & hyperthyroid started on treatment over a period of 1 year were taken consecutively.

All antenatal women were screened using TSH at their first booking visit during first trimester.

Overt hypothyroidism, subclinical hypothyroidism patients were treated with L Thyroxine in the dose of 1.20 μg/kg/day for subclinical hypothyroidism with TSH less than 4.2 mIU/L, 1.42 μg/kg/day with TSH greater than 4.2 to 10, and 2.33 μg/kg/day for overt hypothyroidism, overt hyperthyroidism were treated with propylthiouracil is given at a daily dose of 300-450 mg in two divided dose every 12 hours and continued till the patient becomes euthyroid. The maintenance dose beings 50-150mg daily.

In our study out of 31 hypothyroid pregnant women 54.8% delivered vaginally and 45.2% by LSCS and out of 2 hyperthyroid pregnant women 50% delivered vaginally and 50% by LSCS. In control group out of 467 pregnant women 67.2% delivered vaginally and 32.8% by LSCS. It implies that LSCS rate was significantly higher in thyroid disorder group than control group.

In our study Umbilical artery and Middle Cerebral Artery colour doppler indices were significantly abnormal in thyroid disorder group.

Study by Xiao-dan Zhu et al.[11] PIH women were divided into three groups according to thyroid hormone levels. Results showed that S/D, PI and RI values of MCA in PIH women with thyroid dysfunction were significantly lower than that of PIH women with normal thyroid function, S/D, PI and RI values of UA in PIH women with thyroid dysfunction had an opposite trend to that of MCA. According to our clinical data and general standards, PI<1.6, S/D<4 and RI < 0.6 in MCA and S/D ≥ 3 in UA were diagnosed as fetal hypoxia when detected by Color Doppler ultrasound. Our further analysis showed that there was significant difference between fetal hypoxia.

Total of 33 women placental abnormalities were significantly higher in complicated thyroid women (case) than the uncomplicated thyroid women. The two groups were well matched with respect to age, gravid status and gestational age. Circular shape of the placenta was most common in case group followed by oval and irregular shape. In our study an increasing diameter and increased number of cotyledons were observed in case group indicating a larger sized but thinner placenta.

The study by Shweta Kumari et al presented maximum placenta (55%) with oval shape, whereas that of a majority of hypothyroid mothers exhibited circular shaped (66%) placenta. We found 10% irregular-shaped placenta in both the groups. Shah et al. also found no clinical significance of oval or round shaped placenta. Usually, in case of reduction in placental weight, size of placenta, i.e., diameter also shows a decline. In our study, an increase in diameter and increased number of cotyledons were observed in hypothyroid placenta, indicating a larger sized but thinner placenta. We as anatomists speculate that increased diameter of placenta and a corresponding increase in number of cotyledons could presumably be a compensation for reduced placental thickness due to reduced thyroid hormones in early pregnancy.[12]

Davis et al 1988 followed 25 hypothyroid women through 28 pregnancies who were divided into two groups, of which 16 were clinically hypothyroid and 12 had subclinical hypothyroidism. This study showed that mothers with overt hypothyroidism are more at risk for preeclampsia.

Inadequately treated hypothyroid women in our study had 1 (3.23%) pregnancies complicated by Oligohydramnios which was higher than control group which is only 3.21%.

In our study population 6.45% of inadequately treated hypothyroid pregnancies ended up in preterm delivery (delivery before 37 weeks of gestation).

In our study prevalence of Hypothyroidism was 6.2%.

Casey et al[14]	R	USA	3.4%, TSH >3
Our study*	P	RMC Ajmer	6.2%, TSH >2.5

This is similar to the outcome of a study done by Jones WS et al in the American Journal of Obstetrics and Gynaecology in 2016 who concluded that premature deliveries were more frequent in pregnant women who had low thyroxine levels. Out of 500 pregnant women screened in the 1st trimester 0.4% patients were overt hyperthyroidism hence prevalence of hyperthyroidism in my study group is 0.4%.

Study	Prospective/ Retrospective	Place	Prevalence
Wang et al[35]	R	China	1%
Vaidya et al[54]	R	UK	0.7%
Lazarus et al[55]	R	UK	1.7%
Casey et al[14]	R	US	0.4%
Andersen et al[37]	R	Denmark	0.4 – 0.7%

SUMMARY AND CONCLUSIONS

Thyroid hormone is essential for early placental development in pregnancy. Especially during the first twelve weeks of pregnancy the fetus entirely depends upon the maternal thyroid hormone for the normal neural and skeletal development.

Hence early diagnosis and adequate treatment of thyroid disorder group in pregnancy is essential in decreasing the incidence of complications like abortion, GDM, pre-eclampsia, IUGR, placental abruption, Oligohydramnios and low birth weight.

Thyroid dysfunction of PIH women significantly affected fetal placental circulation. Colour doppler ultrasound is highly specific to diagnose fetal hypoxia in PIH women with thyroid dysfunction group.

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