Original Research Article

Incidence of thyroid dysfunction in antenatal women and its effect on fetomaternal outcome

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Abstract

Background: Thyroid dysfunction is the second most common endocrine disease in pregnant women. Hypothyroidism is a more common dysfunction encountered in pregnancy.

Aim: To study the incidence of thyroid dysfunction in antenatal cases and its effect on fetomaternal outcome.

Materials and methods: Total 50 cases of pregnancy with thyroid disorder were selected. Detailed history was taken and full clinical and general examination was performed using a predesigned proforma including clinical feature suggestive of thyroid dysfunction. Serum TSH, T3, T4, fT3, fT4 was measured by CLIA (Chemiluminescence Immunoassay) in all the cases as initial hormonal screening investigations.

Results: The overall percentage in our study was 15.97% and out of this 74% was without any symptom i.e. subclinical and only 26% had symptoms. Caesarian section rate was (30% v/s 0%), 18% with subclinical hypothyroidism were detected. In controls, 9% with subclinical hypothyroidism were detected. The most common complication associated with hypothyroidism was abortion (14%) and PIH (16% v/s 56%) hyperemesis gravidarum (9% v/s 3%) and hemorrhage in early pregnancy (22% v/s 8%) We also observed that hypothyroidism is associated with more complications even if it is subclinical (42%).

Conclusion: The study concludes that thyroid dysfunction in pregnancy is often significantly associated with maternal complications most commonly abortions, anemia, preterm labour and abruption. Higher caesarean rates are also observed among hypothyroid mothers. Low Apgar scores, increased NICU admissions, low birth weight mainly due to prematurity are usually noted in the

neonate. The early administration of treatment and maintenance of a normal level of thyroid hormones significantly minimize the risk of maternal and fetal complications.

Key words

Hypothyroidism, Pregnancy, Complication.

Introduction

Thyroid dysfunction is the second most common endocrine disease in pregnant women [1]. Hypothyroidism is a more common dysfunction encountered in pregnancy. The incidence of overt hypothyroidism during pregnancy ranges from 0.2 to 2.5% and subclinical hypothyroidism from 2-7% [2-4]. Maternal hypothyroidism specially in first trimester results in neurodevelopmental retardation and impairs cognitive development [5, 6]. It is difficult to diagnose hypothyroidism clinically during pregnancy, due to nonspecific presenting features which may be masked by existing obstetric symptoms. Because of this, subclinical hypothyroidism needs to be diagnosed by thyroid function test. Overt hyperthyroidism during pregnancy may be referred to as suppressed (<0.1mIU/L) or undetectable (<0.01mIU/L) serum TSH value and elevated thyroid hormone levels (>3.4mIU/L). Patients with subclinical hyperthyroidism have normal serum fT4 level and serum TSH level below reference range (0.1-0.45mIU/L) [7, 8]. The thyroid gland increases in size (by about 10-15%) during pregnancy [9]. Women who have restricted or deficient iodine intake are marked affected resulting in IDD (iodine deficiency disorders) and increased pregnancy loss [10].

Materials and methods

This study was conducted in the Department of Obstetrics and Gynecology, S.P. Medical College, Bikaner Rajasthan.

Inclusion criteria

All pregnant women attending the antenatal clinic of Obstetrics and Gynecology Department were included.

Exclusion criteria

Known cases of thyroid disease, known cases of other endocrinal disorder were excluded. Total 50 cases of pregnancy with thyroid disorder were selected. Detailed history was taken and full clinical and general examination was performed using a predesigned proforma including clinical feature suggestive of thyroid dysfunction. Serum TSH, T3, T4, fT3, fT4 was measured by CLIA (Chemiluminescence Immunoassay) in all the cases as initial hormonal screening investigations. Women with thyroid dysfunction were labelled as:

- Overt hypothyroidism - Serum TSH >10 mIU/L, fT3 <1.7 pg/ml, fT4 <0.7 ng/dl
- Subclinical hypothyroidism - Serum TSH 4-10 mIU/L, fT3 =1.7-4.2 pg/ml, fT4 =0.7-1.8 ng/dl.
- Overt hyperthyroidism - serum TSH-0.01 - 0.1 mIU/L, fT3 >4.2 pg/ml, fT4 >1.8 ng/dl.
- Subclinical hyperthyroidism - serum TSH 0.1-.45 mIU/L fT3 =1.7-4.2 pg/ml, fT4 =0.7-1.8 ng/dl.

Ideally screening should carried out during pre-pregnancy evaluation or as soon as pregnancy is confirmed. There are limited data on prevalence of thyroid dysfunction during pregnancy in Northern India. Therefore, the study has been designed to evaluate the incidence and effects of thyroid dysfunction specially hypothyroidism in pregnancy.

Results

Distribution of antenatal women according to gestational age at the time of enrolment was as per **Table – 1**. Incidence of thyroid dysfunction was as per **Table – 2**. Distribution of cases according to age was as per **Table – 3**. Distribution of cases according to weight was as per **Table – 4**. Distribution of cases according to mode of delivery was as per **Table – 5**. Indications for LSCS were as per **Table – 6**.

Distribution of cases showing perinatal outcome was as per **Table – 7**. Percentage of complications in thyroid dysfunction group was as per **Table – 8**. Nature of complications in thyroid dysfunction patients was as per **Table – 9**.

Table – 1: Distribution of antenatal women according to gestational age at the time of enrolment.

POG (trimester)	Study Group	Control
1st (0-14wk)	32	35
2nd (14-28wk)	18	15
Total	50	50

Table – 2: Incidence of Thyroid Dysfunction.

Type	Cases	%
Normal	263	84.03
Overt Hypothyroidism	9	2.38
Subclinical Hypothyroidism	24	7.6
Overt Hyperthyroidism	4	1.27
Subclinical Hyperthyroidism	13	4.15
Total	313	100

Discussion

The study found the percentage of thyroid dysfunction to be 15.97% (overt hypothyroidism 2.38%, subclinical hypothyroidism 7.6%, overt hyperthyroidism 1.27%, subclinical hyperthyroidism 4.15%). In a previous study conducted on 633 patients in the Indian population, in 2010, the prevalence of subclinical hypothyroidism was found to be 6.47% and of overt hypothyroidism 4.58%.Our statistics are comparable to recent study prevalence [18, 18, 22] (**Table - 2**). The most common age at presentation was 21-25 years range, as compared to Western studies, in which mean age at presentation is 29 ± 5 years [22]. This is attributed to early marriage and early conception prevalent in India. 26% of women with hypothyroidism as compared to 2 % women with hyperthyroidism fall in 61-75 kg body weight also 4% of hypothyroid women had weight more than 75 kg. A study undertaken by Mukhopadhyay A., et al. (2007) [17] showed similar results (**Table - 4**). In study group women with history of one previous abortion are 14% as compared to 4% in control group, similarly 2% of women in study group had history >3 abortion which shows recurrent pregnancy loss which can be due to thyroid dysfunction .According to a study [21], such association is usually reversible after appropriate treatment of underlying thyroid disease and normalization of thyroid function. History of miscarriage was high in pregnant women with subclinical thyroid dysfunction, Nambiar V., et al. (2011) [20], also reported the same results (**Table - 9**). In our study 22% of women in thyroid dysfunction had taken treatment for infertility in comparison to 4% is women with normal thyroid function. The difference in statistically significant.($p<0.05$). Thyroid disorders, in particular hypothyroidism, may compromise fertility Jiskra J., et al. (2007) [16], emphasized on screening of all pregnant women during better before conception whenever possible to rule out causes of infertility (**Table - 9**). In this study, percentage of PIH in women with thyroid dysfunction is 16% as compared to 6% in women with normal thyroid function. The incidence of PIH with hypothyroidism has been reported as 5-17%, abruption placentae 0.7%-10%, and PPH 19% by Davis LE, et al. (1988) [11]. Risks for miscarriage and preterm delivery, placental abruption, preeclampsia, and reduced intellectual function in the offspring was comparable to our study also found the incidence of miscarriage comparatively high (12% vs 8%) in pregnant women in subclinical hypothyroidism group. Caesarean section rate among cases (20%) was significantly higher than controls (10%). Miller L K, et al. [18] reported a caesarean section rate of 29% and Idris, et al. [13] found an increased rate of Caesarean section 28.7% in cases of treated hypothyroidism as compared to 18% in controls. The most common indication in study group was elective L.S.C.S. (30%). A study in 2008 did not find any association between maternal hypothyroidism and adverse fetal outcomes. The prevalence of stillbirth and premature delivery was not significantly higher thyroid dysfunction

patients than that in the euthyroid patient population probably due to the adequate treatment given to the patients to maintain euthyroid state. This could again be explained as most mothers were started on treatment with LT4.On the basis of currently available data, cost effectiveness of routine screening with TSH during pregnancy to reduce maternal and neonatal morbidity is controversial. Gartner R., et al. [18] explained that if selective screening for thyroid dysfunction is done only in high-risk group, it would miss about 81.6% pregnant women with hypothyroidism and 80.4% pregnant women with hyperthyroidism. According to the American Thyroid Association [14] and The American Association of Clinical Endocrinologists and The Endocrine society practice guidelines 2002, favors targeted screening in high- risk cases with a personal or family history of thyroid disease [15]. But based on the finding of our study, where maximum complications are in subclinical group we would like to suggest screening of all pregnant women in our region, so that early diagnosis is made and treatment initiated. This will not only reduce perinatal and neonatal problems but also complication in childhood which can lead to lifelong impairment.

Table – 3: Distribution of Cases According to Age.

Age Group (Years)	Study Group		Control	
	No.	%	No.	%
<=20	9	18	11	22
21-25	22	44	25	50
26-30	13	26	11	22
31-35	6	12	3	6
Total	50	100	50	100

Table – 4: Distribution of Cases According to Weight.

Weight in Kg.	Study Group				Control	
	Hypothyroid		Hyperthyroid			
	No.	%	No.	%	No.	%
< 50	1	2	8	16	30	60
50-60	17	34	8	16	17	34
61-75	13	26	1	2	3	6
> 75	2	4	0	0	0	0

Table – 5: Distribution of Cases According to Mode of Delivery.

Mode of delivery	Study Group		Control	
	No.	%	No.	%
Normal Vaginal Delivery	33	66	40	80
L.S.C.S.	10	20	5	10
Forceps Delivery	1	2	0	0
Assisted Breech Delivery	0	0	1	2
Total	44/50	100	46/50	100

Table – 6: Indications for LSCS.

Indications for LSCS	Study Group		Control	
	No	%	No	%
Elective L.S.C.S	3	30	0	0
Fetal distress	1	10	0	0
M.S.L.	1	10	1	20
Prev. L.S.C.S with F.D.	2	20	2	40
Abruption	1	10	0	0
Non progression of Labour	1	10	1	20
P.R.O.M.	1	10	1	20
Total	10	100	5	**100**

Table – 7: Distribution of Cases Showing Perinatal Outcome.

Outcome	Study Group		Control		P-value
	No.	%	No.	%	
Low birth weight	25	50	23	46	0.53
Preterm birth	9	18	10	20	0.89
Low apgar score <8/10 at 5 min	7	14	3	6	0.18
NICU transfer	11	22	6	12	0.173
Perinatal mortality	5	10	4	8	0.99

Table – 8: Percentage of Complications In Thyroid Dysfunction Group.

Type	Complications	Percentage (%)
Overt Hypothyroidism	32	37
Subclinical Hypothyroidism	37	43
Overt Hyperthyroidism	3	3
Subclinical Hyperthyroidism	15	17
Total	87	100

Table – 9: Nature of complications In Thyroid Dysfunction Patients.

Complications	Thyroid dysfunction	Overt Hypothyroi-dism	Subclinical Hypothyro-idism	Overt Hyperthy-roidism	Subclinical Hyperthyro-idism
Hyperemesis gravidarum	9	3	3	1	2
PIH	8	3	3	0	2
Early hemorrhage	11	3	7	0	1
APH	2	1	1	0	0
Infertility	9	4	5	0	0
Abortion	6	1	5	0	0
Preterm labour	9	2	3	0	4
LSCS incidence	10	5	2	1	2
Perinatal mortality	5	2	3	0	0
Apgar score <8/10	7	4	2	0	1
NICU admission	11	4	3	1	3
Total	87	32	37	3	15

Conclusion

Thyroid dysfunction is quite high in antenatal women in our region. The overall percentage in our study was 15.97% and out of this 74% were without any symptom i.e. subclinical and only 26% had symptoms. Both the groups were similar as far as age factor is concerned. History of previous abortion and bad outcome was higher in the study group (14% v/s 4%). Maternal weight was also higher in the dysfunction group. Patients with history of infertility treatment were more in the study group (22% v/s 4%). Complication of pregnancy like PIH (16% v/s 56%) hyperemesis gravidarum (9% v/s 3%) and hemorrhage in early pregnancy (22% v/s 8%) were more in study group. Elective C.S rate is much higher in study group as the pregnancy in patients after treatment of infertility, had precious pregnancy.(30% v/s 0%). Perinatal and neonatal outcome was bad but not significant because treatment was started immediately after diagnosis and good antenatal care was given with high elective caesarean rates. We also observed that hypothyroidism is associated with more complications even if it is subclinical (42%).To conclude screening and treatment of thyroid dysfunction will reduce the severity of its effects in present pregnancy and reduce the effects to almost zero in future pregnancies if treatment is properly followed. In our opinion, screening of all and not only of high risk antenatal women preferably at confirmation of 1st pregnancy is desirable specially in our country as the incidence of thyroid dysfunction is very high. However, larger and multicentric studies are required to recommend it.

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