Original Research Article

Maternal and perinatal outcome in antenatal women with hypothyroidism

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Abstract

Background: Maternal hypothyroidism is common disorder of thyroid function in pregnancy and has been associated with miscarriage, foetal loss, preeclampsia, preterm labour, placental abruption, foetal distress, etc.

Aim and objectives: To know the incidence of hypothyroidism in antenatal women, to screen 1000 antenatal women attending the antenatal OP in Government Victoria Hospital from January 2015 to December 2015, to know the obstetric outcome of pregnant women suffering from hypothyroidism.

Materials and methods: A random prospective study was conducted in a total of 1000 pregnant women in the first trimester of any gravid status and parity attending the OPD unit in Government Victoria Hospital, Visakhapatnam from January 2015 to December 2015. Inclusion criteria were antenatal women with <12 weeks gestation, singleton pregnancies only and either primigravida or multigravida**.**

Results: Out of the 1000 women screened 68 antenatal women were found to have hypothyroidism. Rate of incidence of hypothyroidism is 6.8/100 women. Subclinical hypothyroidism is seen in 51 women and overt hypothyroidism is seen in 17 women. Incidence of maternal complications in subclinical hypothyroidism- miscarriages-5.88%, preterm labour- 11.76%, preeclampsia- 17.64%, IUD- 1.96%. Incidence of foetal complications in subclinical hypothyroidism was IUGR-9.8%, LBW- 7.84%, foetal distress- 3.92%, stillbirth- 1.96%. Incidence of maternal complications in overt hypothyroidism- miscarriages- 17.64%, preterm labour- 11.76%, preeclampsia- 29.41%, APH-11.76%, IUD-5.88%. Incidence of foetal complications in overt hypothyroidism was IUGR-17.6%, LBW- 11.76%, foetal distress- 11.76%, stillbirth- 5.88%.

Conclusion: Incidence of hypothyroidism (6.8%) is more in pregnancy. Maternal and perinatal complications are more with overt hypothyroid cases, emphasizing the need for routine screening for thyroid in early pregnancy.

Key words

Hypothyroidism, Preeclampsia, Preterm labour, Abruptio placenta, Intra uterine growth restriction, Intra uterine foetal demise.

Introduction

Thyroid disorders are the most common endocrine disorders during pregnancy. Thyroid dysfunction is often overlooked in pregnant women because of the non-specific symptoms and the hyper metabolic state of the pregnancy. Hence thyroid function tests are essential in pregnancy.

In view of potential adverse effects associated with maternal thyroid disease and apparent benefits of treatment many have recommended routine thyroid function screening in pregnancy.

Aim and objectives

- To know the incidence of hypothyroidism in antenatal women.
- To screen thousand antenatal women attending the antenatal out-patient department in Govt. Victoria Hospital from January 2015 to December 2015.
- To know the obstetric outcome of the pregnant women suffering from hypothyroidism and the perinatal outcome.

Materials and methods

Material

Random prospective study was conducted in a 1000 pregnant women in the first trimester of any gravid status attending the OPD in Govt. Victoria Hospital, Visakhapatnam between January 2015 to December 2015.

Method

After obtaining informed consent from the patient, detailed history along with review of previous records was taken in a prescribed proforma. Physical examination was done to look for thyroid enlargement and to ascertain the pregnancy.

The following inclusion and exclusion criteria were used to select cases.

Inclusion criteria

- Antenatal women with <12 weeks gestation were taken up for study
- Only singleton pregnancy were included
- Either primigravida or multigravida were selected randomly
- Antenatal women who can come for regular antenatal checkups were chosen for this study

Exclusion criteria

- Antenatal women with multifetal gestation were excluded from this study
- Antenatal women with known chronic disorders like diabetes and hypertension were excluded
- Pregnant women with previous bad obstetric history with known cause were excluded
- Those who underwent surgery for thyroid or a known case of thyroid were excluded

Procedure

After obtaining informed consent and determining the gestational age, 1000 patients in first trimester were randomly selected for the study.

- A detailed history was taken.
- A thorough physical examination was done.
- Per abdominal, per vaginal examination and ultrasound was done to determine gestational age and viability.
- Patients were sent to lab in our hospital for TSH, T3 and T4 estimation (done by chemiluminiscent method).
- Depending upon the fasting TSH, T3 and T4 values, they were grouped as subclinical/ overt hypothyroidism and thyroxine was started.

- Every 8 weeks TSH level was estimated and dose of the drug was adjusted.
- Pregnancy outcome was noted.

The following outcome variables in relation to thyroid disorders were studied:

- Miscarriages
- Preterm deliveries
- IUGR
- Preeclampsia
- Anaemia
- Low birth weight
- Intrauterine foetal demise
- Antepartum haemorrhage
- Stillbirth
- Mode of deliveries- normal, instrumental or caesarean section
- Postpartum haemorrhage
- Birth asphyxia

We had taken consent from ethical committee of our hospital for this study.

Results

Out of the 1000 women screened, 68 antenatal women were found to have hypothyroidism. Subclinical hypothyroidism was seen in 51 women and overt hypothyroidism was seen in 17 women (**Table - 1**). Maternal and perinatal complications were studied in the two groups separately and compared with the other studies.

Table – 1: Incidence of hypothyroidism.

No. of patients screened	No. of hypothyroid women	Incidence of hypothyroidism/ 100 women	Patients with subclinical hypothyroidism	Patients with overt hypothyroidism
1000	68	6.8	51	17

The incidence of hypothyroidism is 6.8/100 in pregnancy.

Table – 2: Type of hypothyroidism in 68 women.

Type	No. of patients	Percentage
Subclinical	51	5.1%
Overt	17	1.7%

Table – 3: Age incidence.

Age group (years)	Number of cases	Percentage
18-20	18	26.47%
21-25	35	51.47%
26-30	11	16.17%
>30	4	5.88%

Table – 4: Gravid status in the 68 women.

Gravid state	Number of cases	Percentage
Primi	33	48.5%
2	22	32.35%
3	8	11.76%
4 or more	5	7.35%

Table – 5: Maternal complications in subclinical hypothyroidism (n=51).

Complications	No. of patients	Percentage
Miscarriage	3	5.88%
Preterm	6	11.76%
Preeclampsia	9	17.64%
APH	-	-
IUFD	1	1.96%
Anaemia	4	7.84%

Table – 6: Foetal complications in subclinical hypothyroidism (n=51).

Complications	No. of patients	Percentage
IUGR	5	9.8%
LBW	4	7.84%
Fetal distress	2	3.92%
Still birth	1	1.96%

The incidence of subclinical hypothyroidism is 5.1/100 and overt hypothyroidism is 1.7/100 during pregnancy (**Table - 2**).

Table – 7: Maternal complications in overt hypothyroidism (n=17).

Complications	No. of patients	Percentage
Miscarriage	3	17.64%
Preterm	2	11.76%
Preeclampsia	5	29.41%
APH	2	11.76%
IUFD	1	5.88%
Anaemia	4	23.52%

Table – 8: Foetal complications in overt hypothyroidism (n=17).

Complications	No. of patients	Percentage
IUGR	3	17.6%
LBW	2	11.76%
Fetal distress	2	11.76%
Stillbirth	1	5.88%

Most of the women with hypothyroidism were between 21-25 years (51.47%). 26.47% were between 18-20 years, 16.17% between 26-30 years and 5.88% were >30 years (**Table - 3**).

48.5% of women with hypothyroidism in this study were primigravidas, 32.35% were second gravidas and 11.76% were third gravidas. 7.35% were having more than 3 children (**Table - 4**).

Maternal complications in subclinical hypothyroidism

Miscarriages are seen in 5.88% of antenatal women with subclinical hypothyroidism, preterm deliveries in 11.76%, preeclampsia in 17.64%, intrauterine foetal demise in 1.96% and anaemia in 7.84% (**Table - 5**).

Foetal complications in subclinical hypothyroidism

9.8% of babies born to subclinical hypothyroid mothers had intrauterine growth restriction, 7.84% had low birth weight, 3.92% had foetal distress and one baby (1.96%) was stillborn (**Table - 6**).

Table – 9: Mode of delivery in hypothyroidism.

Mode of delivery	Subclinical hypothyroidism (n=51)		Overt hypothyroidism (n=17)	
	No. of patients	Percentage	No. of patients	Percentage
Normal delivery	38	74.5%	10	58.82%
Instrumental delivery	6	11.76%	2	11.76%
Caesarean section	7	13.72%	5	29.41%

Table - 10: Incidence of post-delivery complications.

Post-delivery complications	Subclinical hypothyroidism (n=51)		Overt hypothyroidism (n=17)	
	No. of patients	Percentage	No. of patients	Percentage
PPH	3	5.88%	2	11.76%
NICU admission	2	3.92%	4	23.52%

Table – 11: Incidence of hypothyroidism in other studies.

Thyroid activity	Casey, et al. (2005, 2007) [5]	Cleary- Goldman, et al. (2008) [1]
Hypothyroidism	2.5%	2.5%
Overt	2/1000	3/1000
Subclinical	2.3%	2.2%

Maternal complications in overt hypothyroidism

Miscarriages are seen in 17.64% of antenatal women with overt hypothyroidism, preterm deliveries in 11.76%, preeclampsia in 29.41%, abruptio placenta in 11.76%, intrauterine foetal demise in 5.88% and anaemia in 23.52% (**Table - 7**).

Table – 12: Incidence of complications in subclinical hypothyroidism in other studies.

Study	Preeclampsia	Preterm	Miscarriage	IUGR	LBW	Still birth
Our study	17.64%	11.76%	5.88%	9.8%	7.84%	1.96%
Leung, et al. [11]	15%	9%	-	-	9%	-
Sahu, et al. [12]	9.9%	10.3%	-	2.4%	-	2.5%

Table – 13: Incidence of complications in overt hypothyroidism in other studies.

Study	PE	APH	Preterm	Miscarriage	IUGR	LBW	Still birth
Our study	29.41%	11.76%	11.76%	17.64%	17.64%	11.76%	5.88%
Leung	22%	-	-	-	-	22%	4%
Sahu, et al. [12]	20.7%	-	4.7%	-	13.8%	-	2.9%
Ablovich [13]	-	19%	-	-	-	6%	3%

Foetal complications in overt hypothyroidism

17.6% of babies born to overt hypothyroid mothers had intrauterine growth restriction, 11.76% had low birth weight, 11.76% had foetal distress and one baby (5.88%) was stillborn (**Table - 8**).

Mode of delivery

Subclinical hypothyroidism

38 women (74.5%) delivered normally by vaginal delivery, 6 women (11.76%) by instrumental delivery and 7 women (13.72%) by caesarean section (**Table - 9**).

Overt hypothyroidism

10 women (58.82%) delivered normally by vaginal delivery, 2 women (11.76%) by instrumental delivery and 5 women (29.41%) by caesarean section (**Table - 9**).

Discussion

Thyroid disorders are common in pregnancy. If untreated, hypothyroidism may adversely affect the mother and the foetus. Earlier studies have reported an increased association of congenital anomalies, perinatal mortality (20%) and impaired mental and somatic development (50-60%) in newborns of untreated hypothyroid women.

The present study was conducted in Government Victoria Hospital in 1000 antenatal women attending OPD, selected randomly and screened for thyroid disorder. It was a prospective study and the main aim of the study was to know the incidence of new cases of hypothyroidism in antenatal women and their obstetric outcome.

Incidence of hypothyroidism is different in various parts of the world. In endemic areas like coastal regions of Andhra Pradesh, incidence is 6-8/100 women. With the laboratory reference range used to detect hypothyroidism the number of cases found to have disease were 68 which is highly significant. The incidence is very high when compared to studies done in general population by Cleary- Goldman, et al. which showed incidence of 2.5% [1] and Sharma P, et al. [2] which showed an incidence of 1.15%. In a study conducted in 2011 by Nambiar, et al. [3], the incidence was found to be 4.8% which is nearly comparable to our study.

In a recent study by Dinesh Kumar Dhanwal and Saritha Bajaj, et al. in 2016 [4] which is done in 11 cities in 9 states of India, the prevalence of hypothyroidism in pregnancy is 13.13% of which majority are subclinical. Anti-TPO Ab are positive in 40% of hypothyroid pregnant women which is very high. Casey, et al. [5] reported an overall incidence of hypothyroidism to be 2.5%. in a study by Morena-Reyes and Glinoer D, et al. [6], incidence of hypothyroidism in pregnant women is 7.2% of which 6.8% have subclinical hypothyroidism and 0.4% have overt hypothyroidism.

Two types of hypothyroidism are there- subclinical and overt. In subclinical hypothyroidism, TSH is between 3 – 10 mIU/l, T3 and T4 are normal. In overt hypothyroidism, TSH is >10 mIU/l, T3 and T4 are low.

According to ACOG guidelines [7], universal screening for thyroid disorders is not recommended during pregnancy. Screening in high risk groups is recommended like

- Family history of autoimmune thyroid disease
- Women on thyroid therapy
- Presence of goitre or thyroid nodules
- History of thyroid surgery
- Infertility
- Unexplained anaemia or hyponatremia or high cholesterol level
- Previous history of neck irradiation, postpartum thyroid dysfunction, previous birth of infant with thyroid problem
- Other autoimmune chronic conditions like Type 1 DM

The ITS (Indian thyroid society) guidelines

- All antenatal mothers are to be screened at the first trimester of pregnancy
- Ideally screening is to be done at the pre pregnancy evaluation or as soon as pregnancy is confirmed

Vaidhya, et al. (2007) study [8] says that only risk based screening is likely to miss one- third of cases. In a study conducted by Vila L, Velasco I, et al. in 2013, universal screening is superior in detecting thyroid disorder cases than selective screening [9]. This argument can be supported simply on the importance of detecting and treating overt hypothyroidism during pregnancy and its cost effectiveness.

American thyroid association (2007) recommends cut off values for TSH as

- First trimester <2.5 mIU/l
- Second and third trimester <3 mIU/l
- Lower limit of normal- 0.04 mIU/l

Thyroid research concordant with American thyroid association guidelines gives the following recommendations:

- Trimester and population specific reference ranges for TSH should be applied. In First trimester, TSH should be 0.1-2.5 mIU/l, second trimester 0.2- 3 mIU/l, third trimester 0.3-3 mIU/l
- Method specific and trimester specific reference ranges of serum FT4 are required
- All women with hypothyroidism and women with hypothyroidism who are positive for TPO Ab should be treated with LT4.
- The goal of LT4 treatment is to normalize maternal serum TSH values within the trimester-specific pregnancy reference range.
- LT4 dose should be increased by 25-30% upon missed period or positive pregnancy test.
- Hypothyroid patients who are planning pregnancy should have their dose adjusted by their provider in order to optimize serum TSH values to <2.5 mIU/l

Effects of hypothyroidism on pregnancy

Maternal:

- Miscarriages
- Preeclampsia
- Preterm labour
- APH
- Increased caesarean rate
- Increased instrumental deliveries
- Postpartum haemorrhage

Foetal:

- IUGR
- IUFD
- Stillbirths
- Birth asphyxia
- Neonatal hypothyroidism
- Increased NICU admissions

Davis LS, et al. in 1988 [10] found that maternal complications are more common in hypothyroid

women. Complications like anaemia (30%), preeclampsia (44%), APH (19%), preterm labour (19%), LBW (31%), IUFD (12%), PPH (19%) are seen which is slightly more than in our studies. In one study in 183 women, high incidence of preeclampsia is seen in hypothyroid women (26.8%).

In a study done by Leung, et al. [11], the incidence of complications like preeclampsia (15%), preterm deliveries (9%), LBW (9%) in subclinical hypothyroidism which is comparable to our study. Sahu MT, et al. [12] in their study stated that incidence of preeclampsia is 10.3% and IUGR is 2.4% which is less than that in our study.

In our study, subclinical hypothyroidism was associated with complications like preeclampsia (17.64%), preterm delivery (11.76%), LBW (7.84%) which are comparable to other studies. Incidence of IUGR (9.8%) is higher in our study. In the above two studies, there is no incidence of miscarriage but in our study, it is 5.88% which is significant.

In our study, overt hypothyroidism was associated with complications like preeclampsia (29.41%), APH (11.76%), preterm labour (11.76%), miscarriage (17.64%), IUGR (17.64%), LBW (11.76%) and stillbirth (5.88%). In a study by Sahu MT, et al. [12], the complications like preeclampsia (20.7%), preterm labour (4.7%), IUGR (13.8%) were seen in overt hypothyroidism which is less than the incidence in our study.

In other studies conducted by Leung, et al. [11] and Ablolovich, et al. [13], the incidence of maternal and foetal complications are less when compared to our study (**Table – 13**). The incidence of preeclampsia in our cases is far more when compared to other studies.

Another study by Sharma, et al. [2] also showed that most common maternal complication in hypothyroid women is preeclampsia (21.95%), followed by preterm labour (19.51%). Poonam Goel, et al. [14] stated that incidence of preeclampsia is 33.3%, placental abruption is 0.3%, LBW is 13.3% and foetal distress in 20% of cases which is comparable to our studies.

A separate study reported a markedly increased rate of caesarean section due to fetal distress in severely hypothyroid cases (56%) at their first antenatal visit compared with women who were mildly hypothyroid or euthyroid (3%). Even in our study, there is increased rate of caesarean section in overt hypothyroidism than subclinical hypothyroidism mainly due to foetal distress.

Haddow and colleagues [15] stated that

- Children born to untreated mothers had IQ scores that were 7 points lower than treated peers and 19% had IQ scores less than 85 compared with 5% of treated.
- Findings supported by Pop, et al. [16], found impaired psychomotor function in 22 infants less than 10 months age whose mothers had low T4 at 12 weeks of gestation when compared with 194 infants whose mothers had normal readings. The main drawback in our study is that babies were not brought for follow up.

Most of the patients were delivered vaginally in both the groups, few of them delivered by instrumental delivery in view of foetal distress. LSCS was done in cases of foetal distress and also for associated obstetric indications.

At present there is no available recommendations for detection or screening of thyroid dysfunction among Indian pregnant women. Recent consensus guidelines do not advocate universal thyroid function screening during pregnancy, but recommend testing for high risk women with personal history of thyroid or other autoimmune disorders or with family history of thyroid disorders.

Our study shows high incidence of hypothyroidism especially subclinical

hypothyroidism with associated adverse pregnancy outcome which were more with overt hypothyroidism.

Based on the results of the present study, we suggest for a mandatory screening for antenatal women in the first trimester of pregnancy and detection of thyroid dysfunction among pregnant women attending the antenatal clinic and to be potentially aware of associated maternal and fetal complications.

All the babies were screened for TSH on the 5th post natal day but no baby had shown features of congenital hypothyroidism. The drawback of our study was that, follow up beyond newborn period was not possible and after discharge most infants did not come for follow up.

Conclusion

Incidence of hypothyroidism (6.8%) is more in pregnant women. Though subclinical hypothyroidism is more common than overt, maternal and perinatal complications are more with overt hypothyroidism, emphasizing the need for routine screening for thyroid in early pregnancy.

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