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MATERNAL AND PERINATAL OUTCOME IN HYPOTHYROIDISM IN PREGNANCY AT TERTIARY CARE CENTER

Dr. Sonali Deshpande, Dr. Shrinivas Gadappa,Dr. Swati Badgire,Dr Anjali Punwatkar

Department of Obstetrics And Gynecology , Government Medical College , Aurangabad[MS] ,India

Abstract:

Aim & objective: Maternal and Perinatal Outcome in Hypothyroidism in preganacy at tertiary care center.

Materials & Methods:A prospective observational study conducted in the Department of Obstetrics & Gynaecology a tertiary care hospital in Aurangabad district of Maharashtra from September 2020 to September 2021. All patients who fulfilled the inclusion and exclusion criteria during the study period were included in the study.

Observation & Results: In the present studymajority of pregnant women 63 (38.4%) belonged to the age group of 21-25 years & majority 69(42.1%) of them were nulliparous. The risk factors identified in majority 20 (12.19%) of women was h/o pre-eclampsia and in 12 (7.31%) cases previous preterm delivery was observed as risk factor. Further it revealed that, there was statistically significant association between GA and raised TSH level ($p<0.05$). Maternal complications such as anaemia, severe pre-eclampsia and abruptio placenta were significantly correlated with high TSH level. It was observed that maternal and fetal outcome were significantly associated with level of TSH at the time of delivery.

Conclusion: The study concluded that timely diagnosis and management of thyroid dysfunction is the key to avoid obstetric complications. Supplementing thyroxin in patients with hypothyroidism can prevent maternal and fetal complication, so routine screening of thyroid dysfunction is recommended in pregnant women.

Keywords: ***TSH, GA, Hypothyroidism***.

1. Introduction

The thyroid disorders are on the rise in India. Approximately 1 in 10 Indian adults suffer from hypothyroidism, a condition in which the thyroid gland does not produce enough thyroid hormones to meet the needs of the body. Hypothyroidism is encountered frequently during pregnancy and the postpartum period. Most of these conditions are treatable, and may affect mother and fetus adversely if they are not evaluated and managed appropriately. Pregnancy is a time of complex hormonal changes. Thyroid hormones have profound variation and are associated with severe health impacts. [1]

In women with normal thyroid function, there is an increase in thyroxine (T4) and triiodothyronine (T3) production, which results in inhibition of thyroid-stimulating hormone (TSH) in the first trimester of pregnancy, due to a high human chorionic gonadotropin

(hCG) level that stimulates the TSH receptor because of partial structural similarity[2,3].

The prevalence of hypothyroidism reported in India is 12% [4]. India is known to be a relatively iodine sufficient belt, however, iodine deficiency is still prevalent in certain pockets like the hilly regions and foothills. Moreover, iodine deficiency is common in India, and this also contributes to hypothyroidism [5]

Primary maternal hypothyroidism is defined as the presence of elevated Thyroid Stimulating Hormone (TSH) levels during pregnancy. Hypothyroidism can be Overt (OH) or Subclinical (SCH).TSH levels during pregnancy are lower as compared to TSH levels in a non- pregnant state.[5]

Adverse perinatal outcomes such as spontaneous abortion, preeclampsia, preterm birth, abruptio placentae, and fetal death are associated with untreated overt hypothyroidism [6,7]. Hypothyroidism results in preterm births, intrauterine growth restriction, intrauterine fetal demise, respiratory distress and increased perinatal mortality (PNM). In newborns, it leads to cognitive,neurological and developmental impairment [5]. In our institute, around 20,000 deliveries occur every year with well equipped labour room ,availability of ICCU for better management of complications and advanced NICU facilities available 24 x 7. Our institute is a tertiary care center catering more high risk pregnant women from nearby districts and private hospitals.

Keeping this in mind, we have conducted the to evaluate the maternal and perinatal outcome in hypothyroidism in tertiary care centre.

2. Objectives

- To study the sociodemographic factors of Hypothyroidism in Pregnancy.
- To study the risk factor associated with hypothyroidism in Pregnancy.
- To study the maternal outcome of Hypothyroidism in Pregnancy.
- To study the perinatal outcome of Hypothyroidism in Pregnancy.

3. Material and Methodology

A prospective observational study conducted in the department of OBGY in tertiary care hospital from 2020-2021. The study was conducted after formal approval of institutional ethical committee. Total 164 samples were selected by purposive sampling technique and who met the designed set of criteria. Informed written consent was taken from patients and their families.

Inclusion criteria:

1. All pregnant women who are newly diagnosed cases and already known cases of hypothyroidism on treatment more than 28 weeks and plan to deliver in our tertiary care centre.
2. Women who were booked outside k/c/o hypothyroidism with more than 28weeks gestational age and plan to deliver in our tertiary care centre.
3. Women willing to participate in study.

Exclusion criteria:

1. Women who were lost to follow up and did not deliver at our tertiary care centre.
2. Multiple gestation
3. Anomalous baby.

Clinical grounds for inclusion:

Study population was identified from women who satisfied inclusion criteria and going to deliver at our ertiary care centre. Gestational age determined by early scan preferably or LMP or both. In obstetric examination, gestational age, amount of liquor was assessed & FHS were evaluated with stethoscope/ Doppler. Women with 1st time raised TSH level between 3mIU/L to 10mIU/L was given with 25ug of levothyroxine once daily and If TSH >10mIU/L then 50ug of levothyroxine once daily. In known cases dose was titrated according to GOI guidelines.

4. Results

A total 164 cases in the study period were analysed. In the present study it was observed that 63(38.4%) pregnant women were from age-group of 21- 25 years and 35(21.3%) were 26-30 years of age. The mean age was found to be 24.12 ± 4.35years.

Out of 164 women,95(57.9%) women were from rural area and 69(42.1%) were from urban area. Majority 57 (34.7%) was having higher education whereas 27(16.5%) & 34(20.7%) of cases were educated up to primary and middle education respectively. Also, most of 72(43.9%) women belonged to upper lower-class family.

Majority of the women86(54.4%) were diagnosed hypothyroidism in 1st trimester of pregnancy and around 38(23.17%) of women were diagnosed hypothyroidism in 2nd trimester. In the study out of 164 cases, 05(03.1%) were newly diagnosed with raised TSH level, 124(75.6%) were known case of hypothyroidism with normal Serum TSH and 35(21.3%) were known case of hypothyroidism on treatment with raised Serum TSH.

Out of 164 cases 125 were delivered between 37-40 wks. of GA, 18 were delivered between 32-37wks. of GA and 13 pregnant women were delivered between 28-32 wks. of GA (table 2).

There were statistically significant association between Gestational age the time of delivery and raised Serum TSH level (P<0.0001).

Majority of women (95/164) had undergone full term vaginal delivery. Elective LSCS was performed in 38 (23.17%) of women and whereas 19 (11.59%) undergone pre term LSCS. We found significant association between mode of delivery and TSH level (p<0.05).

Table 1.baseline characteristic of study participants

Characteristic		Study Participants (n=164)	
		NumberofCases	Percentage
Age (in years)	>18--20	32	19.5
	21-- 25	63	38.4
	26--30	35	21.3
	31--35	23	14.0
	>36	11	6.7

Residence	Urban	69	42.1
	Rural	95	57.9
Parity	P0	69	42.1
	P1	51	31.1
	P2-P4	27	16.5
	≥P5	17	10.3
Time of Diagnosis	Pre pregnancy	27	16.4
	1st Trimester	86	54.4
	2nd Trimester	38	23.17
	3rd Trimester	13	7.9

In this study maximum i.e. 63(38.4%) pregnant women were from age-group of 21-25 years and minimum i.e 11(6.7%) were reported in more than 35 years of age. Out of 164 cases, 17(10.3%) of cases were grandmultiparaous.95(57.9%) cases rural were from and 69(42.1%) of cases were urban area.

The mean age of cases was 24.12±4.35years.Out of 164 cases, majority 69(42.1%) of the cases were nulliparous. Total Cases were 159, as 5 cases were newly diagnosed without treatment number of women were started hypothyroidism treatment in 1st trimester of pregnancy were 86 (54.1%) and 38(23.8%) cases were started treatment of hypothyroidism before pregnancy *5 cases were newly diagnosed not on any treatment .

Table 2:Risk Factors

Riskfactors*	Numberofcases	Percentage
Previoushistory of preeclampsia	20	12.19%
Previouspreterm delivery	12	7.31%
Previoushistory of Recurrentmiscarriages	7	4.3%
Chronichypertension	5	3%
Previoushistory of IUFD	5	3%
infertility	5	3%
Overt diabetes	4	2.4%
Previoushistory of abruptioplacenta	4	2.4%
History of thyroiddysfunctionin1stdegreerelatives	3	1.82%
Obesity	2	1.21%
Heartdisease	01	0.61%

In present study, majority of the cases of hypothyroidism i.e. 07(4.3%) reported recurrent miscarriages as a risk factor, 05(3.0%) cases were having chronic hypertension and infertility as a risk factor whereas 04 (2.4%) casses were having diabetes. 01 (0.61%).

Table 3: Mode of Delivery

ModeOfDelivery	NewlyDiagnosed [n=5]	NormalTSHLevel[n= 124]	RaisedTSHLevel[n= 35]	Total
Pre-termVaginal Delivery	00	03(2.41%)	07(30%)	10

Table 4: Maternal Outcome

Maternal Complication	Newly Diagnosed [n=5]	Normal TSH Level [n=124]	Raised TSH Level [n=35]	p value
Anemia Hb <11gm%	5 (100%)	74 (59.7%)	28 (80.0%)	0.119
Gestational Hypertension	2 (40.0%)	12 (9.7%)	06(17.1%)	0.374
Severe Preeclampsia	4(80.0%)	13 (10.5%)	13(37.1%)	0.003
PPH	2 (40.0%)	8 (6.4%)	3 (8.5%)	0.189
Abruptio Placenta	3(60.0%)	4(3.2%)	7(20.0%)	0.000
Gestational Diabetes	0	3(2.4%)	3(8.5%)	0.340
Maternal Mortality	1(20.0%)	0	0	0.002

FulltermVaginal Delivery	00	88(70.96%)	07(30%)	95
OperativeVaginal Delivery	01	01(0.80%)	00	02
Pre-termLSCS	04	04(3.22%)	11(31.42)	19
FulltermLSCS	00	28(22.58%)	10(2.85%)	38
Total	5(100%)	124(100%)	35(100%)	164
Chi-square: 12.7, p=0.033				

In newly diagnosed cases,out of 5 cases 4 cases delivery by preterm LSCS and 1 case required operative vaginal delivery. Out of 124 pregnant women with normal serum TSH level on treatment 91 (73%) delivered vaginally, 32(25.8%) were required cesarean section and 1(0.80%) case required operative vaginal delivery. Out of 35 pregnant women with raised serum TSH level on treatment 14(40%) delivered vaginally and 21(60%) were required cesarean section. The rate of cesarean section is significantly higher in women with newly diagnosed or not on any treatment and women on treatment with raised TSH level. There were statistically significant association between mode of delivery and raised Serum TSH level.

There was statistically significant association between maternal complication (Severe Preeclampsia, Abruptio Placenta & Maternal Mortality) and raised serum TSH level. Maternal complications were more in newly diagnosed cases than women on treatment having raised TSH Level. Maternal Complications were more in women having raised TSH level with as compared to women with normal TSH level on treatment.
There was statistical significant association between birth weight and Gestational Age. There were statistical significant association between Perinatal Complications like Birth Asphyxia, Neonatal Jaundice & NICU admission and Gestational Age. There was statistical significant association between 5 min APGAR Score and Gestational Age.

Perinatal complications are more in women having raised TSH level as compared to women with normal TSH level on treatment.There were significant association between IUGR and raised TSH level. There were not significant association between Birth Asphyxia, Neonatal Jaundice, NICU Admission, Sepsis, Meconium aspiration pneumonia, Hypothermia,Convulsions and Classification of TSH Level at the Time of Delivery
Maternal complications were more in newly diagnosed & women with raised TSH level as compared to women with normal TSH level who is on treatment. Statistical significance was seen with Severe Preeclampsia, Abruptio Placenta & Maternal mortality ($p<0.05$). Maternal mortality (1/164) was observed in newly diagnosed case.

In our study we found that maximum number (124/164) of baby delivered with women of normal TSH having birth weight > 2.4Kg. Among women with raise TSH level 2 (5.7%) of baby were having birth weight <1.5 kg

and 6 (17.1%) were having birth weight between 1.5-2 kg. Significant association found between birth weight and raised serum TSH level (P<0.0001).

Out of 164 studied cases, around 135 babies were having APGAR ≥ 7 and 19 babies were having APGAR score <7.
We observed early neonatal death among (5/164) cases and still birth in (10/164). Most number of still birth was observed in women with raised TSH level.

Perinatal complications are more in women having raised TSH level as compared to women with normal TSH level on treatment. There were significant association between IUGR and raised TSH level. There were not significant association between Birth Asphyxia, Neonatal Jaundice, NICU Admission, Sepsis, Meconium aspiration pneumonia, Hypothermia, Convulsions and Classification of TSH Level at the Time of Delivery.

5. Discussion

Proper diagnosis of thyroid dysfunction during pregnancy is essential because maternal thyroid diseases complicate pregnancy. Therefore, accurate diagnosis guidelines may provide cutoff values to correctly diagnose thyroid diseases, allowing appropriate clinical interventions.

In present study most of 39.17% women belonged to the age group of 21-25 years with mean age of 24.12 ± 4.35. Our findings correlate to study conducted by Kalavathi Biradar[8] in which most cases i.e. 72.5% were frome age group of 21-25 yrs. In other studies by Mohammed M. Z et al [9] and Sreelatha S. et al [10] most cases belong to 26-30 years of age group.

In present study 69(42.1%) of women were nulliparous and 51(31.1%) were primiparous. Similar findings were noted in Zareen K. et al. [11] where 32.2% cases were primiparous, whereas Gupta P. et al. [12] found that primiparous were 37.5%.

We found that most women admitted were from urban area 57.9% which correlate to studies done by Kalavathi B. [8] (77.8%), Sreelatha S et al [10] (51%) and Jakhar A. [13] (52%).

We found that 20 (12.19%) reported previous history of preeclampsia as risk factor, 12(7.31%) cases were having previous preterm delivery and 7(4.3%) reported recurrent miscarriages. Mahadik K. et al. [14] study, among women with hypothyroidism, 4.5% had a history of infertility treatment, compared to 3.8% and 4.0% women with hypothyroidism observed in other studies.In present study ,maternal mortality was less as out tertiary care center having well
equipped labour room and availability of ICCU for better management of complications.

In present study, 87.7% of cases were having 5 min APGAR Score≥7 and 12.3% were having <7. Whereas Bawagi G. et al reported APGAR score ≥7 in 99.1% of cases. In present study there were more cases having APGAR Score <7 as more
complicated pregnant women are referred to our tertiary care center because our tertiary care center having more advanced NICU set up and there is lack of awareness
for proper Antenatal Care for pregnant women.
In mode of delivery, we observed that 34.8% cases were delivered by LSCS and 65.2% cases were vaginal delivery similar LSCS were reported in Kaduskar P. et al. [15] 33.3%, Sreelatha S. et al. [10] 22.9%, whereas Mohammed M.Z. et al. [9] reported less LSCS 16.0%.

Most associated factors for maternal complication was Anemia i.e. 65.2%, Gestational Hypertension in 12.2%, Severe Preeclampsia in 18.3, PPH in 7.9%, Abruptio Placenta in 8.5%, Gestational Diabetes in 3.7%

of cases. Sreelatha S et al. [10] found that abortion is associated with 2.1% cases, anemia in 4.2%, Oligohydramnios in 16.7%, Hypertensive disorders in pregnancy in 14.7%, GDM in 4.2%, Pre-term labour in 3.1%, PPH in 6.3% of cases. Ajmani SN. et al. [16]. Reported that hypertensive disorders in pregnancy in 10.0%, Anemia in 12.5% of cases.

We observed that LBW was seen in (28.1%), IUGR in (7.3%), Birth Asphyxia in (6.7%) and Perinatal Death in (9.7%). Whereas study conducted by Ajmani SN et al. [16] found IUGR among (41.7%), LBW in (16.7%), Foetal Distress in (10.4%). Sreelatha S. et al [10] found that LBW in (21.9%) of cases. Kalpesh K et al. [17] reported IUGR in (6.5%), LBW in (34.7%), Stillbirth in (2.1%) of cases.

In study by Saraladevi et al IUGR seen in 6.25%, LBW in 4.68% & Still birth in 1.56% of cases.In present study there were more cases having perinatal deaths as more complicated pregnant women are referred to our tertiary care center and there is lack of awareness for proper Antenatal Care for pregnant women.

6. Conclusion

There was statistically significant association between maternal complication (Severe Preeclampsia, Abruptio Placenta & Maternal Mortality) and serum TSH level at the Time of Delivery.Maternal complications were more in newly diagnosed cases than women on treatment and having raised serum TSH level and more in women having raised TSH level as compared to women with normal TSH level on treatment. Perinatal complications are more in women having raised TSH level with as compared to women with normal TSH level on treatment. There were significant association between IUGR & NICU Admission and serum TSH Level at the time of delivery. Serum TSH is sufficient and cost-effective biochemical marker for screening of thyroid dysfunction. Timely diagnosis and management of thyroid dysfunction is the key to avoid obstetric complications. Supplementing thyroxin in patients with hypothyroidism can prevent maternal and fetal complication , so routine screening of thyroid dysfunction is recommended in pregnant women. With improved prenatal counselling facilities, one should aim at early detection, adequate treatment and converting their hypothyroid status to euthyroid which will greatly improve the obstetric and perinatal outcome. In complicated cases, a multidisciplinary team approach, comprising of obstetrician, physician, anaesthetist, paediatrician and endocrinologist, hopefully, will improve pregnancy outcome of those who are affected.

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