RESEARCH ARTICLE

Study of thyroid profile in pregnancy with perinatal outcome

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ABSTRACT

Objectives: To assess the thyroid profile of pregnant women with comparison of the perinatal outcome in euthyroid and abnormal thyroid profile women. **Methodology**: This prospective cross sectional study was consisted of 150 women, of whom 75 were healthy normal pregnant women (Group A), other 75 were pregnant women with thyroid disorder (Group B). **Results**: Maximum thyroid disorder during pregnancy was subclinical hypothyroidism (68%). No statistically significant difference in relation to gestational age at delivery in cases of 'Group A' and 'Group B' were seen. 48% of caesarean delivery was in 'Group B' in comparison to 'Group A' (24%) ($p<0.05$). 2.67% cases in 'Group A' and 6.67% cases in 'Group B' delivered IUD baby. The mean birth weight of newborn of 'Group B' and 'Group A' were 2.57±0.50 kg and 2.92±0.60 kg respectively ($p<0.001$). The ≤ 6 APGAR score of newborn at 1 and 5 minutes were noted 30.43% and 18.84% in 'Group B' as comparison to 8.22% and 4.11% cases of 'Group A' which was statistically significant ($p<0.01$). **Conclusion**: Present study concludes that there is significant association between thyroid disorders and adverse perinatal outcome.

Keywords: Pregnancy, thyroid profile, perinatal outcome.

Thyroid disorders are the commonest endocrine disorders affecting women of reproductive age and can have adverse effects on pregnancy outcome. The incidence of thyroid dysfunction is 2.3 – 3.8% of women in pregnancy [1]. The most common thyroid disorder in pregnancy is maternal hypothyroidism. The incidence of overt hypothyroidism is 0.2% cases of pregnancies while subclinical manifestation of hypothyroidism is 2.3% cases [2]. Uncontrolled thyroid dysfunctions can be associated with adverse pregnancy outcome like placental abruption, pre eclampsia, preterm delivery, foetal loss, reduced intelle -ctual function in the offspring, low birth weight etc[3].

Physiological changes of pregnancy increase the production of thyroid hormones by 40-100% to meet the maternal and foetal needs [4]. Four major changes occur in maternal thyroid during pregnancy: 1) enlargement of the thyroid, 2) alteration in iodine handling, 3) increase in thyroid hormone binding proteins and 4) production of placental thyroid stimulators. In most of the pregnant women, the thyroid dysfunction is often overlooked because of the non specific symptoms and the hypermetabolic state of pregnancy. In view of potential adverse outcomes with maternal thyroid disorders and obvious benefits of treatment, the expert panels have suggested routine

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thyroid function screening in all pregnant women. So, this study was conducted to evaluate the thyroid profile with comparison of the perinatal outcome in euthyroid and abnormal thyroid profile women.

Methodology

This cross sectional study was carried out in the department of 'Obstetrics and Gynaecology' of 'Assam Medical College and Hospital (AMCH), Dibrugarh' from 1st July 2013 to 30th June 2014. Approval from institutional ethical committee was taken. A group of normal healthy pregnant women constituting 75 in number (group A) and another group of similar number of women with thyroid disorder (group B) were included in the study.

The A and B group were matched by their age, gravid, parity and locality. These women were chosen randomly from the antenatal outpatient department (ANOPD), antenatal ward and from the labour room of AMCH at their first antenatal visit. The women having multiple gestation, major obstetrical complications (antepartum haemorrhage, malnutrition, hydromnios etc.), systemic disease (cardiac, renal, liver), intake of some drugs (steroids, amiodarone, methadone, dopamine) were excluded from the study. Patients who had thyroid related disorders were allowed to take treatment as necessary. The relevant data were collected in structured proforma after taking written consent from the women. The peripheral blood samples were collected for both control and study group. RIAK-4/4A kit, RIAK -5/5A kit and IRMAK -9 kit were used for the quantitative measurement of T3, T4 and TSH respectively.

Hyperthyroidism was defined as low TSH and normal-to-high T3, T4. Hypothyroidism was defined as high TSH and normal-to-low T3, T4. Furthermore, we divided thyroid dysfunctions into the subgroups overt and subclicnial. Overt hypothyroidism was defined as high TSH in conjunction with low T4 and low or normal T3. Overt hyperthyroidism was defined as low TSH in conjunction with high T4. Subclinical hypothyroidism was defined as high TSH in conjunction with normal T4. Subclinical hyperthyroidism was defined as low TSH in conjunction with normal T4. Normal thyroid levels for the study population was considered based on table 1 [5,6,7]. Comparisons of findings were made using inferential statistical methods (χ^2 tests and t-tests). Data are expressed as number, percentage, or mean ± SD. Probability values < 0.05 were considered significant.

Table 1: Normal thyroid levels

Categories	Non pregnant adult	First trimester	Second trimester	Third trimester
TSH (µIU/ml)	0.34-4.25	0.1-4.40	0.4-5.0	0.23-4.4
T4 (µg/dl)	5.4-11.7	3.6-9.0	4.0-8.9	3.5-8.6
T3 (ng/dl)	77-135	71-175	84-195	97-182

** Thyroid Stimulating Hormone (TSH), Total Thyroxin (T4), Total Triiodothyroxine (T3)*

Results

The maximum thyroid disorder during pregnancy was subclinical hypothyroidism (68%). There is no statistically significant difference in relation to gestational age at delivery in cases of 'Group A' and 'Group B'. But, the most of the preterm births in 'Group B' were seen in hypothyroid cases (19.40 %) compared to 12.5% of hyperthyroid cases.

The maximum numbers of both euthyroid group (Group A) and thyroid disorders group (Group B) of women had vaginal delivery. But, the caesarean section percentage was more in thyroid disorder group (48%) in comparison to euthyroid group (24%) which was statistically significant ($p<0.05$).

Table 3 shows 2 (2.67%) cases in Group

Table 2: Gestational age at delivery

Category	Group A (N=75)	Group B (N=75)	
	Number (%)	Hypothyroidism Number (%)	Hyperthyroidism Number (%)
Pre term	13(17.33%)	13(19.40%)	1(12.5%)
Term	62(82.67%)	54(80.60%)	7(87.5%)
Total	75(100%)	67(100%)	8(100%)

Table 3. Modes of delivery, foetal outcome and birth weight

Category	Group A (N=75)	Group B (N=75)		
	No (%)	Hypothyroidism	Hyperthyroidism	Total
		No (%)	No (%)	No (%)
Modes of delivery				
Vaginal delivery	57(76%)	33(49.25%)	6(75%)	39(52%)
Caesarean delivery	18(24%)	34(50.75%)	2(25%)	36(48%)
Total	75(100%)	67(100%)	8(100%)	75(100%)
Outcome of foetus				
Live	72(96%)	61(91.04%)	7(87.5%)	68(90.67%)
Intra uterine death(IUD)	2(2.67%)	5(7.46%)	-	5(6.67%)
Neonatal death	1(1.33%)	1(1.50%)	1(12.5%)	2(2.66%)
Perinatal outcome in accordance to birth weight				
≥2.5Kg	56(74.67%)	35(52.24%)	5(62.5%)	40(53.33%)
2- <2.5Kg	12(16%)	24(35.82%)	2(25%)	26(34.67%)
1.5- <2Kg	6(8%)	6(8.96%)	-	6(8%)
<1.5Kg	1(1.33%)	2(2.98%)	1(12.5%)	3(4%)
Total	75(100%)	67(100%)	8(100%)	75(100%)
Mean birth weight	2.92±0.60kg	2.57±0.50Kg		

A and 5 (6.67%) cases in Group B delivered IUD baby and all of the cases of Group B were hypothyroid category. This finding was statistically not significant. (P-value with Fisher's exact test= 0.25).

Table 3 shows 56 (74.67%), 40 (53.33%) cases had normal birth weight in euthyroid (Group A) and thyroid disorders (Group B) women respectively. The Group B had more cases with low birth weight than Group A which was statistically significant ($p<0.01$). The mean birth weight of Group B (2.57±0.50 Kg) was less than the Group A (2.92±0.60 Kg) which was also statistically significant ($p<0.001$).

It was noted that 30.43% of cases in the group B compared to 8.22% group A had APGAR score at 1 minute of less than 6 which was statistically significant ($p<0.01$). Similarly, 18.84% cases of group B compared to 4.11% in the group A had APGAR score at 5 minutes of less than 6 ($p<0.01$). The most of the new born from group B with APGAR score ≤ 6 at 1minute and at 5 minutes were from hypothyroid pregnant women.

Discussion

This study included 150 patient where 75 numbers of normal pregnant women (Group A) and equal number of pregnant women with thyroid diseases (Group B). The variables like age, locality, gravid and parity of both group A and group B were well matched.

In this present study the 12.5% cases of hyperthyroid and 19.40% of hypothyroid pregnant women had preterm delivery which was comparable to some other studies like Rao et al (11.1%) [8] and Thanuja et al (16.67%) [9]. But a study conducted by Das et al (2014) reported 218 (43.6 %) out of 500 pregnant lady in their 1st trimester was suffering from hypothyroidism with mean TSH level 4.69 ±7.24 mIU/ml [10].

In this study, the caesarean section rates among the study group (Group B) (48%) were significantly higher than the control group (Group A) (24%). These findings were statistically significant ($p<0.05$). Similar higher caesarean section rates were found in thyroid Disorders patient in the study of Sahu et al (56%) [11].

In the present study 6.67% of hypothyroid pregnancies had IUDs. In other study done by Allan et al (1999) 2.9% of cases having TSH 6-9.99 mU/l had foetal deaths and 8.1% of cases having TSH ≥ 10mU/l had foetal deaths ($p<0.001$) [12].

In this study there were 47.76% of hypothyroid cases of 'Group B' delivered with low birth weight which was statistically higher compared to other studies like Roti et al (31%) [13], Goel et al (13.3%)

Table 4: Perinatal outcome in accordance to the APGAR score at 1 and 5 minutes

APGAR Score	Group A (No & %)		Group B (No & %)		Hypothyroidism		Hyperthyroidism	
	1min	5min	1min	5min	1min	5min	1min	5min
≥ 7	67 (91.78%)	70 (95.89%)	48 (69.57%)	56 (81.16%)	43 (69.36%)	49 (79.03%)	5 (71.43%)	7 (100%)
4 – 6	5 (6.85%)	2 (2.74%)	20 (28.98%)	13 (18.84%)	18 (29.03%)	13 (20.97%)	2 (28.57%)	-
≤ 3	1 (1.37%)	1 (1.37%)	1 (1.45%)	-	1 (1.61%)	-	-	-
Total	73 (100%)	73 (100%)	69 (100%)	69 (100%)	62 (100%)	62 (100%)	7 (100%)	7 (100%)

[14] and Sharma et al (27.21%) [15]. In hyperthyroid cases of 'Group B', there were 37.5% babies born with low birth weight. The mean birth weight among the thyroid disorders group was 2.57±0.50 kg compared to 2.92±0.60 kg in the euthyroid group which was statistically significant ($p<0.001$). There was increased prevalence of low birth weight in this study which could be because of other factors such as the lower socio-economic class, anaemic patients, previous low birth weight infants, poor nutrition, insufficient perinatal care, as the population catered by the hospital usually shows this factors, as most of the pregnant mothers are from poor background working as tea-garden labourers. 91.78% of the newborn from group A and 69.57% of newborn from group B pregnant women of the present study had APGAR score at 1 min ≥ 7. 30.43% of cases in the group B compared to 8.22% group A had APGAR score at 1 minute of ≤ 6 which was statistically significant ($p<0.01$). Similarly 95.89% of newborn from group A and 81.16% of the newborn from group B had APGAR score at 5 minutes ≥ 7. It was also noted that 18.84% cases of group B compared to 4.11% in the group A had APGAR score at 5 minutes ≤ 6 which was also statistically significant ($p<0.01$). Study done by Glioner et al [16] had also reported low APGAR score in thyroid disorders pregnant women. Again perinatal outcome in accordance with neonatal intensive care unit (NICU) admission was 22.67% of cases in the group B compared to 10.67% in the group A ($p>0.05$).

Conclusion

In pregnancy if these thyroid disorders are not detected or overlooked, because of the physiological changes during pregnancy, there may be adverse effects not only to the pregnancy but also to the perinatal outcome. Present study concludes that there is significantly high association between thyroid disorders and adverse perinatal outcome.

Conflict of interest: None. **Disclaimer:** Nil.

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