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Original Research

Fetal and Neonatal Outcome in Thyroid Dysfunction

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Abstract
Objective: *To study the fetal and neonatal outcome in antenatal women presenting with thyroid disorders.*
Methods: *This descriptive study was done in 449 pregnant women with different types of thyroid disorders who attended Department of Obstetrics and Gynecology in a tertiary care centre, Kerala during a period of 18 months from January 2014 to June 2015 with an aim to study outcome of pregnancy regarding the fetus and the neonate postnatally.*
Results: *Subclinical hypothyroidism (SCH) was the common dysfunction found in this study. Common fetal complications were fetal growth restriction, meconium stained amniotic fluid, premature membrane rupture, fetal distress and growth restriction with oligamnios. Overt hypothyroidism had higher percentage of complications and increase in the percentage of fetal demise was also found in overt hypothyroidism. The major neonatal complications observed were neonatal jaundice and transient tachypnoea of new born.*
Conclusion: *All pregnant women should be screened for thyroid dysfunction during first antenatal visit itself by doing a thyroid function test so that early diagnosis and treatment can be given by which adverse pregnancy outcome regarding fetus can be reduced to some extent.*
Keywords: *Thyroid dysfunction, fetal outcome, Apgar scoring, neonatal complications.*

INTRODUCTION

Link between thyroid disorders and mental retardation in offspring has been recognized for nearly 100yrs. Cells of the developing brain are major target for thyroid hormone and play a crucial role in brain maturation during fetal development. Both hypo and hyperthyroidism have adverse fetal outcome if not treated adequately and timely. Severe hypothyroidism is commonly associated with ovulatory dysfunction and infertility. In mild hypothyroidism, conception can occur but may be associated with abortion, prematurity or stillbirth(1). Overt maternal thyroid failure during 1st half of pregnancy is associated with several pregnancy complications and poor intellectual function. Prevalence of SCH is about 6.47%, overt hypothyroidism is 4.58% in pregnant women and hyperthyroidism is less commonly encountered in pregnancy(2). Common maternal complications include abortions, recurrent pregnancy loss, pre-eclampsia, preterm delivery, placental abruption,

anemia, higher incidence of caesarean, all may contribute to pregnancy loss. Fetal complications includes low birth weight babies (LBW), meconium stained amniotic fluid (MSAF), stillbirth (SB), hyperbilirubinemia, neonatal respiratory distress, neonatal deaths, neonatal thyroid dysfunction and increased incidence of perinatal morbidity and mortality. Neurological impairment of the offspring can occur in untreated cases of SCH. If hypothyroidism is detected early, it is easy to treat with very little detriment to fetus. Inadequately treated hyperthyroidism can produce fetal and neonatal hypothyroidism.

Practitioners providing health care for pregnant women should be alert about thyroid disease as an underlying cause for pregnancy loss[3]. Monitoring of thyroid stimulating hormone (TSH) levels with trimester specific reference range is essential to avoid adverse effects in the pregnant women and fetus. In those who are already having the disease TSH level should be checked just before conception and rechecked at about four weeks of gestation even if TSH is normal. It should be made mandatory to screen all pregnant women because of the high prevalence of the disease in India, so that all thyroid dysfunctions can be screened and treated at the earliest.

OBJECTIVE

To study the fetal and neonatal outcome in antenatal women presenting with thyroid dysfunction attending Obstetrics and Gynecology Department, TDMC Alappuzha, Kerala from Jan 2014 to June 2015.

METHODS

The study was a descriptive one conducted at Government TDMC, Alappuzha. Study group included 449 pregnant ladies after diagnosing thyroid dysfunction by doing TFT. Pregnant ladies with abnormal TFT (TSH, free T3, freeT4) attending OBG department in TDMC Alappuzha, Kerala and babies born to these mothers were studied. Normal TSH level is 0.1 to 2.5, 0.2 to 3, 0.3 to 3milli IU/L in first, second and 3rd trimesters respectively. In pregnancy any value below are hyperthyroidism and above are considered as hypothyroidism. When T3 and T4 values are normal and TSH is abnormal the disease is subclinical. Pregnant ladies with thyroid disorder TFT done in each trimester, diagnosed cases are given proper treatment and any complications developing in them during pregnancy and newborn were studied.

STATISTICAL ANALYSIS

Data was entered into a master sheet and necessary statistical tables were constructed .To test hypothesis, statistical tests like Chi square test and Odds ratio were used.

RESULTS

Among the 449 women studied, 324 (72.2%) cases had SCH, 6 (1.3%) women had subclinical hyperthyroidism. Overt hypothyroidism detected in 93 (20.7%) and 24 (5.3%) had overt hyperthyroidism, thyroid nodule and thyroid cancer for 2 (0.4%) cases (Table -1). Subclinical hypothyroidism was more in 20-25 yrs age, overt hypothyroidism in >35 yrs and other types of thyroid dysfunction was more in below 20 yrs age group. Out of the 449 women 47 (10.5%) had spontaneous abortion in the first trimester. Remaining 402 continued pregnancy and delivered. Gestational age at time of delivery was 28-36 week+6 days in 51 women (12.7%) and 37 wks and above in 351 (87.3%) women. About 132(32.8%) babies delivered by caesarean section and 270 (67.2%) delivered vaginally. In overt hypothyroidism abdominal delivery was significantly high (25%).In SCH (72.6%) and other thyroid dysfunction (9.3%) more babies are born vaginally (TABLE- 2).

Majority of the babies were between 2.6-3.5 kg (59.5%) 33% had FGR, 6% had severe FGR (TABLE -3). No intrapartum complications seen in 60.5% of case. Fetal distress was the common complication (13.6%) next was Fetal Growth Restriction (FGR)13.3% followed by MSAF 9%, Premature rupture of membrane (PROM) 5.6%, oligamnios 9% and Preterm PROM (PPROM) 3.7% (TABLE- 4). Significant increase in the

percentage of Intra uterine fetal demise (IUFD) was found in overt hypothyroid group compared to others (TABLE-5).

Apgar score at birth were fine in 96% had an apgar of 10-7 and 4.3% had apgar below 7.Majority (54.1%) of the babies didn't develop any complications. 45.9% had NICU admission. The major complications observed were neonatal jaundice (NNJ) 20.7%, transient tachypnoea of newborn (TTNB) 9.4%, meconium aspiration syndrome (MAS) 5.3% and hypoxic ischemic encephalopathy (HIE). Others were hypotonia, sepsis, necrotizing enterocolitis (NEC) neonatal death ((NND) and Hypoglycemia (TABLE- 6). SCH had significantly higher percentage of complication than others, NNJ 22.2%, TTNB 9.9% MAS 5.6% HIE3% (TABLE- 7).

TABLE- 1 Types of thyroid dysfunction.

Dysfunction	Frequency	Percentage
Subclinical hypothyroid	324	72.2
Overt hypothyroid	93	20.7
Subclinical hyperthyroid	6	1.37
Overt hyperthyroid	24	5.3
Thyroid nodule and cancer	2	0.4
Postpartum thyroiditis	0	0

Subclinical hypothyroidism was the most common disorder found.

TABLE- 2 Mode of delivery.

Type of delivery	Frequency	Percentage	SCH frequency	SCH percentage	Overt hypothyroid frequency	Others Frequency	Others Percentage
Vaginal	270	67.2	196	72.6	49	25	9.3
LSCS	132	32.8	94	71.2	33	5	3.8

Significant increase of LSCS in overt hypothyroid.

TABLE-3 Percentage according to birth weight

Birth weight	Frequency	Percentage
<=1.5kg	24	6
1.6-2.5kg	110	27.4
2.6-3.5kg	239	59.5
3.-4.5kg	29	7.2

Majority weighed between 2.6-3.5 kg.

TABLE - 4 Percentage distribution of fetal outcome

Fetal outcome	Number	Percentage
Nil	279	62.1
FGR	27	6
MSAF + Fetal distress	24	5.3
Fetal distress	18	4
PROM	18	4
Oligamnios + FGR	16	3.6
PPROM	15	3.3
Oligamnios	14	3
MSAF	12	2.66
FGR + Fetal distress	8	1.8
IUFD	8	1.8
Oligamnios + Fetal distress	2	0.4
FGR + MSAF	2	0.4
Still birth	1	0.2

FGR &MSAF were the common complication

TABLE-5 -Fetal outcome and thyroid dysfunction

Fetal outcome	SCH		Overt hypothyroidism		Others	
	Number	Percent	Number	Percent	Number	Percent
Nil	196	60.5	59	63.4	24	75
Fetal distress	44	13.6	9	9.7	1	3.1
FGR	43	13.3	10	10.8	3	9.4
Oligamnios	32	9.9	6	6.5	2	6.3
MSAF	29	9	7	7.5	1	3.1
PROM	18	5.6	4	4.3	2	6.3
PPROM	12	3.7	2	2.2	1	3.1
IUFD	2	0.6	6	6.5	0	0
Stillbirth	0	0	1	1.1	0	0

Still birth was present in overt hypothyroidism.

TABLE -6 Neonatal complication and NICU admission.

Complications	Count	Percentage
Nil	243	54.1
NNJ	93	20.7
TTNB	42	9.4
MAS	24	5.3
NEC	5	1.1
NND	5	1.1
Sepsis + Hypoglycemia	1	0.2
NNJ + TTNB	4	0.9
Hyoptonia	3	3.07
Sepsis	4	0.9
Hypoglycemia	2	0.4
HIE	14	3.1
NNJ + MAS	4	0.9
NNJ + hypoglycemia	1	0.2
NEC + NNJ	1	0.2
NNJ + HIE	3	0.7

Neonatal jaundice and transient tachypnoea were noted in significant numbers.

TABLE -7 NICU admission and thyroid dysfunction.

Neonatal complication	SCH		Overt hypothyroidism		Others	
	Count	Percent	Count	Percent	Count	Percent
NIL	170	52.6	56	60.2	1.7	53.1
NNJ	72	22.5	16	17.2	6	18.8
MAS	18	5.6	5	5.4	1	3.1
TTNB	32	9.9	5	5.4	5	15.6
HIE	12	3.7	1	1.1	2	6.3
Others	10	3.1	9	9.7	0	0.0

Neonatal jaundice and transient tachypnoea were common indication for admission.

DISCUSSION

Thyroid dysfunctions in pregnancy are associated with increased risk for mother and the fetus. Among 449 women studied 72.2% had subclinical hypothyroidism 1.3% had subclinical hyperthyroidism, overt hypothyroidism for 20.7% and overt hyperthyroidism in 5.3%. In a study 68% women had subclinical hypothyroidism, 5.6% had subclinical hyperthyroidism 22.6% had overt hypothyroidism and 3.7% had hyperthyroidism [4]. In India prevalence of SCH is 2-3% and overt hypothyroidism is 0.3-0.5%. During the study period there were 4695 deliveries in our institution. Incidence of thyroid dysfunction being 9.7%.Most common was SCH, 6.9%. Untreated hypothyroidism subclinical or overt at time of conception is associated with miscarriage rate up to 31.4% compared to 4% for euthyroid at time of conception [5]. Overt thyroid dysfunctions are associated with several pregnancy complications and intellectual impairment of the offspring compared to milder dysfunctions [6].

Higher % of subclinical hypothyroidism was found in 20-25 yrs group .Overt hypothyroidism was more in >35yr group and other types more in below 20 yrs group. The mean age at presentation of all types of thyroid dysfunction was 25.19 $\pm$ 4.17 and overt hypothyroid women had higher maternal age reason may be the current trend of older women having conception[7]. Most of the diseases were diagnosed in the first trimester. Detection of thyroid dysfunction in first trimester itself and prompt treatment can reduce the fetal complications [8].

FGR was the most common complication detected followed by presence of MSAF with fetal distress. PROM, Fetal distress, FGR with oligamnios and PPROM follows. In SCH the incidence of FGR was 13.3%, MSAF 9%, Oligohydramnios 9.95%, PROM 5.6%, Fetal distress 13.6%, IUFD 0.6% and no stillbirth. One study reports incidence of FGR 10.8%, Fetal distress 9.7% ,MSAF7.5% , Oligamnios 8%, PROM 4.3%, IUFD 6.5% and stillbirth1.1% in overt hypothyroidism[9]. Offspring of women with overt hypothyroidism are at greater risk of preterm labor, FGR and increased neonatal distress[10]. In our study incidence of preterm labor was 12.9%. Thyroid dysfunction seems to exert irreversible effects on placenta and fetus in early pregnancy which may impair ability to tolerate stress. High prevalence of SCH noted in women with preterm delivery before 32 weeks compared to matched controls [11]. In our study population 33% delivered by Caesarean section, 67% had vaginal delivery. Chance of caesarean delivery for fetal distress is more in severe hypothyroidism compared to mild hypothyroidism [12].

Majority of the babies weighed between 2.6-3.5 kg and FGR was present in 33% cases. Majority of the babies did not develop any complications. Major indications for NICU admission were i neonatal jaundice, TTNB and MAS and HIE. Overt hyperthyroid cases had higher percentage of complications than others. No other significant neonatal complications were found in terms of hyprbilirubinemia, sepsis, hypoglycemia, hypothermia or NND in our study.

Most of the studies above mentioned suggest the importance of universal screening for thyroid disorders in early pregnancy itself and treating them timely. If thyroid disorders are detected early it is easy to treat with very little detriment to mother and fetus [13].

CONCLUSION

Our study concluded that thyroid dysfunction has significant role in fetal and neonatal outcome. Subclinical hypothyroidism and overt hypothyroidism were the common disorders found. Significant % of subclinical hypothyroidism was present between 20-25 yrs. Overt hypothyroidism are significantly high in women >35 yrs and had more complications. FGR was the most common fetal complication found followed by MSAF, PROM, Fetal distress, FGR with oligamnios, and PROM. Significant increase in the % of fetal demise was found in overt hypothyroidism. The major neonatal complications were neonatal jaundice and TTNB.

Thyroid dysfunction is a condition that affects a significant number of women during pregnancy which is associated with adverse fetal and perinatal outcome. Hence it is important to screen all pregnant women in the first antenatal visit itself in order to facilitate early diagnosis and provide aggressive timely treatment. They should be properly counseled regarding the adverse outcome of the disease. Close monitoring of the pregnancy and the newborn after delivery is essential.

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