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TO STUDY PROFILE OF MATERNAL HYPOTHYROIDISM AND FETAL OUTCOME

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Abstract: Thyroid diseases are responsible for many fatal outcomes for unborn baby as well as neonate, due to which neonates may present early or late symptoms of the underlying thyroid disease in near future after birth .it is very difficult to know the symptoms of thyroid diseases in pregnancy who are just new to motherhood. Also there might be lack of knowledge in the rural background and the socioeconomic as well as the educational status of the mother might take it difficult to reach out for the symptoms appeared to make it diagnosed from a clinician .in medical terms in pregnancy there are changes in maternal hypothalamic-pituitary-thyroid axis, the fetus develops its own HPT axis and there is also very active role of placenta for newborn in iodide, metabolism and T4 transport. Thus, during gestation three-compartment thyroid model exists. The maternal and fetal hypothyroidism occurs in combination when there is iodine deficiency in that region. Congenital hypothyroidism is the most common preventable disease that can be prevented by being vigilant for the disease during pregnancy as well as during neonatal period. A major portion of the disease is responsible for the infertility and also first trimester spontaneous abortions.

Key words: hypothyroidism, birthweight, posterior fontanelle

Introduction

Thyroglossal duct forms the thyroid gland which is the downward extension from the floor of pharynx after the formation of pharyngeal arches in the 4th to 5th week of gestation. Para-follicular cells are derived from caudal pharyngeal complex from 4th and 5th pharyngeal pouches. Anomalies of the thyroid gland may be either due to shape (pyramidal lobe, absent isthmus, one small gland); or due to position (lingual, infra-lingual, supra-hyoid, infra-hyoid, intra-thoracic) or thyroid tissue may be ectopic (1). Thyroid reaches its definitive position in 8th to 10th weeks of gestation. The thyroid gland produces Thyroxine (T4), Tri-iodothyronine (T3) and Calcitonin. In blood, thyroid hormones are bound to thyroxine-binding globulin (TBG), thyroxine binding pre-albumin and albumin. Thyroid hormone has a slow onset and longer duration of action. T4 has a long latent period of 10 to 12 hours and T3 has a latent period of 6 to 12 hours. Thyroid hormones act on cell nucleus via retinoid receptors initiating new protein synthesis affecting growth, metabolism, central nervous system development, cardiovascular system and hence whole body functions.(2) In the gestation period, iodine intake should be increased to 250 mcg to prevent thyroid disease and to meet daily requirements . The iodine loss occurs by up to 30% during pregnancy due to iodine loss in urine maternally secreted excess placental human chorionic gonadotropin (hCG) stimulates the thyroid gland. Thyroxine-binding globulin (TBG) half-life is also prolonged by maternal oestrogen and thus increases T3 and T4 levels. Maternal support to the fetus starts in the early gestational weeks as evidenced by detection of T4 in coelomic fluid. The fetal thyroid gland starts uptake of iodine and t4 synthesis at 10th week of gestation. Mother keep on supply of thyroid to fetus till 20 weeks of gestation after that there is incrementally increase in T3 and T4 synthesis. If dyshormogenesis or agenesis is present in the fetus, maternal support prolongs until birth. The fetal hypothalamus-derived TRH synthesis matures at around 34 weeks. TRH-TSH release occurs in 30 minutes of delivery; TSH level increases to 70-90 mU/L in mature babies and 30-40 mU/L in preterm babies and the T3-T4 levels increase. A physiologic hyperthyroxinemia period is experienced in the postnatal 3-4 days and this shows metabolic adaptation (3). Thyroid disease is the second most common endocrine disease to affect women of reproductive age. Thyroid disorders can have adverse reproductive and pregnancy implications. Although gestational hyperthyroidism is uncommon (0.2%), gestational hypothyroidism occurs in higher prevalence (2.5%) and can lead to neonatal and child neurodevelopmental deficits and maternal obstetric complications (4, 5). Preterm

infants, IUGR babies, and low birth weight babies have a delayed TSH surge and the second screen at 2-4 weeks of age should be performed.(6)

Material and Methods

This study was conducted at Civil Hospital Jwalamukhi District Kangra Himachal Pradesh on confirmed cases of only hypothyroid mothers with gestation >37 weeks over a period of one year. A set of prestructerd questionere from the mothers of baby were asked and their hypothyroid status was confirmed upon the previous Thyroid profile reports at start of thyroxine in pregnancy. The history regarding previous baby issues and ongoing pregnancy was also taken. History regarding the thyroid medication was inquired. The reference values as given by American thyroid association for pregnancy as well as for neonates were used as standard. The blood for Thyroid profile study from neonates were taken on day 3 of life for term babies only.

Results

In our study total of 30 patients were studied for the maternal profile with hypothyroidism and its effects on the fetal outcome. In our study mostly mothers were from rural background (70%) and the mean age of the mothers was 29.4 ±4.8yrs with average maternal TSH levels 8.9±2.7 µIU/ml. Mostly cases were seen in range of 2.6-10 µIU/ml (86.7%). About 26.7% mothers reported history of spontaneous abortions. In the babies born to these maternal cases 43% were males with birthweight of less than 2.5kg with average birth weight 2.57±0.29 kg in about 26.6% cases. The average TSH of the neonates were 7.03±4.1 µIU/ml and only four cases with hypothyroidism were reported whose TSH were more than 10 µIU/ml. Neonatal hyperbilirubinemia was seen in 60% cases. In 60% cases the OFC ranged between 31to 35cm and posterior fontanel was open in 23.3% cases and sutural diastasis was seen in 30% cases.

Table 11. Summary of Maternal Characteristics

Maternal Characteristics		n (%)
Age-group (years)	Less than 30	18(60%)
	31-40	12(40%)
Geographic distribution	Rural	21(70%)
	Urban	9(30%)
TSH Range	< 2.5µIU/ml*	0
	2.6- 10 µIU/ml	26(86.7%)
	> 10 µIU/ml	04(13.3%)
Spontaneous Abortions	Yes	8(26.7%)
	No	22(73.3%)

Table 2. Show Demographic profile of Hypothyroid Mothers

Demographic Profile Of Mothers	Rural	21(70%)
	Urban	9(30%)

Table 3. Show sex distribution of baby born in study

Sex	Count
Males	13(43.3%)
Females	17(56.7%)

Table 4.Shows birth weight distribution of the babies born to mothers in study

Weight	Count
<2.5 kg	8(26.6%)
>2.5 kg	22(73.3%)

Table 5.Show the rate of neonatal hyperbilirubinemia in neonates of hypothyroid mothers

Neonatal Hyperbilirubinemia	Neonates born to mothers with Hypothyroidism n=30(%)
Present	12(40%)
Not Present	18(60%)

Table 6. Show the distribution pattern of Occipitofrontal circumference of neonates in study

OFC	Count n=30(%)
<31cm	**1(3.3%)**
31-35cm	**18(60%)**
35cm-37 cm	**11(36.6%)**

Table 7. Show character distribution of the Fontanelle

Posterior Fontanelle	Neonates born to mothers with hypothyroidism n =30 (%)
Open	7(23.3%)
Closed	23(76.6%)

Table 8.Show distribution of cases with sutural Diastasis

Sutural diastasis	n (%)
Present	9(30%)
Absent	21(70%)

Table 9.Show TSH distribution of neonates at 72hrs

TSH of baby at 72 hrs.	n%
<5.58	10 (33%)
5.58-10	16 (53.3%)
>10	4 (13.3%)

Discussion: In our study 30 mothers with their neonates were studied for different parameters of mother as well as neonate. In our study there were four cases of congenital hypothyroidism who were having TSH values more than 10 at 72 hours of life constituting to about 13.3%. The mean age of antenatal mothers was 29.4 ±4.8yrs in our study and a study done by of Dhanwal DK et al. reported mean age of 25.5±5.6 years in their study (7).which was almost similar to our study. In study done by Hareesh MV et al. In their study of mothers with subclinical hypothyroidism maternal age group constituted of following groups: 26-30 years (51.02%), about half of the mothers were in this group, 34.69% belonged to 20-25 years of age group. 4.08% and 8.16% mothers belong to < 20 years and > 30 years of age group respectively(8). In our study out of 30 mothers, 21 (70%) mothers were from a rural background and 9 (30%) mothers were from an urban background. In a study by Phiri NS et al, it was concluded that women in rural areas had deficient obstetric care (9). In himachal district kangra has easy access to health services where this study was conducted which is in contrary to other parts of himachal especially tribal belts of the state might have higher incidence of the thyroid diseases in pregnancy which remain undiagnosed. In our institute total no 0f deliveries were 350 and the prevalence calculated was 8.5%. The study conducted by Saraladevi R et al (2016) where they found that the prevalence of thyroid disorder in antenatal mothers was 11.6%. The prevalence of subclinical and overt hypothyroidism was 6.4% and 2.8% respectively and prevalence of subclinical and overt hyperthyroidism was 1.8% and 0.6% respectively (10).in our study there were history of spontaneous abortions in about 8 cases which contributes to 26.7% and several studies have shown that hypothyroidism can be the underlying cause for the unreported abortions during pregnancy. In our study 8 (26.6%) neonates were low birth weight and Saraladevi R et al found that 4.68% neonates born to mothers with thyroid disorders had low birth weight. (10). In a study done by Leung et al, the incidence of low birth weight babies was 9 % (11).Seven (23.3%) neonates had open posterior fontanelle. Rastogi M et al mentioned that thyroid hormone is important in the formation and maturation of bone and congenital hypothyroidism can lead to a wide posterior fontanel of greater than 5 mm size (12).

Conclusion: The incidence of hypothyroidism in pregnancy is varied and depend on the demographic profile and the availability of health care facilities in the region. It can affect the neonate to varied extent leaving behind the poor mental outcome for whole life if did not corrected early in course by early detection of maternal as well as neonatal thyroid status.

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