Research Open

Pediatric Studies and Care
Volume 2 Issue 1

Research Article

A Clinical Study on Hypothyroidism and Early Pregnancy Loss

Jayati Nath*[1], Sadhana Meena[2] and Tuhina Gupta[3]

[1]Professor, Obstetrics & Gynaecology, SGT Medical College, Gurugram, India
[2]Assistant Professor, Obstetrics & Gynaecology, SGT Medical College, Gurugram, India
[3]Assistant Professor, Obstetrics & Gynaecology, SGT Medical College, Gurugram, India

Corresponding author: Dr Jayati Nath, Professor, Department of Obstetrics & Gynaecology, SGT Medical College, Gurugram, Haryana-122505, India

Received: July 25, 2022; **Accepted:** August 01, 2022; **Published:** August 08, 2022

Abstract

Thyroid disorders are recognized associated factors for adverse pregnancy outcomes spontaneous miscarriages being an important entity. This study was conducted on 200 women who had early pregnancy losses and their thyroid profile was evaluated. Prevalence of overt and sub clinical hypothyroidism was calculated along with euthyroid women. The results obtained were statistically analysed. In conclusion, it was established that hypothyroidism, both overt and sub clinical, when untreated can lead to early pregnancy losses, therefore all antenatal women should be universally screened for thyroid dysfunction in their very first antenatal visit and treatment should be initiated at the earliest.

Keywords: *Early pregnancy loss, Hypothyroidism, Overt hypothyroidism, Spontaneous miscarriage, Subclinical hypothyroidism, Thyroid dysfunction*

Introduction

Thyroid dysfunction during pregnancy has been known to be associated with adverse pregnancy outcomes especially spontaneously miscarriages, being the most common early pregnancy complication. Though various causes of early pregnancy losses include genetic, anatomical factors, endocrine dysfunction, autoimmune disorders, thrombophillias, life style and environmental factors, maternal general diseases and infections, a large chunk of such cases are unexplained and also known as idiopathic early pregnancy losses. Thyroid dysfunction constitutes the most common endocrine disorder encountered in pregnancy sometimes recognized for the first time during antenatal check-ups. Pregnancy is characterized by profound physiological modifications in thyroid function regulation as a result of various factors e.g. increased Thyroid Binding Globulin (TBG) due to elevated Estrogen and human chorionic gonadotropin (HCG) levels, increased renal iodine losses due to increased Glomerular filtration rate (GFR), peripheral metabolism of maternal thyroid hormones modifications and physiological changes in the iodine transfer to the placenta [1-4].

It has been observed that antenatal women with thyroid dysfunction - both overt and subclinical types - are at higher risk for developing pregnancy-associated complications e.g. threatened miscarriage, pre-eclampsia, pre-term labour and pre term birth, abruption placentae and post-partum haemorrhage. Fetal complications are also associated with thyroid dysfunction in pregnancy e.g. spontaneous abortions in first trimester, pre term births, Intrauterine Growth Restriction (IUGR), low birth weight (LBW) babies, low APGAR scores, stillbirths and neonatal deaths, higher incidence of NICU admission because of neonatal hyper-bilirubinemia, neonatal hypothyroidism, and increased perinatal mortality rate [5]. Euthyroid status is defined as having normal TSH levels (0.1-2.5 mIU/L) in 1st trimester. Subclinical Hypothyroidism (SCH) is defined as TSH increase (>3.0 mIU/L) in the presence of normal Free T4 (0.8-2.0 ng/dL). Overt hypothyroidism (OH) has increased TSH (>3.0 mIU/L) and low Free T4 (<0.8 ng/dL). Subclinical hyperthyroidism is defined as low serum TSH (<0.2 mIU/L) and normal Free T4 (0.8-2.0 ng/dL). Overt hyperthyroidism has high free T4 (>2.0 ng/dL) and low TSH (<0.2 mIU/L). This study was conducted with the aim of determining the prevalence of hypothyroidism in patients presenting with early pregnancy loss.

Materials and Methods

- **Study type**: Hospital based, cross-sectional study.
- **Study duration**: 18 months.
- **Study population**: Pregnant women presenting with Early pregnancy losses (EPL) (missed/incomplete/ complete miscarriages).
- **Sample size**: 200.

This study was conducted in the department of Obstetrics and Gynaecology of a tertiary care medical college in rural Haryana, in North India.

All pregnant women presenting with EPL (missed/ incomplete/ complete miscarriages) were enrolled in this study after obtaining proper written informed consent. All these patients recruited had detailed history taken, followed by thorough clinical examination consisting of general physical, systematic and obstetric examinations and all the findings were entered in a pre-structured performa. History including socio-demographic parameters, age, parity, socio-economic status, menstrual history, obstetric history, medical or surgical history, date of her last menstrual period (LMP) were noted.

BMI was calculated based on pre-pregnancy body weight and height (BMI=wt in kg/height in sq.m).

Exclusion Criteria

- Multiple gestation
- Known Thyroid dysfunction
- Known cases of DM/ Renal/ liver disease/ hypertension
- Known cases of recurrent pregnancy losses (RPL)

Blood samples were collected for Thyroid Function Test (TFT) Serum TSH and free T3 and T4. Thyroid status of the patient was established using the standard cut-off laboratory levels (Table 1).

Results and Observations

Total 200 patients with EPL were recruited in the study.

The results observed were as follows (Table 2-5):

Table 1: Interpretation of Thyroid Function Tests (TFT).

Status	TSH level (μIU/L)	Free T4 level (ng/L)
Euthyroid	0.1-2.5	
Overt Hypothyroidism (OH)	> 3.0	<0.8 (decreased)
Subclinical Hypothyroidism (SCH)	>3.0	0.8-2.0 (normal)
Subclinical hyperthyroidism	<0.2 (decreased)	0.8-2.0 (normal)
Overt hyperthyroidism	<0.2(decreased)	>2.0 (raised)

Table 2: Age distribution of patients.

Age (years)	Number (n)	Percentage (%)
19-24	115	57.50
25-29	51	25.50
30-34	26	13.00
≥35	8	4.00
Total	200	100.00

Table 3: Parity-wise distribution of patients.

Parity	Number (n)	Percentage (%)
≤1	99	49.50
2	49	24.50
3	28	14.00
≥4	24	12.00
Total	200	100.00

Most patients were primipara, were young (19-24 years of age), with low BMI.

Table 4: Mean BMI of the patients.

Thyroid status	BMI (kg/m^2)
Euthyroid	22.1 ± 2.2
Hypothyroid	22.8 ± 3.6

Table 5: Comparison of age and BMI.

Parameter	Mean age (years)	BMI (kg/m^2)
Euthyroid women	22 ± 3.6	22.1 ± 2.2
Hypothyroid women	25 ± 2.3	22.8 ± 3.6

Discussion

This study was conducted on 200 antenatal women presenting with early pregnancy losses, showing that hypothyroidism is a significant contributor to miscarriages especially in the first trimester. In our study, 48 patients (24.0%) had hypothyroidism with 36 overt hypothyroidism (75.0%) and 12 with subclinical hypothyroidism (25.0%0). Our results are comparable with those from various studies from different geographical areas of the globe. In their study, Abalovich et al. reported that untreated hypothyroidism both SCH and OH at the time of conception, was associated with significantly higher rates of spontaneous miscarriages as compared to euthyroid women [6]. Ashoar et al. in their study reported statistically significant association between low serum thyroxine (FT4) in mothers in first trimester and early fetal loss in subclinical hypothyroid pregnant women [7]. Rao et al. from south India, determined the frequency of hypothyroidism in women with EPL in India, which they stated as 4.12%. Leduk et al. in their retrospective cohort study, concluded that patients with recurrent pregnancy losses in 1st trimester, 19.4% subclinical hypothyroidism SCH and 5.4% had overt hypothyroidism (OH). Salek et al. reported increased prevalence of hypothyroidism for twin gestation than singleton pregnancy at 6.42% and 5.32% respectively. Zhang et al. studied the relationship between SCH and risk of spontaneous miscarriage before 20 weeks of gestation and reported significantly increased chances. They also observed that SCH patients with thyroid autoimmunity had higher prevalence of spontaneous miscarriage as compared to euthyroid women [8-11].

Conclusion

From the present study, we reinforce the fact that hypothyroidism - both overt and subclinical - if untreated - leads to early pregnancy losses. It also causes recurrent pregnancy losses. Therefore all pregnant women should be universally screened for thyroid dysfunction so that replacement therapy can be initiated at the earliest so as to ensure the best maternal and fetal outcomes.

Conflict of Interest

Nil.

Funding

None.

Abbreviations

EPL: Early Pregnancy Loss; GFR: Glomerular Filtration Rate; IUGR: Intrauterine Growth Restriction; LBW: Low Birth Weight; NICU: Neonatal Intense Care Unit; OH: Overt Hypothyroidism; RPL: Recurrent Pregnancy Loss; SCH: Subclinical Hypothyroidism; TFT: Thyroid Function Test.

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Citation:

Nath J, Meena S, Gupta T (2022) A Clinical Study on Hypothyroidism and Early Pregnancy Loss. *Pediat Stud Care* Volume 2(1): 1-3.