ASSOCIATION OF SUBCLINICAL HYPOTHYROIDISM AND IUGR IN PREGNANT WOMEN

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ABSTRACT

Introduction

The objective of this study was to evaluate the association between maternal subclinical thyroid dysfunction with the risk for intrauterine growth restriction (IUGR).In IUGR, the serum concentration of thyroid stimulating hormone is elevated. This might trigger subclinical hypothyroidism. Pregnancy itself is a risk factor for developing hypothyroidism. Ultimately, an insufficient amount of thyroid hormones may lead to severe pregnancy complications.[1]The term intrauterine growth restriction (IUGR), or fetal growth restriction, is used to describe a fetus that cannot reach its growth potential. It is usually diagnosed by fetal biometry and Doppler flow.[1] Small for gestational age (SGA) is used to describe those infants who are smaller in size than normal for their gestational age, defined as a weight below the 10th percentile or 2 standard deviations (SD) for the gestational age.[2] Although the 2 terms are different, SGA is widely considered to be a proxy for IUGR, and weights below 2 SD would capture the majority of fetuses with IUGR.[3]

Retarded development of the infants results in short-term adverse outcomes, such as increased mortality and morbidity, prematurity, and hypoglycemia, as well as some long-term outcomes such as delayed growth during childhood, short stature, obesity, higher thyroid-stimulating hormone (TSH) levels, hypertension, and type 2 diabetes.[4–6]

Thyroid diseases are relatively common in women during their reproductive period. Normal maternal thyroid function is currently considered crucial for fetal growth and neurocognitive development. Many epidemiological studies also indicate a possible effect of thyroid dysfunction or antithyroid antibodies (ATA) on increased risks for pregnancy complications such as IUGR or SGA. However, the results vary between studies, and drawing conclusions remains controversial, especially with respect to subclinical thyroid dysfunction or positive ATA with euthyroid status. It is widely accepted that overt hypothyroidism (OH) and overt hyperthyroidism increase the risk for deleterious outcomes. Therefore, the aim of this meta-analysis was to review all of the eligible studies to evaluate the association between thyroid disorders, including subclinical hypothyroidism (SCH), subclinical hyperthyroidism, thyroid peroxidase antibody (TPOAb) positivity, and isolated hypothyroxinemia, and the risk for IUGR.

Method And Materials

100 subjects of subclinical hypothyroidism as cases and 100 euthyroid subjects as controls were taken and their serum analysed for T_3, T_4 and TSH. Pregnancy outcome in terms of IUGR were compared in terms of student t-test.

Result

Incidence of IUGR was found clearly in excess in cases as compared to controls, showing association between IUGR and subclinical hypothyroidism.

Conclusion

There is association between thyroid abnormalities and pregnancy caused
hypertension. It suggests that thyroid function test should be done in each pregnant women to detect subclinical hypothyroidism , so that timely intervention can be done to prevent pregnancy related complications.

Keywords

T_3,T_4,TSH, SCH,IUGR.

INTRODUCTION

Pre-eclampsia, characterized by new onset hypertension to the extent of 140/90mm Hg or more on two occasions, measures 4 hours apart and proteinuria, with or without pedal edema after the 20th week of gestation in previously normotensive and non proteinuric patients,[2,3] causes substantial morbidity and mortality in mothers and infants. In pre-eclampsia, the serum concentration of thyroid stimulating hormone is elevated. This might trigger subclinical hypothyroidism. Researches have shown that TSH levels occasionally improve 2.42 occasions above baseline in women with pre-eclampsia.

Whenever a patient has elevated TSH (reference range: 0.45 to 4.50 µU per mL) in conjunction having a thyroid hormone level inside the regular range, this really is frequently known as “subclinical hypothyroidism.” It’s usually regarded as to become an early stage of hypothyroidism. Of the different types of thyroid disorders, hypothyroidism is the most common in women. Subclinical hypothyroidism (SCH) is defined as a high TSH concentration with a normal range of serum T4. There is new consideration towards the possibility that vascular harm, following preeclampsia, might impact on the thyroid gland causing subclinical hypothyroidism.

The present study is being undertaken to evaluate the risk of subclinical hypothyroidism in pregnant women having associated pre-eclampsia.

MATERIAL & METHODS

A comparative cross sectional study was conducted at Department Of Biochemistry, Medical College, kota and central lab Department Of Biochemistry M.B.S Hospital, kota From november 2016 to october 2017.
Group 1: 100 pregnant females with subclinical hypothyroidism.
Group 2: 100 healthy euthyroid pregnant females as controls.
Both groups were compared for pregnancy outcome in term of development of pre eclampsia.

Inclusion Criteria :

1. Single ton pregnancy.
2. Both primigravida and multigravida between 18-38 years.
3. Pregnant female with diagnosed subclinical hypothyroidism selected as cases.
4. Cases after 20th weeks of gestation.

Exclusion criteria :

1. Previously diagnosed hypothyroidism.
2. Multiple pregnancy.
3. Diabetes mellitus.
4. Cardiac disease.
5. History of any metabolic disorder before or during the pregnancy.
6. History of intake of any medication that might affect thyroid function.
7. History of renal disease.
8. History of hypertension before 20 week of gestation.

Statistics

The data was tabulated and analyzed by using suitable statistical software. All the quantitative parameters were expressed as mean with standard deviation in both groups. To test for the differences in the mean values between the two groups for various quantitative parameters. Student's t-test was applied when the data followed the normal approximation. Differences in the proportions between different categorical variables were tested through appropriate statistical test.

RESULTS

Table 1 : Mean Values Of Thyroid Function Tests Among Cases & Controls

Parameter	Mean values of Thyroid Function Tests		
	Cases (n1=100)	Controls (n2=100)	p value
T3	1.08	1.21	0.0035
T4	4.27	8.65	<0.00001
TSH	5.5	2.74	<0.00001

Figure 1 : Mean Values Of Thyroid Function Tests Among Cases & Controls

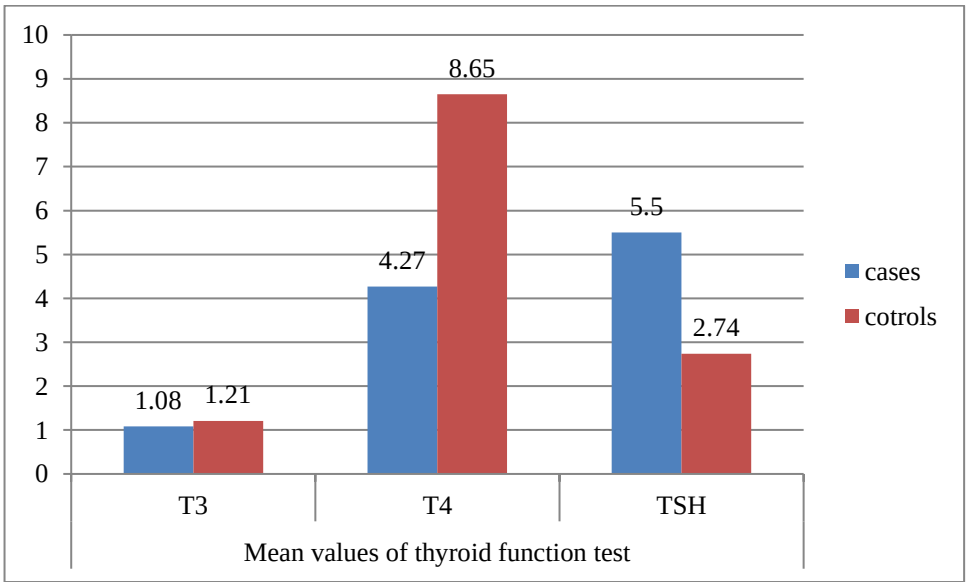
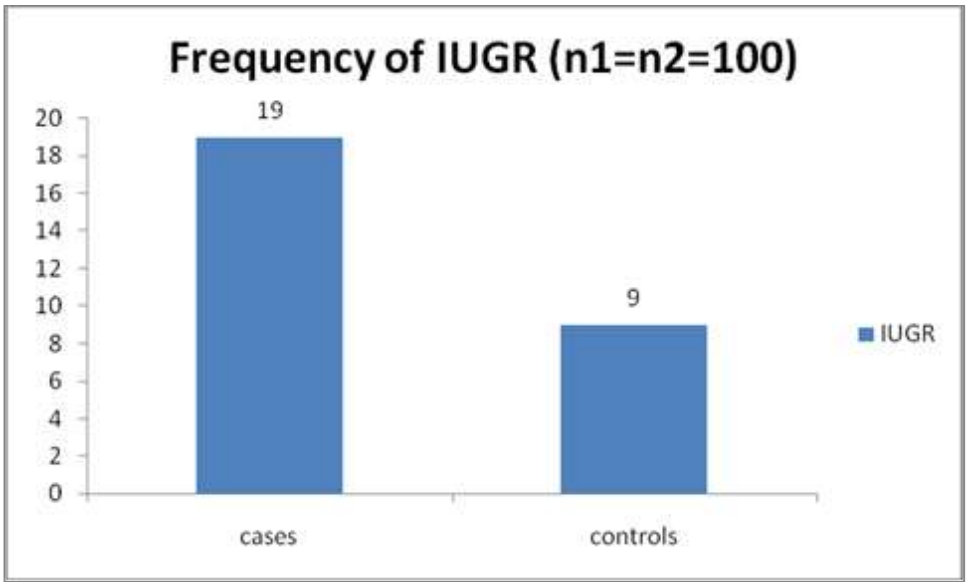


Table 2 : Frequency Distribution Of IUGR Among Cases & Controls

Parameter			
	Cases (n1=100)	Controls (n2=100)	p value
IUGR	19	9	0.042

Figure2: Frequency of IUGR among cases & controls



DISCUSSION

The one salient finding of this study that pregnant women of study group was that those identified to have subclinical hypothyroidism had a increased risk for development of IUGR when compared with euthyroid women of control group (Allan W et al,2000), also revealed the same finding in their epidemiological work of pregnancy related complications[4].

Wilson et al, 2012 found positive associations between thyroid disorders and the risk of PIH,IUGR. However in discordance with above stated study our study suggested that even after an adjustment for confounding factors (eg, maternal age, smoking, rural/urban background, ethnicity, and parity), there was not statistically significant association between pregnant women with hypothyroidism and development of IUGR.

Different factors may play an important role in development of IUGR. Etiology of IUGR is clearly unknown and it may happen at second or third trimester of pregnancy (Mehdi *et al*., 2009; Hasanzadeh *et al*., 2008)[6,7]. In present study, our findings showed that levels of TSH were higher and T4 were lower in study population women and no significant difference in T3 levels compared to healthy pregnant women ($p>0.05$) which was not in agreement with the finding of other study (Kumar *et al*., 2005; Lao *et al*., 1990; Skjoldebrand *et al*., 1986; Basbug *et al*., 1999)[8,9].

In accordance with our study (Khaliq *et al*., 1999), showed that there is significant increased in TSH levels with development of IUGR ,while few other studies shows an association with the risk for developing and severity of IUGR and increased level of TSH was not significant in IUGR women[10].

SUMMARY AND CONCLUSION

The results of the present study suggest that there were significant different in development of pre-eclampsia, between pregnant women having subclinical hypothyroidism and healthy pregnant women. Pregnancy induced hypertension was one of common complications developed in patients of subclinical hypothyroidism.

There is association between thyroid abnormalities and pregnancy caused

hypertension. The difference of our finding with other studies could be related to different geographical areas, races and diets. Variation of thyroid functioning later in life may develop in pre-eclampsia women. Thus, it suggests that thyroid function test should be done in each pregnant women to detect subclinical hypothyroidism , so that timely intervention can be done to prevent pregnancy related complications.

REFRENCES

1. Hirsch, D., Levy, S., Nadler, V., Kopel, V., Shainberg, B., & Toledano, Y. (2013). Pregnancy outcomes in women with severe hypothyroidism. *European Journal Of Endocrinology*, *169*(3), 313-320. http://dx.doi.org/10.1530/eje-13-0228
2. American Association of Clincal Endocrinologists and American College of Endocrinology. AACE clinical practice guidelines for the evaluation and treatment of hyperthyroidism and hypothyroidism. Endocr Pract. 1995; 1:54-62.
3. Brosens JJ, Pijnenborg R, Brosens IA. The myometrial junctional zone spiral arteries in normal and abnormal pregnancies: a review of theliterature. Am J Obstet Gynecol. 2002;187:1416-1423.
4. Allan, W., Haddow, J., Palomaki, G., Williams, J., Mitchell, M., & Hermos, R. et al. (2000). Maternal thyroid deficiency and pregnancy complications: implications for population screening. *Journal Of Medical Screening*, *7*(3), 127-130.
5. Wilson, K.L., B.M. Casey, D.D. McIntire, L.M. Halvorson and F.G. Cunningham, 2012. Subclinical thyroid disease and the incidence of hypertension in pregnancy. Obstet. Gynecol.,119: 315-320
6. Mehdi, F., A. Hossein, H.Z. Maliheh and T.M. Naser, 2009. Serum level of vascular cell adhesion molecule-1 (sVCAM-1) in sera. Acta Medica Iranica, 47: 65-70.
7. Hasanzadeh, M., H. Ayatollahi, M. Farzadnia, S. Ayati and M.K. Khoob, 2008. Elevated plasma total homocysteine in pre-eclampsia. Saudi Med. J., 29: 875-878.
8. Kumar, A., B.K. Ghosh and N.S. Murthy, 2005. Maternal Thyroid hormonal status in pre-eclampsia maternal. Ind. J. Med. Sci., 59: 57-63.
9. Basbug, M., E. Aygen, M. Tayyar, A. Tutus, E. Kaya and O.R. Oktem, 1999. Correlation between maternal thyroid function tests and endothelin in pre-eclampsia-eclampsia. Obstet. Gynecol., 94: 551-555.
10. Khaliq, F., U. Singhal, Z. Arshad and M.M. Hossain, 1999. Thyroid functions in pre-eclampsia and its correlation with maternal age, parity, severity of blood pressure and serum albumin. Indian J. Physiol. Pharmacol., 43: 193-198.