International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2021; 5(1): 200-202
Received: 04-11-2020
Accepted: 06-12-2020

**Dr. Latha B**
Associate Professor, Department of Obstetrics and Gynecology, JJM Medical College, Davanagere, Karnataka, India

**Dr. Indumathi K**
Post Graduate, Department of Obstetrics and Gynecology, JJM medical College, Davanagere, Karnataka, India

**Corresponding Author:**
**Dr. Latha B**
Associate Professor, Department of Obstetrics and Gynecology, JJM Medical College, Davanagere, Karnataka, India

# Evaluation of serum triglyceride level in early pregnancy in prediction of pre eclampsia

**Dr. Latha B and Dr. Indumathi K**

**DOI:** https://doi.org/10.33545/gynae.2021.v5.i1d.814

**Abstract**
**Background:** Hypertensive disorder of pregnancy is one of the major cause of maternal and perinatal morbidity and mortality. Early detection of the disease is very important, so as to reduce the adverse effects caused by it. Hypertriglyceridemia is seen before the onset of the hypertension, and therefore it can be used as a predictor of PIH. The purpose of this study is to evaluate

- The association of early pregnancy triglyceride level with pre eclampsia
- Its association with the severity of the disease

**Materials and Methods:** A prospective follow up study was carried out in the obstetric department in Bapuji Hospital, WCH hospital and CG hospital attached to JJM medical college, Davanagere between November 2018 to May 2020
**Results:** Out of 201 cases, 124 cases had triglyceride level between 150- 200 mg/dl. Out of 124 cases, 11 cases developed GHTN and 4 cases developed non-severe PE. 53 cases had triglyceride level between 201-300 mg/dl. Out of 53 cases, 9 cases developed GHTN, 24 cases developed non-sever PE, 16 cases developed sever PE. 20 cases had serum triglyceride level between 301-400 mg/dl. Out of 20 cases, 18 developed severe PE and 2 cases developed non-severe PE. 4 cases had serum triglyceride level more than 400, out of which 3 developed severe PE and 1case developed non-severe PE.
**Conclusion:** PE is associated with increased risk of Maternal and Perinatal morbidity and mortality. In the present study, increased triglyceride level was found in early pregnancy of women who develop hypertensive disorders of pregnancy. Serum triglyceride level in early pregnancy can be used as a prediction of PE.

**Keywords:** pre eclampsia, triglyceride

## Introduction
Hypertensive disorder of pregnancy is one of the major cause of maternal and perinatal morbidity and mortality, and more common in developing countries than developed countries. Incidence of hypertensive disorders of pregnancy is around 5-10% [1].
Preeclampsia is a multisystem disorder associated with new onset hypertension, occurring after 20 weeks of gestation and frequently near term and often accompanied by new onset proteinuria [2]. FFA metabolism is impaired in preeclampsia, resulting in increase in serum triglyceride concentration. Exaggerated hypertriglyceridemia in PE is said to occur due to impaired adipose tissue lipoprotein lipase activity. Increase in plasma triglyceride concentration is seen before the onset of clinical disease [3, 4]. Therefore Serum triglyceride can be used as an early predictor of PE.

## Aims and Objectives
The purpose of this study is to evaluate

- The association of early pregnancy triglyceride level with pre eclampsia, and
- Its association with the severity of the disease

## Materials and Methods
A prospective follow up study was carried out in the obstetric department in Bapuji Hospital, WCH hospital and CG hospital attached to JJM medical college, Davanagere between November 2018 to May 2020.
Pregnant women from 13- 20 weeks of gestation enrolled in the study. Details of the study protocol will be explained to the subjects. Informed consent will be taken.

Detailed history regarding age, parity, past obstetric history, medical history, family history, height, weight, blood pressure were measured. Routine investigations and Serum triglyceride level was done. Pregnant women with serum triglyceride level more than 150 mg/dl are followed up in the antenatal clinic and were examined 4 weekly till 28 weeks, fortnightly up to 34weeks and thereafter weekly till delivery. At every visit blood pressure was recorded, urine was examined for albumin, to detect PIH. (Normal triglyceride level = <150 mg/dl)

## Results

Two hundred and one women were enrolled in the study, all the women were completely followed up till delivery. Out of 201 women in the study 88 women developed PIH and 113 women remained normotensive.

**Table 1:** Case distribution

| Diagnoses | No of cases | Percentage |
|---|---|---|
| Gestational HTN | 20 | 10.0 |
| Severe PE | 37 | 18.4 |
| Non-Severe PE | 31 | 15.4 |
| Normal | 113 | 56.2 |
| Total | 201 | 100.0 |

Out of 88 cases who developed PIH. There were 20 cases of Gestational hypertension, cases of severe PE and 31 cases of non- severe PE

**Table 2:** BMI distribution among pih cases

| BMI | Diagnosis | | |
|---|---|---|---|
| | Gestational HTN | Severe PE | Non-Severe PE |
| 18.5 - 24.9 | 16 | 28 | 27 |
| 25 - 29.9 | 4 | 9 | 3 |
| 30 - 34.9 | 0 | 0 | 1 |
| Total | **20** | **37** | **31** |
| Chi Square test *P* <0.001, Highly Sig. | | | |

Among 20 cases who developed GHTN, 16 cases had BMI between 18.5-24.9 and 4 cases had BMI between 25-29.9. Out of 37 cases which developed severe PE 28 cases had BMI between 18.5-24.9, 9 cases had BMI between 25-29.9. Out of 31 cases which develop non-severe PE 27 cases had BMI between 18.5-24.9, 3 cases had BMI between 25-29.9 and 1case had BMI between 30-34.9

**Table 3:** Distribution of cases among nulliparous and multiparous women

| Diagnosis | Nulliparous | | Multiparous | |
|---|---|---|---|---|
| | N | Percent | N | Percent |
| Gestational HTN | 7 | 6.5 | 13 | 13.8 |
| Severe PE | 16 | 15.0 | 21 | 22.3 |
| Non-severe PE | 14 | 13.1 | 17 | 18.1 |
| Normal | 70 | 65.4 | 43 | 45.7 |
| Total | 107 | 100 | 94 | 100.0 |
| Chi Square test *P* <0.03, Sig | | | | |

In 201 cases, 107 women were nulliparous and 94 women were multiparous. Out of 107 women were nulliparous, 7 developed GHTN, 16 women developed severe PE and 14 developed non-severe PE. Out of 94 multiparous women, 43 remained normotensive, 17 developed non- severe PE, 21 developed severe PE and 13 women developed GHTN.

**Table 4:** Ultrasound distribution among cases

| USG | Diagnosis | | | | Total |
|---|---|---|---|---|---|
| | Gestational HTN | Severe PE | Non-Severe PE | Normotensive | |
| Abnormal | 0 | 20 | 2 | 0 | 22 |
| Normal | 20 | 17 | 29 | 113 | 179 |
| Total | 20 | 37 | 31 | 113 | 201 |
| Chi Square test *P* <0.001, Highly Sig | | | | | |

Ultrasound was done for all the women at the time of enrolment to the study 20 women who developed severe PE had abnormal ultrasound report [ultrasound- diastolic notching present and increased Doppler indices] and 2 women who developed non severe PE had abnormal ultrasound.

**Table 5:** Distribution of cases according to serum triglyceride level

| TG | Diagnosis | | | | Total |
|---|---|---|---|---|---|
| | Gestational HTN | Severe PE | Non-Severe PE | Normal | |
| 150-200 | 11 | 0 | 4 | 109 | 124 |
| 201-300 | 9 | 16 | 24 | 4 | 53 |
| 301-400 | 0 | 18 | 2 | 0 | 20 |
| > 400 | 0 | 3 | 1 | 0 | 4 |
| Total | 20 | 37 | 31 | 113 | 201 |
| Chi Square test *P* <0.001, Highly Sig | | | | | |

Out of 201 cases, 124 cases had TG level between 150- 200 mg/dl. Out of 124 cases 109 cases remained normotensive, 11 cases developed gestational hypertension and 4 cases developed non-severe PE.

53 cases had triglyceride level between 201-300 mg/dl. Out of 53 cases, 9 cases developed gestational hypertension, 24 cases developed non-sever PE, 16 cases developed sever PE and 4 cases remained normotensive.

20 cases had serum triglyceride level between 301-400 mg/dl. Out of 20 cases, 18 developed severe PE and 2 cases developed non-severe PE.4 cases had serum triglyceride level more than 400, out of which 3 developed severe PE and 1 case developed non-severe PE.

Serum triglyceride values of those women who developed PIH were found significantly higher than those women who remained normotensive.

**Table 6:** Distribution of cases according to gestational age at which they develop pih

| GA | Diagnosis | | |
|---|---|---|---|
| | Gestational HTN | Severe PE | Non-severe PE |
| ≤ 30 | 0 | 6 | 1 |
| 30.1 – 35 | 2 | 14 | 1 |
| 35.1 – 40 | 15 | 14 | 27 |
| > 40 | 3 | 3 | 2 |
| Total | 20 | 37 | 31 |
| Chi Square test *P* <0.001, Highly Sig | | | |

This table shows the gestational age at which they developed PIH. Out of 7 cases below 30 weeks of gestation 6 women developed sever PE and 1 developed non severe PE. Between 30.1-35 weeks of gestation 2 women developed GHTN and 14 of them developed severe PE and 1 developed non-severe PE.

Between 35.1-40 weeks of gestation, 15 of them developed GHTN and 14 and 27 women developed severe PE and non-severe PE respectively. Above 40 weeks of gestation 3 women developed GHTN, 3 women developed severe PE and 2 developed non-severe PE.

## Discussion

Among 201 cases that completed the study, 88 cases subsequently developed PIH, and 113 cases remained normotensive. Among 88 cases who developed PIH, 20 cases developed GHTN, 37 cases developed severe PE and 31 cases developed non-severe PE.

In the study conducted by Urmila Sing *et al.* [5]. 270 women between 13-20 weeks of gestation were enrolled in the study. Among these 58 subjects developed PE and 212 subjects remained normotensive.

In the study conducted by Daniel A. *et al.* [6]. Women between 13-16 weeks of gestation were enrolled in the study. In the study 57 women developed PE and 510 remained normotensive and served as control.

In our study, majority of the women were included in the age group of 20-24 years [58.7%]. Mean age among normotensive group was 24.8 and mean age among women who developed GHTN was 24.6, mean age among non- severe and severe PE group was 25.2 and

23.7 Respectively. In the study conducted by Daniel A. *et al.* [6]. majority of the cases belong to age group of 20-34 years.

In our study 124 cases had Serum triglceride between 150-200mg/dl. Out of 124 cases 11 cases developed GHTN and 4 cases developed non- severe PE .53 cases had TG level between 201- 300 mg/dl, in that 9 cases developed gestational hypertension,24 cases developed non-sever PE, 16 cases developed sever PE.

20 cases had Serum triglceride between 301-400 mg/dl. Out of 20 cases, 18 developed severe PE and 2 cases developed non-severe PE. 4 cases had Serum triglceride more than 400, out of which 3 developed severe PE and 1 case developed non-severe PE.

The mean Serum triglceride level in cases who remained normotensive is 172.7mg/dl. The mean triglyceride level in cases who developed gestation hypertension is 201.5mg/dl and the mean triglyceride level among non-severe PE group and severe PE group are 245.3mg/dl and 310 mg/dl respectively.

In study conducted by Urmia Singh *et al.* [5]. The mean Serum triglceride level in normotensive group was 155.22±22.31 mg/dl and that of PE group was 207.76±47.31mg/dl. [Mean Serum triglceride in mild PE-197.75±47.87 and severe PE group 239.10±27.64] there was 25.3% increases in Serum triglceride level in PE group compared to normotensive group. Serum triglceride level was found to be significantly higher in severe PE group than mild PE group [$p$ <.001]. Adjusted multivariate logistic regression analysis confirmed TG [OR=2.96, 95% CI=1.04-8.45, $p$ <0.001] is the independent and significant risk factor for PE.

This study proves that dyslipidaemia particularly, hypertriglyceridemia precedes the onset of clinical signs and symptoms of PE.

In the study conducted by Oya Demirci *et al.* [7] 30 women who developed PE had mean triglyceride level of 157.76±69.57 at time of enrolment of the study [before 20 weeks of gestation] compared to 320 women who remained normotensive who had mean Serum triglceride level of 120.58±51.61, with the p-value of 0.008 and was statistically significant. This study proves that early pregnancy hypertriglyceridemia is associated with significant risk of developing PE.

In a study conducted by Daniel A. Enquobahrie *et al.* [6]. 57 women developed PE and 510 women remained normotensive. PE group had mean Serum triglceride level of 137.81 compared to normotensive group who had mean TG level of 121.27. 13.6% higher concentration of Serum triglceride was found in women who developed PE than women who remained normotensive, in sample collected at an average of 13 weeks of gestation with $P$ <0.05. The study showed 4.15 fold increase in the risk of PE among women with Serum triglceride level.133mg/dl [95% CI 1.23 to 10.51].

This study showed a strong positive relationship between plasma triglyceride concentration at an average of 13 weeks of gestation and risk of PE.

## Conclusion

Pregnancy induced hypertension is one of the leading causes for maternal and perinatal morbidity and mortality. By Early prediction various steps can be taken to prevent complications caused by it. Extensive research has been done for the past 15-20 years to identify various early biophysical and biochemical markers, for the prediction of PE.

In this study it has shown that early changes in the plasma lipid level [Serum triglceride level] play an important role in the causation of hypertensive disorder of pregnancy. Elevated Serum triglceride level is associated with endothelial damage, which lead to PE.

In the present study increased triglyceride level was found in early pregnancy of women who develop hypertensive disorders of pregnancy. Serum triglceride level in early pregnancy can be used as a prediction of PE.

## References


1. Dolea C, Abou Zahr C. Global burden of hypertensive disorders of pregnancy in the year 2000. GBD 2000 Working Paper, World Health Organization, Geneva. http://www. Who. Int/evidence/bod. 2003b. Global Burden of Obstructed Labor in the Year 2000. GBD 2000 Working Paper, World Health Organization
2. Homer CS, Brown MA, Mangos G, Davis GK. Non-proteinuric pre-eclampsia: a novel risk indicator in women with gestational hypertension. Journal of Hypertension 2008;26(2):295-302.
3. Lorentzen B, Endresen MJ, Clausen T, Henriksen T. Fasting serum free fatty acids and triglycerides are increased before 20 weeks of gestation in women who later develop preeclampsia. Hypertension in Pregnancy 1994;13(1):103-9.
4. Potter JM, Nestel PJ. The hyperlipidemia of pregnancy in normal and complicated pregnancies. American Journal of Obstetrics and Gynecology 1979;133(2):165-70.
5. Singh U, Yadav S, Mehrotra S, Natu SM, Kumari K, Yadav YS. Serum lipid profile in early pregnancy as a predictor of preeclampsia. International Journal of Medical Research and Review 2013;1(2):56-62.
6. Enquobahrie DA, Williams MA, Butler CL, Frederick IO, Miller RS, Luthy DA. Maternal plasma lipid concentrations in early pregnancy and risk of preeclampsia. American journal of hypertension 2004;17(7):574-81.
7. Demirci O, Tuğrul AS, Dolgun N, Sözen H, Eren S. Serum lipids level assessed in early pregnancy and risk of pre-eclampsia. Journal of Obstetrics and Gynaecology Research 2011;37(10):1427-32.