ABSTRACT

The main objective of the study was to see the association of dyslipidemia in preeclampsia (PET) as compared to normotensive (NT) patients. It was a descriptive study done in Nepal Medical College Teaching Hospital Department of Obstetrics and Gynecology from April 2019 to April 2020. A total of 75 PET (test group) and 75 NT (control group) in their third trimester were included. Their fasting lipid profile was studied. It was found that triglyceride (TG) and very low density lipoprotein (VLDL) was significantly high among PET group as compared to that of NT patients. The mean TG of PET group was 266.11± 98.61 and the NT group was 187±58.56 (p=0.00) and the mean VLDL of PET group was 46.00±15.31 and NT group was 37.88±12.85 (p=0.001). On the other hand, the total cholesterol (TC), low density lipoprotein (LDL) and high density lipoprotein (HDL) were not significantly different in both the groups. It was also found that with the severity of the disease (Preeclampsia), the level of TG and VLDL increased significantly. Therefore, among the investigation done for PET, we should include lipid profile, especially the TG and VLDL. Furthermore, TG and VLDL should be measured serially (at least once a week) so as to predict the progress of PET and manage the patient accordingly.
INTRODUCTION

Preeclampsia (PET) is hypertension of 140mm Hg systolic and/or 90mm Hg diastolic or more than that on at least two occasions, done 6 hours apart after the 20 week of gestation in women known to be normotensive (NT), associated with proteinuria. The incidence of PET globally is 2-10% of all pregnancy. PET is one of the commonest cause of maternal mortality and perinatal morbidity and mortality. It is a multisystem disorder, and affects almost all the organ of the body. However, it’s exact etiopathology is not known till now.

During course of the normal pregnancy, level of total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL) increases. TC is required for placental steroid synthesis and stores in mothers’ body. Compare to normal pregnancy, PET is directly associated with significant increased levels of TC, TG, LDL and very low density lipoprotein (VLDL) where as the high density lipoprotein (HDL) is decreased as compared to normal pregnancy and has been proposed that in preeclampsia, increased levels of circulating lipids result in their accumulation within cells. This accumulation decreases the release of prostacyclin resulting in oxidative stress via endothelial dysfunction. Thus, the maternal endothelial dysfunction is classic hallmark of PET.

There were many studies done to see the level of dyslipidemia in PET patients but the findings were inconsistent. A large systematic meta-analysis was done to see the association of dyslipidemia in PET patients with the inclusion of 74 studies (from 1950 - July 2013) in which they found that TC, TG LDL and VLDL was significantly increased and HDL was decreased. Similar findings were observed in studies done by Anuradha and her team and Despande et al whereas in some studies significant rise of only TG was found as compared to NT group. Many studies observed that PET preceded by dyslipidaemia in first and second trimester particularly hypertriglycerideremia and elevated lipoprotein which indicates that they may be etiologic and pathophysiologic mechanism responsible for PET. In paper describes the association of dyslipidemia in PET group as compared to NT group of pregnancy at a tertiary care center in Nepal.

MATERIALS AND METHODS

This cross-sectional descriptive study was done at Department of Obstetrics and Gynecology of Nepal Medical College Teaching Hospital from April 2019 - April 2020. Ethical approval was taken Nepal Medical College Institutional Review Committee. The patients taking part in the study were explained about the study, the extra expenditure and written consent was taken.

Patients with PET in third trimester (28 weeks till 41 weeks) were selected as the test group (n=75). The patients with history of diabetes, hypertension, renal disease, liver disorders, multiple pregnancies were excluded. The NT group (n=75) (control group) of same period (third trimester) were also selected. Detailed history of the test and control group of patient regarding age, parity, gestation was taken. The pregnant women of both the groups were advised to do fasting lipid profile test (i.e. TG, TC, LDL, VLDL and HDL) at the central clinical laboratory of the hospital. The laboratory test results were collected and mean of the all the parameters were calculated and were tested for statistical significance by applying the chi-square test using SPSS 16.0 software.

RESULTS

The patient characteristics (similar in the two groups) are shown in the Table 1. The mean systolic blood pressure of PET group was 149.33±16.05 where as in the NT group (control) was 106.27±13.13 (p = 0.000). The diastolic

| Characteristics | NT group (n=75) | PET group (n=75) | t/χ²/χ²-value | p-value |
|-----------------|----------------|-----------------|---------------|--------|
| Age in years    | 27.57 ± 4.98   | 26.92 ± 5.62    | 0.769         | 0.443  |
| Parity          | 1              | 38(50.67%)      | 43(57.33%)    | 0.671* |
|                 | ≥2             | 37(49.33%)      | 32(42.67%)    | 0.413  |
| Blood pressure  |                |                 |               |        |
| Systolic        | 106.27 ± 13.13 | 149.33 ± 16.05  | 17.986        | 0.000  |
| Diastolic       | 72.27 ± 13.31  | 99.87 ± 10.19   | 14.252        | 0.000  |

*Pearson Chi-Square
Table 2: Serum lipid profile among NT and PET groups

| Characteristics                  | NT (n=75)     | PET(n=75)    | Mann-Whitney U value | p-value |
|----------------------------------|---------------|--------------|----------------------|---------|
| Total cholesterol                | 184.88 ± 38.04 | 198.25 ± 60.85 | 2326.5              | 0.068   |
| High density lipoprotein         | 51.28 ± 18.06  | 51.19 ± 15.44  | 2668.5              | 0.588   |
| Low density lipoprotein          | 102.80 ± 34.13 | 96.45 ± 46.05  | 2347.5              | 0.080   |
| Very low density lipoprotein     | 37.88 ± 12.85  | 46.00 ± 15.31  | 1899.5              | 0.001   |
| Triglyceride                     | 187.00 ± 58.56 | 266.11 ± 98.61 | 1328.0              | 0.000   |

Table 3: Statistical significance of serum lipid profile of mild and severe PET as compared to normal pregnancy

| Serum Lipids               | Category       | No. of Patients | Mean    | SD     | Chi-square | p-value |
|---------------------------|----------------|-----------------|---------|--------|------------|---------|
| Total cholesterol         | Normal         | 75              | 184.88  | 38.04  | 3.366      | 0.186   |
|                           | Mild PET       | 47              | 194.26  | 56.29  |            |         |
|                           | Severe PET     | 28              | 204.96  | 68.37  |            |         |
| High density lipoprotein  | Normal         | 75              | 51.28   | 18.06  | 2.172      | 0.338   |
|                           | Mild PET       | 47              | 51.55   | 15.73  |            |         |
|                           | Severe PET     | 28              | 50.57   | 15.21  |            |         |
| Low density lipoprotein   | Normal         | 75              | 102.8   | 34.13  | 3.717      | 0.156   |
|                           | Mild PET       | 47              | 97.74   | 40.84  |            |         |
|                           | Severe PET     | 28              | 94.29   | 54.45  |            |         |
| Very low density lipoprotein| Normal       | 75              | 37.88   | 12.85  | 15.759     | 0.000   |
|                           | Mild PET       | 47              | 43.85   | 15.96  |            |         |
|                           | Severe PET     | 28              | 49.61   | 13.66  |            |         |
| Triglyceride              | Normal         | 75              | 187.00  | 58.56  | 42.670     | 0.000   |
|                           | Mild PET       | 47              | 237.53  | 90.49  |            |         |
|                           | Severe PET     | 28              | 314.07  | 94.29  |            |         |

Kruskal- Wallis H test

The mean lipid profile values of the both the groups are shown in the Table 2. The mean TG in PET group was 266.11±98.61 and NT group was 187.00=58.56 (p = 0.00). VLDL of PET group was 46.00±15.31 and NT group was 37.88±12.85 (p = 0.001). The value of TG and VLDL of PET group were significantly high as compared to the NT group whereas the TC (p=0.068), LDL (p=0.080), HDL ( P=0.588) were similar in each group. A total of 28 cases (37.33%) of severe PET group and total 47 cases (62.66%) of mild PET were observed. When mild and severe PET were compared with the control group with the severity of the disease from mild to severe PET, the value of TG and VLDL also increases significantly (Table 3). Such finding was not observed in case of TC, LDL and HDL.

DISCUSSION

PET is one of the commonest medical condition encountered in pregnancy. It is associated with various complications and even maternal mortality. A total of 60,000 maternal death world-wide per year are estimated due to PET. If timely detection and management of the cases of PET in tertiary level hospital, we can avoid the complications of the conditions. The most important factor for the management of the problem is diagnosis of the condition in time. Furthermore, if we can predict the disease, we
are more prepared to confront the problem, plan the pregnancy with timely intervention. In this study, we have studied the lipid profile of patient with preeclampsia (PET group) along with those of normal patients (NT group) in third trimester with the similar age and parity. In our study, the TG and VLDL values were significantly higher among PET group than in NT group (control) (p = 0.001). There was no significant difference in TC, LDL and HDL level in both the groups. These finding were similar to the study done by Lima and his team. In their study, the TG and VLDL values were highly significant (P = <0.0001) and compared to control group. De and his group studied lipid profile in all three trimester. They also found significant elevation of TG and VLDL in third trimester as compared to NT patient. In the study done by Das and his team, however, only rise of TG was found in the preeclampsia patients (PET group) as compared to normal patient (NT group) (p = <0.002) and no difference in other parameters of lipid profile were observed. The rise in only the TG value have found in many other studies as well. Ray et al reported that women with elevated TG had twice the risk of PET abnormalities. It was also suggested that TG assessment between 28 to 32 wks could be predictive of PET.

In our study we also found that with severity of the disease, the level of TG and VLDL increased significantly. Similar finding was present in the study done by Anuradha and her team. However, in their study along with TG and VLDL, LDL and TC also increased significantly. Thus serial lipid profile specially TG and HDL can be done once a week in cases of PET to the plan the further management and delivery of the baby.

We can include lipid profile as routine investigation to be carried out in cases of PET. Also in some selective cases of high risk patient such as obesity, chronic hypertension, history of fetal loss and bad obstetric history lipid profile can be done to predict the disease around 28 to 32 weeks of gestation, so that we can be more careful of these cases.

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