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## ORIGINAL PAPER

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# PLATELET COUNT IN WOMEN WITH PREGNANCY INDUCED HYPERTENSION IN UNIVERSITY HOSPITAL CENTER OF MOTHER AND CHILD HEALTHCARE “KOÇO GLIOZHENI”, TIRANA, ALBANIA

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## ABSTRACT

**Introduction:** One of the most common and potential life threatening complications of pregnancy is pregnancy induced hypertension. This cross-sectional study aimed to investigate the relationship between platelet count and pregnancy induced hypertension. **Material and methods:** Twenty (20) patients (subjects) and twenty (20) healthy pregnant women (control) visiting the Obstetrics and Gynecology Hospital University of “Koço Gliozheni” Tirana Albania were registered in the study and followed during their pregnancy. Both, subjects and control participants were subject to platelet count manually performed using standard methods on. **Results:** The mean platelet count of the control group ( $38448 \pm 235500$ ) was significantly higher than that of the subject group ( $217050 \pm 50780.7$ ) ( $p < 0.03$ ). In the first and second trimester was more prevalent low platelet counting with the mean platelet count ( $107 \pm 57.3$ ) and ( $101 \pm 63.4$ ), respectively. The mean age at marriage in subjects with PIH was found to be with low platelet count. Regular monitoring of platelet counts in women with Pregnancy Induced Hypertension must be subject of the management protocols.

**Key words:** Platelet count, Pregnancy, Hypertension, Obstetrics and Gynecology, Hospital University of “Koço Gliozheni” Tirana, Albania.

## 1. INTRODUCTION

One of the most common and potential life threatening complications of pregnancy is Pregnancy Induced Hypertension (PIH). 5-8 percent of all pregnancies is affected by PIH constituting, especially in developing countries.

One of the leading causes of high morbidity for both mother and fetus (1). Pregnancy induced hypertension can be classified into: gestational hypertension or pregnancy induced hypertension alone without proteinuria. Without intervention pregnancy induced hypertension can progress to eclampsia, which is characterized by hypertension, proteinuria, edema and epileptiform convulsions requiring emergency caesarean section (2).

The importance of the problem is linked to the significant morbidity and mortality potential of pregnancy induced hypertension. Due to vasospasm and micro thrombosis or even hemorrhage due to severe thrombocytopenia), acute pulmonary edema, cerebral edema, placental abruption,

liver hemorrhage/ rupture, transformation in chronic hypertension, or even maternal death, the mother may develop disseminated intravascular coagulation, acute renal failure, stroke (ischemia) (3); the fetal sufferance seems to be due exclusively to the placental insufficiency and may include: pregnancy loss, fetal death in utero, intrauterine growth restriction, premature labour (4).

It is characterized by Hemolysis (destruction of red blood cells), Elevated Liver enzymes (which indicate liver damage), and Low Platelet P count. About 10% to 20% of women who have severe preeclampsia develop HELLP. In most cases, this happens before 35 weeks of pregnancy, though it can also develop right after childbirth (5). There is paucity of data on the effect of PIH on the platelet count.

The aim of this case - control study was to investigate the effect of PIH on the platelet count.

## 2. PATIENTS AND METHODS

### Study area

This present cross-sectional study was carried out at the f at Obstetrics and Gynecology Hospital University of "Koço Gliozheni" Tirana Albania. Report from the 2011 National Population Census indicated that the Tirana area population is 749 365 inhabitants according to Albanian Census 2011 (6).

### Study framework

The study was conducted in the hematology at University Center of Mother and Child Health Care "Koço Gliozheni" Tirana, Albania.

### Study subjects

The subjects for this cross-sectional study included consecutively - recruited twenty (20) pregnant women with hypertension (HTA) and twenty (20) subjects without HTA will serve as a control.

### Subjects

The subjects for this case control study included twenty consecutively-recruited pregnancy induced hypertensive pregnant women visiting the Obstetrics and Gynecology Hospital University of "Koço Gliozheni" Tirana, Albania.

### Methods

Two milliliters of blood sample was drawn aseptically using the S- Monovette vacutainer blood collection system (Sarstedt, Numbrecht, Germany) from the median ante cubital vein of all the subjects and control participants into EDTA-ant coagulated tubes. The blood was diluted with the diluents (1% ammonium oxalate) by 1 in 20 dilutions (0.02 ml of blood and 0.38 ml of diluents) and platelets were counted using improved Neubauer ruled counting chamber (Hawksley, UK) and the number of platelets per liter of blood was calculated using the first principle.

### Inclusion criteria

All consenting, adult ( $\geq 18$  years) pregnant women who were confirmed to have pregnancy induced hypertension by an Obstetrician constituted the subjects for these subjects.

### Exclusion criteria

Non-consenting, non adult pregnant women with other pregnancy-related complications were excluded.

### Statistical analysis

The data was collected into an excel spread sheet. Collected data was analyzed statistically using statistical software SPSS version 17.0 (Chicago Illinois). Statistical analysis included descriptive statistics of percentages, mean and bivariate analysis of t-test and Fisher's exact test. Differences were considered significant when  $p < 0.05$ .

## 3. RESULTS

The study subjects had mean age of  $24.7 \pm 5.6$  years compared to the control present age  $25.6 \pm 5.8$  years. The mean platelet count for the subject was significantly lower among subjects compared to the control of ( $p = 0.003$ ). Table 1 shows the mean platelet count of subjects and controls. The platelet count of subjects was higher in the third trimester ( $158.7 \pm 68.4$ ) compared to the second trimester ( $100.9 \pm 62$ ) and the first trimester ( $108 \pm 62$ ). Table 2 shows effect of trimester of pregnancy on platelet count of PIH patient. The demographic characteristics (age, age at marriage and gestational age) of the PIH subject and the control was determined. There was a significant relationship between age at marriage and

Variable	Pregnant women with HTA (Nr=20)	Non pregnant women without HTA (N=20)	T value	P value
Platelet count in thousand	$217050 \pm 50780.7$	$384448 \pm 235500$	3.23	0.003

Table 1. Platelet count of subjects and control

Parameter	Trimester			t-value	p-value
	1st	2nd	3rd		
Platelet count	$108 \pm 59.1$	$100.9 \pm 62$	$158.7 \pm 68.4$	0.04	0.9
Number (%)	16(14.3%)	56(54%)	29(27.9%)		

Table 2. Effect of trimester pregnancy on platelet count of PIH patient

Parameter	Subjects	Control	p-value
Mean age	$24.7 \pm 5.6$	$25.6 \pm 5.6$	0.470
Age at marriage	$16.1 \pm 3.5$	$19.0 \pm 2.5$	0.008
Mean gestational age	$5.9 \pm 1.9$	$5.6 \pm 1.3$	0.112

Table 3. Effect of demographic factors on platelet count of PIH patient

PIH as it shown in Table 3. The mean age at marriage for the subject with PIH was  $16.1 \pm 3.5$  years while age at marriage of the control was  $19.0 \pm 2.5$  years ( $p = 0.008$ ). There was no statistically significant difference in the mean age and gestational age of subjects and controls ( $P > 0.05$ ). Table 3 shows effect of demographics on incidence of PIH among subjects.

## 4. DISCUSSION

This study presents data on the platelet count investigated for twenty pregnant women with pregnancy induced hypertension. Significant lower platelet count was observed among pregnant women with PIH compared to individuals from control group. A relationship between low platelet count and PIH is found in significant levels. Our finding is consistent with a previous study (6) which observed a low platelet count among PIH patients. Despite this, the etiology and pathogenesis of preeclampsia still remain poorly understood. It is often characterized by suboptimal uteroplacental perfusion associated with a maternal inflammatory response and maternal vascular endothelial dysfunction and platelet count falling to below  $100 \times 10^9/L$  (7).

We observed that trimester stage of pregnancy has affect on the platelet count in patients with PIH. The platelet count of subjects with PIH was lower in the first and second trimester compared to the trimester platelet count, but this difference however was not statistically significant. This finding is consistent with result obtained in a previous study (8). Our finding is however at variance with a previous report (9). This indicates that low platelet count is more apparent during 3<sup>rd</sup> trimester of pregnancy. The variation is platelet count among pregnant women with PIH may be due to an increased consumption with reduced life span and increased aggregation by increased levels of thromboxane  $A_2$  at placental circulation (10). It might also be due to incomplete trophoblastic inversion of the uterine spiral arteries resulting to placental ischemia followed by release of anti-angiogenic proteins that lead to endothelial dysfunction (11).

In this study we investigated the effect of three demographic variables (gestational age, present age and age at marriage) on the platelet count of pregnant women with

PIH. The mean age at marriage of the subjects with PIH was found to be significantly lower compared to controls. Our finding is consistent with a previous report (12), which indicated that majority of patients affected by PIH are teenagers because of early marriage. Similarly, our finding is also consistent with a previous report which indicated that teenagers faced increased risks of several obstetric complications including eclampsia (13-17). In developing countries, the increase in teenage pregnancy rates has been attributed to early age of marriage, cultural permissiveness, low socioeconomic status of parents, lack of knowledge of sexuality education, peer group influence, lack of knowledge, ineffective use of contraceptives and family instability and disorganization which may be caused by poverty.

## 5. CONCLUSION

In this study we observed that pregnancy induced hypertension (PIH) is associated significantly with low platelet count.

### Recommendations

Routine and regular monitoring of platelet count can be included in the routine antenatal check-up among pregnant women with PIH. Patients with low platelet count should be under the management of qualified obstetrician during their pregnancy period to avoid the risk of bleeding. There is a demand for increasing the awareness and education to highlight the role of teenage pregnancy in the incidence of PIH.

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