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A Cross sectional study of Neutrophil and Lymphocyte ratio between Pregnancy Induced Hypertensive Women and Normal Pregnant Women

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Abstract

Background: Pregnancy-induced hypertension (PIH) is a form of high blood pressure in pregnancy. It occurs in about 7 to 10 percent of all pregnancies. Another type of high blood pressure is chronic hypertension - high blood pressure that is present before pregnancy begins. Pregnancy-induced hypertension is also called toxemia or preeclampsia. It occurs most often in young women with a first pregnancy. It is more common in twin pregnancies, and in women who had PIH in a previous pregnancy.

Methods: This paper focuses on Identify the importance of hematological parameters in pregnancy induced hypertension including NL ratio and their implications in the evolution of the disease by using standard procedure of selected biochemical parameters.

Results: The present study showed that the value of NL ratio were significantly high in pregnancy induced hypertension patient compare to normal Pregnant women.

Conclusions: Our study also shows that NLR value is higher in preeclampsia patient especially in sever preeclampsia. The NLR might be a useful laboratory marker for clinical prediction and disease severity evolution of preeclampsia.

Keywords: NLR, PIH, Pregnancy

Introduction

Approximately 6–10% of pregnancies are complicated with pregnancy-induced hypertension (PIH). [1] Systolic blood pressure (SBP) >140 mmHg and diastolic blood pressure (DBP) >90 mmHg are the criteria for this condition. SBP 140-149 and DBP 90-99 mmHg are considered mild, SBP 150-159 and DBP 100-109 mmHg are considered moderate, while SBP >160 and DBP >110 mmHg are considered severe. [2]

Pre-existing hypertension, gestational hypertension with proteinuria, pre-existing hypertension plus superimposed gestational hypertension with proteinuria, and unclassifiable hypertension are the four conditions that the Canadian Hypertension Society defines as PIH. [3]

Epidemiology: An epidemiological study in the USA over the period 1995-2004 showed that gestational hypertension and PE were the most commonly diagnosed hypertensive conditions in pregnancy, whereas pre-existing hypertension was much rarer. [4] Studies from Europe revealed a prevalence of preeclampsia at 2.3-3%. [5,6]

Complications: One of the major causes of maternal, fetal, and neonatal mortality and morbidity, according to the WHO, is PIH. [1] In Europe, it is the leading cause of maternal death. [7] PIH was the

third most cause of maternal death in a retrospective research conducted in an Indian tertiary hospital from 2000 to 2009. In a related study, PIH was identified as the second leading cause of maternal death in Henan Province, China, between 1996 and 2009. Complications from PIH account for 10% of maternal mortality in Africa and 25% of maternal fatalities in Latin America. [1,8,9] According to a different study, haemolysis, increased liver enzymes, and low platelet count (HELLP) or partial HELLP syndrome accounted for 83.3% of all preeclampsia-related deaths. [10]

Other short-term maternal problems include oliguria, pulmonary edema, cerebrovascular events, central nervous system dysfunction, hepatocellular damage, thrombocytopenia, acute disseminated intravascular coagulation (DIC), and placental abruption.11-14 In one study, the incidence of one or more systemic problems was 6% among 4,188 preeclamptic women. The most frequent problems were hematologic, and 2.8% of pregnancies ended abruptly. [15]

Compared to late-onset PE, early-onset PE (gestational week 32) has a higher incidence of PIH-related problems. [16] According to a comparison study, perinatal problems affect both women with and without superimposed PE at the same rate. The risk of intervention-related problems, including as birth at or before gestational week 34, cesarean section, and admission to a neonatal intensive care unit, was considerably higher in women with superimposed PE. [17]

Intrauterine growth restriction (IUGR), small for gestational age (SGA) neonates, low birth weight neonates, preterm birth, intrauterine and perinatal deaths are some of the short-term problems that affect foetuses and newborns. [18,19] 9.2% of a study's 17,933 stillbirths were caused by pregnancies complicated by perinatal hypertension diseases. [20] One study from Greece found that infants of preeclamptic women had more neonatal unfavourable outcomes than infants of normotensive women. [21] In pregnancies affected with PE, a retrospective research found that hospital-based continuous prenatal care decreased the risk of preterm delivery and compromised fetal growth. [22]

With regard to long-term health risks, numerous studies have shown that women with PIH are more likely to develop later in life diseases like hypertension, cardiovascular disease, diabetes mellitus, and kidney disease. [23,24] A study involving 3,593 women who experienced preeclampsia during their first singleton pregnancy found a link between pregnancy-related hypertensive disorders and hypertension-related ailments later in life. [25]

those with PE or gestational hypertension had a 2-fold increased chance of developing diabetes later in life than those without these conditions. [26] Children born to mothers who experienced PIH-complicated pregnancies appear to be at higher risk for long-term health. These issues include greater blood pressure in adolescence and adulthood, a propensity for an abnormal lipid profile, a twofold increased risk of stroke, decreased cognitive function, and mental illnesses later in life. [27-31]

Risk factors: PIH is thought to have risk factors for hypertension, collagen vascular disease, obesity, black race, insulin resistance, diabetes mellitus, gestational diabetes, elevated blood testosterone concentrations, and thrombophilia. [32,33]

Recent epidemiological research revealed that Asian women had a significantly lower risk of developing any kind of hypertension during pregnancy than non-Hispanic white women, whereas Black and some Hispanic women had a noticeably higher risk. The same study found that pre-pregnancy weight and risk of PIH were positively correlated, although parity and smoking were protective factors for the emergence of PE. [4] Data on parity are contradictory because both nulliparity and multiparity appear to increase the chance of developing PE. [34-36]

Body mass index (BMI) and maternal age were found to be strongly connected with risk for PIH in Arab women. [37] An additional risk factor for PE in twin pregnancies was an elevated pre-pregnancy BMI. [38] Additionally, an above-average pregnancy weight gain was positively connected with the incidence of PE.Significant risk factors for PE in pregnancy include personal and family history of PE.[39-41]

It is well known that APS, an autoimmune disorder marked by recurrent thrombosis, increases the risk of a number of obstetric problems, including PIH. PE will occur in about one-third of women with APS. [42,43] Low maternal vitamin D concentrations are

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linked to a higher risk of PE, according to two recent meta-analyses.[44,45]

Materials and Method

This is an observational analytical case control study conducted to find the changes that occur in the neutrophil-lymphocyte ratio in pregnancy induced hypertension as compared to that in normal pregnancy. The neutrophil-lymphocyte ratio was determined among pre-eclampsia patients, (who are admitted to the maternity ward and labor room of the Obstetrics and Gynaecology department, Pacific Institute of Medical Sciences Umarda Udaipur) and in the control groups, having age and anthropometrically matched apparently healthy pregnant women for a period of two years. A total number of 100 patients admitted at Pacific Institute of Medical Sciences Udaipur, was form the subjects of the present study. Out of these 50 patients were suffering from pre-eclampsia and eclampsia., and 50 were normal Pregnant women. Efforts will be made to match all anthropometric factors comparable to both the groups of patients.

In Inclusion Criteria Pregnant women between 37 and 42 weeks of gestation with pre-eclampsia and eclampsia and Normotensive pregnant women between 37 and 42 weeks of gestation

Pre-existing medical disorders - diabetes mellitus, chronic kidney disease, any coagulopathies, chronic hypertension, and thyroid disorder, Smokers, alcoholics, Multifetal gestation. Placental abruption or previa. in exclusion criteria.

After obtaining informal consent from all patients and healthy control, 5 ml of venous blood was collected in EDTA vial, mix well and run in H 360 haematology analyser and count was obtained from the microscopic examination.

Clinical Methodology: Symptoms (hypertension, nausea, vomiting), Complete Blood Count were recorded by using Autoanalyzer H 360.

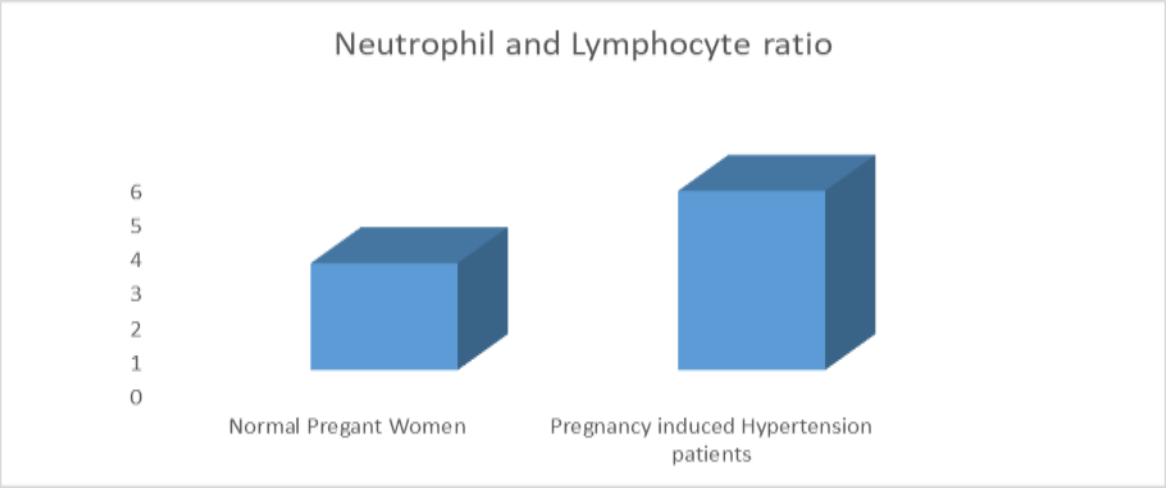
Statistical Analysis: For the quantitative analysis, we used the software SPSS software. In this meta-analysis, all p values reported were two-tailed with the statistical significance set at $\leqslant$ 0.05.

Result

Table 1: Comparison of Neutrophil and Lymphocyte ratio between Normal Pregnant Women and Pregnancy induced Hypertension patients

S. No	Test	Normal Patient		Pih Cases		P Value
		Mean	SD	Mean	SD	
1	Neutrophil and Lymphocyte ratio	3.10	0.51	5.20	1.02	P < 0.0001

Fig 1: Comparison of Neutrophil and Lymphocyte ratio between Normal Pregnant Women and Pregnancy induced Hypertension patients.



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The present study showed that the mean and standard deviation of Neutrophil and Lymphocyte ratio significantly high in Pregnancy induced Hypertension patients compare to normal pregnant women with p value <0. 0001.(Table 1, Fig 1)

Discussion

The results of NLR values describe nonspecific inflammatory mediators as first-line defences and protective components in inflammation. NLR believed in providing diagnostic and prognostic values.7 We have involved 100 respondents in making this study. The Mean neutrophil to lymphocyte ratio among cases and control is 5.2±1.02 and 3.10±0.51. From these results, we found that there were significant mean differences in the NLR variable (p <0.0001) between the normal pregnancy group and the pregnancy with preeclampsia A study conducted by Mohammad et al. stated that NLR values were higher in preeclampsia patients compared to normal pregnant patients and increased significantly in the severe preeclampsia (PEB) group (p = 0.042).[46] The same results were obtained in a study conducted by Kurtoglu et al. that showed significant NLR results in the group of women with preeclampsia compared to the control group (p = 0.023), but when comparing the severity, proteinuria levels, subjective symptoms, and onset of preeclampsia concerning NLR values, there is no difference.[47]

Conclusion

The present study done on Normal Pregnant women and pregnancy induced hypertension patient admitted in Pacific Institute of Medical Sciences, Udaipur. Total 100 patients were included for this study .50 was Normal Pregnant women and 50 was pregnancy induced hypertension patient. 19-35 age group was taken for this study the study shows that the mean value and standard deviation of Neutrophil and Lymphocyte ratio were significantly high in pregnancy induced hypertension patient compare to Normal Pregnant women.

Our study also shows that non-alcoholic fatty liver disease patients have a high risk of critical condition and developing sever disease and also show poor prognosis compare to normal patent.

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