

Physiological Changes In Individual Leukocytes In Pregnancy

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Abstract

To determine the changes in individual types of leukocytes in third trimester of pregnancy, a cross sectional study was conducted in the antenatal clinic of Gynaecology and Obstetrics Lady reading Hospital Peshawar, from 1st Aug to 10th Dec 2012. A Total of 152 pregnant ladies were included and necessary information was recorded on the questionnaire.

The age range of the patient was from 20 years to 49 years with mean age of 33 ± 3.4 years. Out of total 27(18%) were prima gravida. Total leukocyte count was higher than normal in 68% cases. Regarding effects of pregnancy on neutrophils, 60.7% of the pregnant women had neutrophil count >68%. About, 46% had lymphocyte count >25%. No evident changes were seen in monocyte counts. Eosinophilia was present in 10.5% while 3.16% had basophilia.

It was evident from the data collected that physiological changes were present in individual leukocytes. There was marked neutrophilia and lymphocytosis. Changes in monocytes, eosinophils and basophils were not remarkable.

Keywords: Pregnancy, leukocytosis, Peshawar.

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Introduction

Pregnancy is a state characterized by many physiological haematological changes, which may appear to be pathological in the non-pregnant state. Differential leukocytes counts also changes dramatically in the pregnancy. The proportion of the neutrophils increases significantly in pregnancy which normalizes in normal levels within one month after delivery. The numbers and percentages of lymphocytes and eosinophils decrease throughout pregnancy. The proportion and number of basophils decreases

during pregnancy and is encountered more in the third trimester of pregnancy, and both returned to the non-pregnant levels at 4 months postpartum and within one-month postpartum, respectively¹. An elevated white count is usually encountered in pregnancy. A study reported that Neutrophil count (whole blood) continuously increases in pregnancy from first trimester to the last².

Cell	First Trimester	2nd Trimester	Third Trimester
TLC	3600-10100/cmm ³	3800-12300/cmm ³	3900-13100/cmm ³

During pregnancy there is both an increase in neutrophil count as well as increased activation. In preeclampsia there is further marked neutrophil activation. Raised neutrophils count may play a vital role in relationship between the placenta and vascular endothelium, and it further exaggerates with dysfunction in the maternal endothelium those results

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in cascade of symptoms³. A reported change in lymphocyte subsets blood samples of pregnant women as examined by flow cytometry was observed. They reported that changes of lymphocyte subsets may indicate suppression of immunological activity during pregnancy⁴.

Monocytes may play a central role in this inflammatory response. Macrophages are present in the endometrium and play a role in placentation in normal pregnancy. These macrophages appear to be present in larger numbers and are also activated⁵. Basophils are also part of the body's immune system. Present study was designed therefore to determine changes in individual types of leukocytes during third trimester of pregnancy in our set up.

Patients and Methods

This was a cross sectional study conducted in the department of Gynaecology and Obstetrics Postgraduate Medical Institute, Lady reading Hospital (PGMI-LRH) Peshawar, from 1st August 2012-10th Dec 2012.

This study was conducted through convenient (Non-Probability) sampling. A total of 152 women in their third trimester attending the Gynaecology OPD of a Post graduate medical institute Lady Reading Hospital were included.

Inclusion criteria were all clients/women irrespective of symptoms or cause for attending the Gynae/Obstetrics OPD, in their third trimester presenting to the Gynaecology OPD.

Exclusion criteria were all cases those are post-natal or patients with other gynaecological disorders (like patients with tumors of the female genital tracts, fibroids or other associated disorders. Women with other clinical issues such as uremia were also excluded. Similarly women in their first and second trimester were excluded. Similarly patient taking regular iron pills were also excluded.

Blood samples were collected from these women. The technique for the blood sampling col-

lection was to collect three ml of venous blood by vein-puncture using disposable syringes under aseptic techniques. The blood was added in an Ethylene Diamine Triacetic Acid (EDTA) vacutainer at concentration of 1.5mg/ml and mixed gently. Complete blood count was calculated on hematology analyzer.

Preliminary information's of the women regarding demographic variables like age, gravida and parawere recorded on the questionnaire. Differential Leukocytes count and Total Leucocyte Count (TLC) were research variables. The data was analyzed using MS-Excel program for outcome. Range and percentages were calculated for different variables.

The normal white blood cell count range is 4000-10800 /mm³. Normally, the percentages of the WBC s are,

- " Neutrophils count : 50-70%
- " Lymphocytes in the blood: 25-30%
- " Monocytes in the smear: 4-10%
- " Eosinophils percentage: 1-5%
- " Basophils count: 0.4-1.5% per cubic millimeter of blood⁶. These parameters were taken as standard to define leukocytosis and neutrophilia in present study.

Results and Discussion

A total of 152 women in their third trimester presenting to Gynecology and obstetrics department of Lady reading hospital Peshawar. The age range of the patient was from 20 years to 49 years with mean age of 33 + 3.4years (Table 1). Out of total 27(18%) were primagravida. Total leukocyte count was higher than normal in majority of the cases. Regarding effects of pregnancy on neutrophils 60.7% of the pregnant women had neutrophil count >70%. 46% had lymphocyte count >25%. No evident changes seen in monocyte counts. 10.5% had eosinophilia. 3.16% had basophilia (Table 2).

Table 1. Age range of patients

Age range	Count of patients	Percentage
20-29	61	40.13
30-39	72	47.37
40-49	18	11.84
50-59	1	0.66
Grand Total	152	

Table 2. Changes on Total Leucocyte Count (TLC) and individual White Blood Cells (WBC) in Pregnancy

Cell count	n (%)
Leukocytosis (TLC>11000/cmm ³)	103 (68%)
Normal (TLC ranging 4000-11000/cmm ³)	49 (32%)
Neutrophilia (Neutrophil percentage >70%)	92 (60.8%)
Normal	60 (39.2%)
Lymphocytosis (Lymphocyte percentage >25%)	70 (46%)
Normal Lymphocyte Count	82 (54%)
Monocytosis (Monocyte percentage >12%)	18 (12%)
Normal Monocyte count	134 (88%)
Eosinophilia (Eosinophil percentage >5%)	16 (10.5%)
Normal Eosinophil count	136 (89.5%)
Basophilia (Basophil percentage >2%)	5 (3.16%)
Normal Basiophil count	147 (96.94%)

Neutrophilia is an increase in circulating neutrophils in the third trimester of pregnancy for the same age, sex, race and physiological status. The neutrophil count above $7.5 \times 10^9/l$ is noted in nearly all pregnancies. In present study we found that total leukocyte count was higher than normal in majority of the cases. Regarding effects of pregnancy on neutrophils, 60.7% of the pregnant women had neutrophil count >70% of the total TLC. White cell count is often increased in pregnancy with lower level typically not less than 6,000/cumm. Leucocytosis in pregnancy is due to the physiologic stress in pregnant state⁷. In our study 70 (46%) cases had lymphocyte counts elevated than normal. Six patients had count in the range of 45-55%. A decrease in total lymphocyte count was observed in the first and second trimester but was increased in third trimester. Similar finding has been reported in another study which concludes on that T cell immunity is predominant in normal pregnancy⁷.

In our study 12% had monocytosis. Both non-classical and intermediate monocytes have been implicated in different inflammatory conditions. We hypothesized that these monocytes would increase during pregnancy. In pregnancy in the majority of cases neutrophils and monocytes are activated. But monocytes recorded were below the normal and similarly has been documented in a study which found that a lower percentages of classical monocytes were found in pregnant women 91%, 94% in nonpregnant ladies while a further decrease was observed in pre eclampsia 90%⁸ The decreasing of specific immunity is more common in the third trimester of pregnancy. The study consists of 45 samples (45 pregnant) individuals showed the immunity gap in the third trimester of the pregnancy⁹. Nearly 136 (89.5%) had eosinophils count in the range of 1-5%. About 16 (10.5%) had elevated eosinophils in the range of 5-20% while 3.1% had basophilia. The physiological roles of eosinophils that accumulate in the uterus during pregnancy yet to be defined. In a study, it was noted that eosinophils and basophils degranulate in the pregnancy and their concentration increases¹⁰.

Neutrophilia of pregnancy is natural, physiologic phenomenon. Where in pregnancy the immune system is altered and there is also increased lymphocytosis. As these women have increased level of neutrophils hence need closed monitoring as any minor trauma/ complication of delivery can lead to disseminated hypercoagular and septic condition that can even result in death of patients. Therefore pregnant women especially in the third trimester need regular bi-weekly visit to antenatal clinic to check there full blood count and blood pressure. Due to their low immune system they are more susceptible to infections/sepsis and anemia with its related subsequent complications.

Conclusion

We concluded that Changes in WBC were evident from the data. There was marked neutrophilia Changes in lymphocytes, monocytes and eosinophils were not remarkable.

Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization for this study

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