VARIATION OF TOTAL AND DIFFERENTIAL COUNT OF LEUKOCYTES AND INCREMENT IN THE NUMBER OF YOUNG NEUTROPHILS IN DIFFERENT TRIMESTERS OF PREGNANCY

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ABSTRACT

Objective: To find out the variation of total and differential count of leucocytes and young neutrophils in young non-pregnants and pregnant ladies of different trimesters.

Setting: Nepal Medical College, Jorpati, Kathmandu, Nepal

Design: Total and differential count of leukocytes were performed and percentage of young band forms among the neutrophils was determined in young non pregnant women and in young pregnant ladies in different trimesters.

Results: Increase in the number of total leukocyte, neutrophil and monocyte along with decrease in the number of lymphocytes is noticed in all the three trimesters of pregnancy in comparison to those of non pregnant counterparts. Eosinophil count increases significantly in the 2nd trimester of pregnancy in comparison to non pregnant women. The number of young band forms among the neutrophils having more myeloperoxidase (the main bactericidal system in neutrophil) increases with the advancement of pregnancy.

Conclusions: The weakened specific immunity of the maternal host (due to decrease of IgA, IgG and IgM in pregnancy)is compensated at least partly by non specific immunity exerted by young neutrophils and other WBCs like eosinophils and monocytes.

KEY WORDS: Glucocorticoid, band neutrophil, bactericidal activity.

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INTRODUCTION

It has been reported that specific immunity decreases in pregnancy [1]. Levels of IgA, IgG and IgM decrease steadily from 10th to 30th week and then remain stationary until term[2]. It has also been reported that the number of helper T lymphocytes decreases markedly in pregnancy between 14th and 28th week causing an impairment in maternal immunity.[3] Nevertheless reports are scanty about the alteration in total and differential count of leucocytes, which may indicate the physiological compensation of the body's defense mechanism through nonspecific immunity, exerted by neutrophils - the migratory phagocytes and other leukocytes like monocytes and eosinophil

in different trimesters of pregnancy. To explore this area this study has been designed.

SUBJECTS AND METHODS

Blood smears are prepared from normal pregnant ladies attending OPD of our hospital. Medical students (female) of our college served as control group. Staining (Leishman's stain), total leukocyte count and differential leukocyte count was done by routine laboratory methods. Blood smears stained by Leishman's stain was examined to get the percentage of band forms among the neutrophilic leucocytes. Neutrophils having no distinct fine filament (length but no breath) connecting the nuclear lobes were considered as band forms. Band neutrophils are young immature forms of neutrophils.[4]

RESULTS

It is evident from the information in Table-I that the total count of the leukocytes, the percentage of neutrophils and monocytes among the WBCs and the percentage of young band forms among the neutrophils increases in all the three trimesters of pregnancy in comparison to that of non pregnant group. There is no significant alteration in basophil count in pregnant and non pregnant women. Lymphocyte count decreases gradually with the advancement of pregnancy, whereas, eosinophil count increases significantly in 2nd trimester of pregnancy in comparison to that of non-pregnant counterpart.

DISCUSSION

It has been reported that stimulated by oestrogen the adrenal cortex produces increasing levels of total and free plasma cortisol and other corticosteroids from 12 weeks to term[2, 5]. Glucorticoid increased the number of total WBC along with the number of the neutrophils. There is a slight increase in the number of monocytes as well. It decreased the circulating lymophocyte count, size of lymph node and thymus by inhibiting lymphocyte mitotic activity[6-9]. Most of the alteration in differential

TABLE-I
Total count and differential count of leucocytes and percentage of band forms among neutrophils in non pregnant ladies and in ladies of different trimesters of pregnancy

Parameters	*Non pregnant (Mean±SD) n=30*	*1st trimester (Mean±SD) n=30*	*2nd trimester (Mean±SD) n=30*	*3rd trimester (Mean±SD) n=30*
Total count	5041.06 ± 856.47	5901.73 ± 998.87*	5886.00 ± 1457.86*	6373.83 ± 1322.65*
Neutrophil (%)	60.86 ± 5.77	67.30 ± 8.32*	71.26 ± 4.57*	72.73 ± 5.48*
Eosinophil (%)	1.90 ± 0.99	1.96 ± 1.12	3.36 ± 1.42*	2.13 ± 1.19
Basophil (%)	0.13 ± 0.34	0.30 ± 0.46	0.06 ± 0.25	0.16 ± 0.37
Lymphocyte (%)	35.33 ± 5.90	27.00 ± 8.10*	21..86 ± 4.79*	21.96 ± 5.90*
Monocyte (%)	1.76 ± 1.22	3.10 ± 1.39*	3.43 ± 1.19*	3.00 ± 1.59*
Percentage of band forms among the neutrophils	28.83 ± 4.14	43.83 ± 10.87*	57.16 ± 4.60*	57.43 ± 4.92*

n= Number of subjects.
Parameters of all trimesters has been compared with non pregnant group for t test.
* = $p < 0.05$

count in different trimesters is likely to be due to the threefold increase in plasma cortisol concentration which comprises the major part of glucocorticoid[5]. Clinically it is appreciated that it is useful to determine whether young forms of neutrophil (band forms) are increased or the proportion of multilobed forms are increased. An increase in younger forms (band cells) suggest increased release of young neutrophils from the bone marrow[10]. In the present study an increase in the number of band ones among the neutrophils with the advancement of pregnancy was noted, suggesting an increased release of young neutrophil from the bone marrow. Band neutrophils contains more amount of myeloperoxidase[11]. Myeloperoxidase system is the most competent bactericidal system present in neutrophils. As the number of younger neutrophils increases in second and third trimesters, it gives an indication that bactericidal activities of neutrophils may be more in last two trimesters compared to that of non-pregnant and first trimester groups.

As the prenatal growth rate is highest in 2nd trimester[12], the mother's body tolerates and tries to adjust more antigenic load of the foetal origin within a very short period to which it was not used to. This may be the cause of slight increase in eosinophil count in 2nd trimester.

It seems that, the nonspecific immunity offered by the increased number of neutrophil, eosinophil and monocyte tries to compensate at least partly, the weakened specific immunity of the mother's body.

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