

'T' CELL POPULATION IN NORMAL PREGNANCY

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SUMMARY

Pregnancy is associated with absolute lymphopenia in all trimesters which becomes statistically significant in third trimester. There is also statistically significant fall ($p < 0.001$) in mean total T lymphocytes in comparison to control (60%, 1271/cmm) in first trimester (40.56%, 765/cmm), with gradual reversion of T lymphocytes in second trimester (44.05%, 862/cmm) and third trimester (51.39%, 828/cmm). However, even upto third trimester the T lymphocyte count remained slightly lower in comparison to controls.

The changes in T lymphocytes appear relevant in acceptance of foetus-an allograft and may give insight in mechanism of infertility, habitual abortion and therapeutic induction of abortion in future.

Introduction

One of the most fascinating, challenging and puzzling phenomena in the field of immunology is the successful grafting of foetus on the uterus and the maintenance of foetus and placenta throughout gestation.

One of the hypothesis to explain why foetus is not rejected by mother is impairment of mother's cellular immune response during pregnancy. However, the existing literature does not affirm/exclude altered cellular immune response (shown by change in number of 'T' lymphocytes) in various trimesters of pregnancy. The

present study was conducted to study T cell population during various trimesters of pregnancy.

Material and Methods

The present study was conducted on pregnant women attending the out-patient departments of P.B.M. Hospital attached to S.P. Medical College, Bikaner. All the women studied were divided into four groups.

Group I included 25 healthy non-pregnant female/volunteers of child bearing age and served as control.

Group .II (1st trimester) included 25 pregnant women having pregnancy of 8 weeks (60 days after L.M.P.) to 12 weeks. Pregnancy was confirmed by history and

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clinical examination. No pregnancy tests were done.

Group III (2nd trimester) included 21 women having normal pregnancy from 13 weeks to 24 weeks of gestation, followed from Group II.

Group IV (3rd trimester) included 18 women having pregnancy after 24th week of gestation, followed from Group III.

Five to ten ml of heparinised venous blood was obtained from the women under study and the following tests were done:

I. Hb estimation by Sahli's method to rule out anaemia.

II. Peripheral lymphocyte count by total and differential counts, using conventional methods.

III. T-lymphocyte percentage and levels as described by Jondal *et al* (1972).

Observations

Table I shows that the number of pregnant women diminished from 25 in 1st trimester to 21 in second trimester and 18 in third trimester. This was due to failure of some women to report for further antenatal check-up.

Mean age of control women was 26.2 years. The mean age of pregnant women was comparable to controls viz 27.6 years in first trimester, 29.2 years in second trimester and 28.8 years in third trimester.

The mean parity in controls was 1.20. It was respectively 1.56, 1.71 and 1.17 in healthy pregnant women in first, second and third trimesters.

The mean total leucocyte count in healthy controls was 7200/cmm. In pregnant women the deviation of total leucocyte count from controls was insignificant viz. 6424/cmm in first trimester, 6661/cmm in second trimester and 7267/cmm in third trimester.

In healthy controls mean absolute lym-

phocyte count was 2134/cmm. Lymphopenia was observed in all trimesters counts being 1882/cmm in first trimester, 1961/cmm in second trimester and 1619/cmm in third trimester. The lymphopenia was statistically significant only in third trimester ($p < 0.02$).

The mean percentage of T lymphocytes was 60% in controls. Highly significant ($p < 0.001$) fall was observed in all trimesters, the percentage of T-lymphocytes being 40.56% in first trimester, 44.05% in second trimester and 51.39% in third trimester. These figures also show that there was a progressive rise in percentage of T lymphocytes in second and third trimesters following a fall in first trimester.

The mean absolute count of T cells in control women was 1271/cmm. In pregnancy, a highly significant fall ($p < 0.001$) in T lymphocytes was observed in all trimesters. The mean T lymphocyte counts were 765/cmm in first trimester, 862/cmm in second trimester and 828/cmm in third trimester.

Discussion

A suppression of PLC (Peripheral Lymphocyte Counts), more significant in third trimester—as has been observed in present study, agrees with the results of Purtilo *et al* (1972), Rita Bulmer *et al* (1977) and Dennis, (1979). Contrary to present study, Brain *et al* (1972) and Strelkauskas *et al* (1975) could not observe any change in PLC in pregnancy. Upreti *et al* (1980) did not find any significant change in third trimester of pregnancy, but observed slight depression in first trimester. Rajavanshi *et al* (1981) observed slight increase in PLC in first and second trimesters with a fall to normal in third trimester. The mechanism of lymphocyte kinetics in normal pregnancy

TABLE I
Showing age, Parity, T.L.C., Absolute Lymphocyte Count and T⁺ Cells (% and Absolute Number) in Controls and Various Trimesters of Pregnancy

	Group with number of cases/controls			
	(I) CONTROL (25)	(II) PREGNANCY I trimester (25)	(III) PREGNANCY II trimester (21)	(IV) PREGNANCY III trimester (18)
1. Mean age in years	26.2 (16-14)	27.6 (17-42)	29.2 (18-42)	28.8 (18-42)
2. Mean parity	1.20 (0-5)	1.56 (0-5)	1.71 (0-5)	1.17 (0-5)
3. T.L.C./Cmm (Mean ± S.D.)	7200 ± 1748.09 (4150 — 10900)	6424 ± 1874.62 (4100 — 10900)	6661 ± 1762.52 (3950 — 11000)	7267 ± 1625.62 (5000 — 11650)
4. Absolute lymphocyte count/ Cmm (Mean ± S.D.)	2134 ± 748.09	1882 ± 512.84	1961 ± 568.02	1619 ± 549.29*
5. T cell percentage (Mean ± S.D.)	60.00 ± 6.65 (44 — 70)	40.56 ± 5.23** (29 — 51)	44.05 ± 6.53** (31 — 54)	51.39 ± 5.07** (43 — 60)
6. T cell absolute number/Cmm (Mean ± S.D.)	1271 ± 430.88 (535 — 2319)	765 ± 245.39**	862 ± 288.59**	828 ± 280.29**

Figures within parenthesis indicate range.

* statistically significant — $p < 0.02$.

** highly significant statistically — $p < 0.001$.

responsible for altered lymphocyte counts is poorly understood.

Our results suggest that pregnancy is associated with a marked fall in T cell absolute number and percentage in all trimesters—more marked in first trimester with increase thereafter in second and third trimesters. They do not return to normal control values during pregnancy. Our findings are in agreement with those of Nekakita *et al* (1973) and Rita Bulmer and Hancock (1977). Our findings are also consistent with the findings of Upreti *et al* (1980) and Rajvanshi *et al* (1981) who reported a fall in T cell% and absolute number in first trimester with reversion to normal in second and third trimesters. Contrary to present study, Dodson *et al* (1977), Campion and Curry (1972), Brain *et al* (1972), Gergeley *et al* (1974) and Dennis *et al* (1979) did not find significant change in T cells during pregnancy, especially third trimester.

Our results suggest that a fall in T lymphocytes in early pregnancy may be attributed to lowered cell mediated immunity, helping in acceptance of the foetus—an allograft. This understanding in the normal mechanism of acceptance of foetus may help in mechanism of its initial non-

acceptance (infertility) and early repeated rejections (habitual abortions). This knowledge may contribute in devising means for rejection of the allograft as and when desired (Therapeutic induction of abortion).

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