January 1992

Platelets and leucocyte counts in pregnancy

Saadiya Aziz Karim
Aga Khan University

Javaid H. Rizvi
Aga Khan University

Iffat Rizwana
Aga Khan University

Mohammad Khurshid
Aga Khan University, mohammad.khurshid@aku.edu

Sadiqua N. Jafarey
Jinnah Postgraduate Medical Centre

PLATELETS AND LEUCOCYTE COUNTS IN PREGNANCY

Pages with reference to book, From 86 To 87

Saadiya Aziz Karim, Javaid H. Rizvi, Iffat Rizwana (Departments of Obstetrics and Gynaecology, Aga Khan University Hospital, Karachi.)
Muhammad Khurshid (Departments of Pathology, Aga Khan University Hospital, Karachi.)
Sadiqua N. Jafarey (Department of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Centre, Karachi.)

ABSTRACT

A study involving the obstetric clinic population of 3 major teaching hospitals of Karachi has been conducted to define changes in leucocyte and platelet counts as pregnancy progresses. 573 "normal" pregnant women - 183 in the first trimester, 195 in the second trimester and 194 in the third trimester were included in this analysis. We have found leucocytosis to be a feature of normal pregnancy; the change is subsequent to a progressive increase in granulocytes. Platelet counts were found to decrease slightly as pregnancy progresses (JPMA 42: 86, 1992).

INTRODUCTION

Studies on leucocyte counts in pregnancy have suggested a 'physiological' leucocytosis confined to neutrophils[1]. The neutrophil count rises as early as the estrogen peak of a normal menstrual cycle and if fertilization occurs, neutrophuls continue to rise[2]. A maximum is reached on the 15th post ovulation day followed by a fall[3]. There is a subsequent rise to a peak at 30 weeks[4] and plateau during the third trimester. Analysis of platelet counts in pregnancy record a statistically significant fall as pregnancy progresses[5-7]. This has been re- emphasized by Fay et al[8] who also suggest an increased platelet destruction throughout normal pregnancy. Lack of data on the haematological status in pregnant Pakistani women has prompted this study. The aim is to define a range of normal and mean values for leucocyte and platelet counts in the three trimester of pregnancy.

SUBJECTS AND METHODS

Normal pregnant women attending the antenatal clinics of three major teaching" hospitals of Karachi. The Aga Khan University Hospital, between November 1986 and October 1987 and between January 1990 and July 1991, the Civil Hospital, between May 1987 and October 1987 and the Jinnah Postgraduate Medical Centre between January1988 and June 1988, were included in this analysis. Excluded were anaemic women (Hb < 10 gm/dl), those suffering from infections or diseased states and those on drugs known to alter platelet or white cell Counts. Also excluded were women with hypertension, diabetes and other medical problems. Consecutive women seen at the above hospitals at their 1st (booking visit) were included until a total of about 200 in each trimester were reached. The study population comprised women of all socio-economic levels, ages 16 to 45 and all parities (primiparae to 12th gravidae). Trimester 1 was defined as 6 to 13 weeks pregnancy, trimester 2, 13 + to 26 weeks pregnancy and trimester 3,26 + weeks to term. Total differential leucocyte counts and platelet counts were measured by the Coulter S + 4 automated haematology analyser at The Aga Khan University laboratory. A standard test of significance (Z test) was applied.

RESULTS

The results of our study are shown in Table I and II.

TABLE I. Total and differential leucocyte counts in pregnancy trimesters.

Trimester	Total patients (n)	No. with total count >10000 /cu mm	Mean total leucocyte count/dl ±S.D.	Mean granulocyte count/dl ±S.D.	Mean lymphocyte count/dl ±S.D.
Trimester 1	183	71 (38.8%)	9.7 ± 2.6	6.0 ± 1.9	2.7 ± 0.9
Trimester 2	195	96 (49.2%)	10.1 ± 2.5	6.3 ± 1.9	2.62 ± 0.75
Trimester 3	194	101 (52.1%)	10.4 ± 2.2	6.6 ± 1.8	2.6 ± 0.82

TABLE II. Platelet counts in pregnancy.

Trimester	Total patients (n)	Platelet counts range (thousands/cu mm)	Mean value ± S.D.
Trimester 1	183	125 to 480	278 ± 77
Trimester 2	195	123 to 496	275 ± 89
Trimester 3	194	104 to 540	266 ± 86

TABLE III. Platelet and leucocyte counts in pregnancy trimesters. Statistical Analysis.

Mean total leucocyte count/dl	Z	P value	Significance
Trimester I vs Trimester II	-.09	.926	N.S.
Trimester II vs Trimester III	-1.00	.318	N.S.
Trimester I vs Trimester III	-.80	.426	N.S.
Mean granulocyte count/dl			
Trimester I vs Trimester II	-1.49	.138	N.S.
Trimester II vs Trimester III	-1.35	.178	N.S.
Trimester I vs Trimester III	-2.83	0.005	Significant
Mean lymphocyte count/dl			
Trimester I vs Trimester II	.79	.428	N.S.
Trimester II vs Trimester III	.81	.419	N.S.
Trimester I vs Trimester III	1.50	.135	N.S.
Mean platelet count/dl			
Trimester I vs Trimester II	.33	0.741	N.S.
Trimester II vs Trimester III	.96	0.336	N.S.
Trimester I vs Trimester III	1.36	0.176	N.S.

The number of patients studied were 183 in trimester 1, 195 in trimester 2 and 194 in trimester 3. Of the 183 women in the first trimester, 71 (38.8%) had leucocytosis (total count> 10,000). This increased to 49.2% in second trimester and 52.1% in third trimester. The mean total white cell count was 9.7 in the 1st trimester (range 5.0 to 16) increasing to 10.1 in the 2nd trimester (range 5.4 to 16.6) and 10.4 in the 3rd trimester (range 4.4 to 18). The mean granulocyte count rose from 6.0 in the 1st trimester to 6.6 in the 3rd trimester and the change is statistically significant (Z test, P.0.005). The mean lymphocyte count remained fairly constant throughout pregnancy with values similar to those in the non-pregnant. There was a wide range in platelet counts in all three trimesters of pregnancy. Mean values were similar (278 in trimester 1, 275 in trimester 2, 266 in trimester 3) with a drop in average platelet count in the third trimester compared with the first trimester.

DISCUSSION

Leucocytosis is mentioned as a common feature of pregnancy in reviews by both obstetricians and haematologists[9,10]. We have found it to be present amongst 38.8% normal pregnant women in early pregnancy increasing to 52.1% in the third trimester. It is therefore likely to be a normal feature of pregnancy. Mean total leucocyte counts are high normal (9.7 to 10.4) at all stages of pregnancy. The rise in total white cells is due to progressive increase of granulocyte from early to late pregnancy whereas the mean lymphocyte count remains static at the non-pregnant level. This is in accord with

prior work[4]. Platelet counts have been shown to decrease slightly but significantly during pregnancy[11]. This change was explained by either haemodilution or hyperdestruction[8]. We have found the platelet count to be normal at all stages of pregnancy with a slight fall in average counts as pregnancy progresses. These findings in a Pakistani population confirm those of prior studies in the West[4,11].

REFERENCES

1. Efrati, P., Presentey, B., Margalith, M. and Rozenszajn, L. Leucocytes of normal pregnant women, Obstet. Gynaecol., 1964; 23:429.32.
2. Cruickshanks, J.M., Morris, It, Butt, W.R. andCrooke, AC. The relationship of total and differential leucocyte counts with urinary oestrogen and plasma cortisot levels. J. Obstet. Gynaecol. Br. Comm., 1970; 77:634.9.
3. Good, W., MacDonald, H.N., Hanocock, K.W. and Wood, J.a Haematological changes in pregnancy following ovulation induction therapy. J. Obstet. Gynaecot. Br. Comm., 1973; 80:486-90.
4. Cruickshank, J.M. The effects of parity on the leucocyte count in pregnant and non-pregnant women. Br. 3. Haematol., 1970; 18:531-8.
5. Sejeny, S.A, Eastham, R.D. and Baker. SR. Platelet counts during normal pregnancy. 3. Clin. Pathol., 1975; 28:812-16.
6. Cairns, J.W., Manon, A, Waters, D.A.W.. et al. Platelet levels in pregnancy. 3. Clin. PathoL, 1977; 30:392-6.
7. Pitkin, R.M.] and Witte, DL Platelet and leucocyte counts in pregnancy. JAMA., 1979, 222696.
8. Fay, R.A., Hughes, A.O. and Patron, NT. Platelets in pregnancy; hyperdestruction in pregnancy. Obstet Gynaecol., 1983; 61:238.40.
9. Letsky, & The hacmatological system, in clinical physiology in obstetrics. Edited by Frank Hyuen and Geoffrey Chamberlain. Oxford, Blackwell, 1980, pp.43-60.
10. Fleming. AR. Haematological changes in pregnancy. Clin. Obstet. Gynaecol., 1975; 2:269-79.
11. Hytten, F.E., and Leitch, I.The volume and composition of the blood, in the physiology of human pregnancy. 2nd ed. Oxford, Blackwell, 1971, pp. 1-10.