SIGNIFICANCE OF SERUM FOLIC ACID IN CASES OF ABRUPTIO-PLACENTA

by

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Introduction

Folic acid, an important co-enzyme in DNA synthesis, enjoys an unquestionable sheet anchor role in cellular reproduction (Israels and Dacunha, 1952; Spray, 1964). Its demand increases multifold during pregnancy because of increased maternal, foetal and trophoblastic cell proliferation (Banerjee and Chatterjee, 1965. Streiff and Little, 1967). Its deficiency leads to impaired cellular growth resulting in a basic defect in placentation and an insecure attachment of the placenta to the uterine wall. Depending upon the severity of deficiency, it will lead to different pregnancy complications including abruptio plancenta (Hibbards and Hibbard, 1963; Pritchard *et al* 1969).

Present work was to study normal S.F.A. level in Northern Indian women (pregnant) and to find out relationship with abruptio placenta, if it persists.

Material and Methods

The present work was carried out in Department of Obstetrics and Gynaecology in collaboration with the Postgraduates Department of Pathology and Bacteriology, S.N. Medical College, Agra. The subjects for the present study were selected from the patients attending outpatients department and those admitted in the wards. The cases were divided into two sub-groups:

(1) Control group comprising of 25 normal healthy pregnant woman in third trimester of pregnancy with past history of no foetal wastage (Group A).

(2) Study group comprised of 50 cases of abruptio-placentae (Group B).

A detailed history, clinical examination, haemogram was done in all cases. Serum iron was estimated by Di-pyridyl method (Kings, 1964). Serum folic acid was assayed using lactobacillus cases (AT CC 7469 method).

Observations

Age

Age of patients ranged between 20 to 40 years and there was no statistical difference between the age of patients in control and study groups.

Parity

In study group, majority of patients were multigravida (64% cases 3rd para

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or more) while in the control, parity was more or less uniform.

Obstetric History

No case with past foetal loss of any aetiology was included in control group, while in study group 16% cases had one abortion, 18% had past history of toxaemia, and 6% had past history of antepartum haemorrhage.

Haemogram

In control group, only 3 cases (12%) had less than 10 gms% haemoglobin while in study group 24 cases (48%) had less than 8 gms, the difference being significant ($p < .05$).

The mean total leucocyte count in control cases was 8,800 cells/cmm while it was high in study group (12,800 cells/cmm). Eighteen cases (72%) of control group had normocytic normochromic, 4 cases (16%) had microcytic hypochromic and 3 cases (12%) of control group had macrocytic blood picture. In study group, it was 64%, 18% and 18% respectively. Thus there was no significant difference.

Serum Iron Level

The mean serum iron level in control cases was 121.3 μg/ml, in study group it was 118.12 μg/ml, thus slightly lower but the difference was not significant statistically.

Serum Folic Acid Level

The S.F.A. level in control and study groups has been depicted in the following Table:

The mean serum folic acid level in control group was 6.29 ng/ml with a range of 5.1 to 9.4 ng/ml, while in study group it was 1.73 ng/ml with a range of 0.4 to 5.1 ng/ml. Thus, the levels were considerably low in study group statistically, as compared to normal pregnant females.

TABLE I

Serum Folic Acid Level in Normal Pregnant and Abruptio-Placentae Cases

Serum Folic Acid in ng/ml.	Control Group (25 cases)	Study Group (50 cases)
0.1 to 1.0	—	2 (64%)
1.1 to 2.0	—	6 (12%)
2.1 to 3.0	—	20 (40%)
3.1 to 4.0	—	12 (24%)
4.1 to 5.0	—	6 (12%)
5.1 to 6.0	5 (20%)	4 (8%)
6.1 to 7.0	7 (28%)	—
7.1 to 8.0	12 (48%)	—
8.1 & more	1 (4%)	—

It is further evident from the Table that 46 cases (92%) had less than 5 ng/ml. of S.F.A. in study group, while in control group all cases had S.F.A. level more than 5 ng/ml.

Discussion

The normal values of S.F.A. varies greatly from country to country and even in different parts of the same country (Spray, 1964). Its mean value in western countries ranges from 6.77 ng to 9.9 ng/ml. in non-pregnant women (Karthigeani, 1964 and Water and Mollins, 1961). In pregnant women its value is lowered upto 4.37 ng/ml. From India, Menon *et al* (1964) and Dutta *et al* (1977) considered 4 ng and 3 ng/ml. respectively as lower limit of normal range in normal pregnant women. A level below this was considered pathological.

In the present study mean S.F.A. level in normal pregnant was 6.2 ng/ml. with

TABLE II

Comparative Analysis of Relationship of Low Folate Levels in Abruptio placenta

Investigator	Tests of Evidence of Folic Acid Deficiency	No. of cases	Incidence in %	
			Affected	Control
Hibbard (Liverpool)	FIGLU	161	98	10
Hibbard (Liverpool)	Megaloblastic Erythropoiesis	98	64	5
Strieff and Little (Boston)	Low Serum Folate	16	94	18
Strieff and Little (Boston)	Low RBC Folate	9	100	0
Present Study (Northern India)	Serum	50	92	0

a range of 5.1 to 9.4 ng/ml, which is little higher than that of Water and Mollins (1961) but from northern India no report is available for comparison. The difference was highly significant ($p < .01$).

In cases of abruptio placentae in our study the mean S.F.A. value is 1.73 ng/ml. with a range of 0.4 to 5.1 ng/ml. Forty cases (80%) were having less than 4.0 ng/ml. serum level and 6 cases (12%) were having 4.1 to 5.0 ng/ml. level. Therefore, there was significant reduction in 92% of cases.

The critical review of world literature reveals that reduction in S.F.A. level ranges from 64% to 98% in abruptio placentae cases as depicted in the following Table:

From the above Table it is evident that significant reduction occurs in fairly high percentage of cases. Therefore, S.F.A. level less than 4.0 ng/ml. is suggestive of close correlation between abruptio placenta and folic acid deficiency.

However, further work is required to establish the normal S.F.A. values with adoptation of similar methods in different laboratories in different parts of the country to have a uniform standard and early diagnosis of abruptio placenta.

Summary

Folic acid, a co-enzyme in DNA synthesis, plays an important role in cell reproduction but in trophoblastic cell proliferation its role is still not clearly known. In the present study a significant reduction of serum folic acid (S.F.A.) (mean less than 2.46 ng/ml) level in 46 cases (92%) of abruptio-placentae suggests a definite correlation with it. A level less than 4 ng/ml is significant pathologically.

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