FOLIC ACID DEFICIENCY IN CASES OF TOXAEMIA OF PREGNANCY*

by

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SUMMARY

Folic acid deficiency was hardly ever considered as a possible etiological factor for toxaemia of pregnancy. The serum level below the critical value in 60% cases of pre-eclampsia and 84% cases of eclampsia was observed. This lower level along with lower oestrogen level may have adverse effect of implantation and placentation and poor circulation resulting in toxaemia of pregnancy.

Introduction

Folic acid is a coenzyme in D.N.A. synthesis and essentially required for cellular reproduction, specially trophoblastic proliferation. Its deficiency may result in a number of pregnancy complications like abortion (Hibbard and Hibbard, 1966); abruptioplacentae (Streiff and Little, 1967; Agrawal et al); accidental haemorrhage (Krishna Menon et al 1966; Spray, 1964; Streiff and Little, 1967) and megaloblastic anaemia of pregnancy (Walter and Mollin, 1961; Karthigeari, 1964 and Streiff and Little, 1967). In toxaemia of pregnancy, a disease with many etiological factors the role of folic acid was hardly ever considered in world litreature. The present study was undertaken to assess folic acid deficiency as a possible etiological agent in cases of toxaemia of pregnancy, specially eclampsia.

Material and Methods

The present study was conducted in the Department of Obstetrics and Gynaecology, with the collaboration of Postgraduate Department of Pathology and Microbiology, S.N. Medical College, Agra. The subjects for the study were selected from the patients attending O.P.D. and admitted in the wards from January 1980 to June 1981. All the cases were subdivided in two groups:

(i) Control group comprising of 50 normal healthy pregnant women in 3rd trimester of pregnancy with no past his-

*Paper presented at 25th All India Obstetrics and Gynaecology, Conference held at Calcutta on December 1981.

From: Sarojini Naidu Medical College, Agra. Accepted for publication on 3-6-83.

tory of foetal loss or toxaemia or hypertension (Group I).

(ii) Study group comprised of 60 cases of toxaemia of pregnancy (Group 2), out of which 35 patients were of pre-eclampsia (Group 2-A) and 25 cases were of eclampsia (Group 2-B).

Criteria for selection of cases was either oedema, hypertension and albuminuria present with 3rd trimester of pregnancy.

A detailed clinical history, clinical examination, routine examination and haemogram was done in all cases. Serum iron was estimated by 2-2 dipyridyl method. Serum folic acid was assayed using lactobacillus casei (AT CC 7469).

Observations

Age of patients ranged between 18-34 years and there was no statistical difference between the age of patients in study and control groups.

In control group there was more or less uniform pattern of parity, while in study group 60% (36 patients) were primigravida, 10% (6 cases) 2nd para, 20% (12 cases) 3rd gravida and remaining multigravida. In this group there was no case with foetal wastage or any other obstetric complications while in study group 10 cases (16.67%) had past history of toxaemia. Five cases (8.33%) had history of abortion.

Haemogram—In group A, 7 cases had haemoglobin less than 10 gms while in 2-A 16 cases (64.1%) and in 2-B 18 cases (51.4%) had less than 8 gms Hb. The mean total leucocyte count in control cases was 6400 cells/cumm while it was high in study group with hypersegmented neutrophils. General blood picture in control group was normocytic normochromic in 72% cases, while in study group it was normocytic normochromic in only 20% cases (12), microcytic hypochromic in 16.67% cases (10 cases) and mainly macrocytic hypochromic in 63.33% cases (38 cases).

Serum Iron level: The mean serum iron level in control cases was 121.3 ugm/ml while in study group it was 119.03 ugm/ml in group 2-B and 116.06 ugm/ml in group 2-A. The difference was not statistically significant.

Serum folic acid level in control and study group has been depicted in Table I.

TABLE I

Serum Folic Acid in mg/ml.	Group 1		Group 2			
	Control Cases		Group 2-A		Group 2-B	
	No.	%	No.	%	No.	%
0-1	—	—	2	5.8	7	28.0
1.1-2.0	—	—	6	17.1	8	32.0
2.1-3.0	—	—	13	37.2	6	24.0
3.1-4.0	—	—	8	22.8	4	16.0
4.1-5.0	—	—	6	17.1	—	—
5.1-6.0	9	18.0	—	—	—	—
6.1-7.0	22	44.0	—	—	—	—
7.1-8.0	15	30.0	—	—	—	—
8.0 & above	4	8.0	—	—	—	—
Mean	6.25 ng/ml.		3.04 ng/ml		1.76 ng/ml	
Range	5.1-9.4 ng/ml		0.91-4.21 ng/ml		0.62-3.4 ng/ml	

The mean serum folic acid level in control group was 6.25 ng/ml with a range of 5.1 ng to 9.4 ng/ml while in study group mean serum level was 3.04 ng/ml with a range of 0.91 to 3.21 ng/ml in pre-eclampsia and 1.76 ng/ml with a range of 0.62 to 3.4 ng/ml in eclampsia. It was less than 3 ng/ml in 60.0% (21 cases) of pre-eclampsia and 84% (21 cases) of eclampsia. More than 3 ng/ml of serum folic acid was seen in 14 cases (40%) of pre-eclampsia and 4 cases (16%) of eclampsia.

Discussion

The demand of folic acid increases multifold during pregnancy which results in decrease in its serum level. It is also established that estrogen has definitely a promotive proliferative action at end organs, especialy uterus and mammary gland (Klin and Dorfman, 1951; Silver, 1954). Coyle and Brown (1963) had shown that lower excretion of estrogen had direct relationship with lower foetal weight. An association between reduced urinary oestrogen excretion with low serum folic acid activity in pregnancy has been reported by Martin and Land (1964).

In the present study there is significant reduction of serum folic acid level (less than 3 ng/ml) in 21 cases (60%) of pre-eclampsia and 21 cases (84%) of eclampsia. This clearly signifies that serum folic acid is lowered as the disease clinically advances. Thus, the lowered serum folic acid level below the critical level (3 ng/ml) in Indian pregnant women causing the decreased oestrogen level, has adverse effect on tissue proliferation resulting in poor implantation and placentation. Low oestrogen level also affects the placental circulation resulting in toxaemia of pregnancy and in more severe form in eclampsia cases.

A study of large number of cases from different parts of the country is required for further exploration of this possible etiological factor.

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