ESTIMATION OF MATERNAL SERUM ALPHA FETO PROTEIN LEVELS IN TOXAEMIA OF PREGNANCY

By

SAROJ SINGH, ABHILASHA GUPTA, BEENA VERMA AND KUSUM GUPTA

SUMMARY

A total of 80 cases were studied for estimation of Alpha Feto Protein in maternal serum using M-partigen Immuno Diffusion Plates. Out of them 50 cases were of Toxaemia of Pregnancy, 30 were of normal pregnancy 10 in each trimester of pregnancy. In normal pregnancy Alpha Feto Protein Levels were 83.9 ± 36.3 mg/ml, 226.6 ± 17.89 mg/ml and 382 ± 95.55 mg/ml in 1st, 2nd and 3rd trimester respectively being maximum at 32 weeks of gestation. In pre-eclampsia levels were 155 ± 49.2 mg/ml and 169.12 ± 104.05 mg/ml in 2nd and 3rd trimester while they were 148.0 ± 59.39 mg/ml in 2nd trimester and 98.2 ± 48.96 mg/ml in 3rd trimester in cases of eclampsia. The difference between Alpha Feto Protein levels in normal pregnancy and toxaemia of pregnancy was highly significant.

Introduction

The ultimate goal of modern Obstetrics is to provide healthy baby and healthy mother as the outcome of pregnancy. Toxaemia is still an important factor contributing to maternal and perinatal morbidity and mortality. Its early detection and timely management is the most important step to overcome this Obstacle.

Since the advent of a feto protein, an embryo specific protein by Citlin and Boesman (1956) it has been studied in various types of abnormal pregnancy. The presence of abnormal levels of this embryo, specific protein might form a basis for rapid screening test which will predict toxaemia ef pregnancy in early stage. Seppala (1975) noted low levels of Alpha Feto Protein in Toxaemia of Pregnancy while Walter in 1985 reported raised levels of a Feto Protein in severe proteinuric eclampsia. Because of this controversy it was decided to carry-out the present study for estimation of serum alphafeto protein levels in toxaemia of pregnancy.

From: Department of Obstetrics and Gynaecology, S.N. Medical College, Agra.

Accepted for publication on 5-10-87.

Material and Methods

A total of 80 ante-natal cases were selected and studied in two groups:

(A) Control group.

(B) Study group—(i) Pre-eclamptic group (ii) Eclamptic group.

Control group comprised of 30 healthy

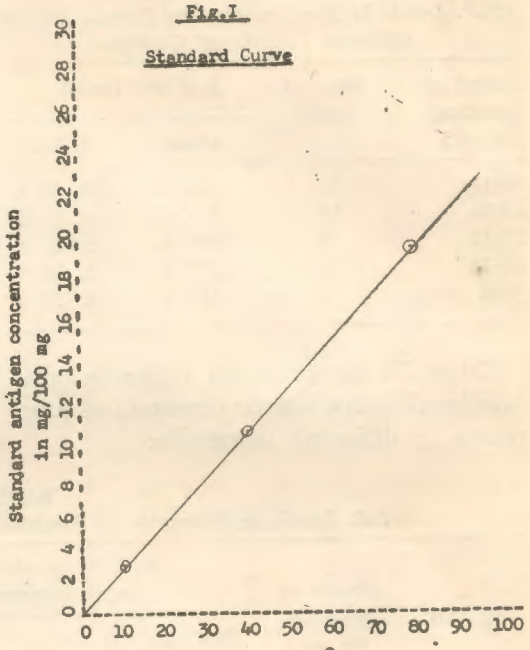
pregnant females, 10 in each 1st, 2nd and 3rd trimester of pregnancy.

Study group included 50 patients of toxaemia of pregnancy. Out of them 28 cases were of pre-eclampsia and 22 were of eclampsia.

After detailed history, clinical examination and routine investigation for toxaemia of pregnancy, blood samples were collected in dry plain sterilized vials for estimation of serum alpha feto protein levels. Serum was separated and quantitative immunological assay of alpha feto protein was performed by "Single radial immuno diffusion method" using N-partigen alpha fetoprotein immuno diffusion plates manufactured by M/s. Behring Worckey (antisera of alpha feto protein in agar gel). These A.F.P. standard K No. 7, was used in three dilutions to get a reference curve. .005 ml of each of these dilution were applied on wells on the plates. Remaining wells filled with the same amount of test serum. These were kept on room temperature for 2 days. Precipiten ring formed were measured within .1 mm. Standard curve was plotted as square diameter of precipiten ring against standard concentration of antigen in mg/100 mg. Concentration of A.F.P. was directly read from this curve (Fig. 1).

Fig. 1

Standard Curve



I - Undiluted standard serum 22 mg/100 ml

II- 1:2 dil. of standard serum i.e. 11 mg/100 ml

III- 1:4 dil. of standard serum i.e. 5 mg/100 ml.

Observation

Table I shows distribution of cases in various group according to period of gestation.

In study group there is no patient in first trimester as this disease occurs after 1st trimester. Maximum number of patients were of 33-38 weeks of gestation, 16 and 10 respectively of pre-eclampsia and eclampsia.

TABLE I

Distribution of Cases in Various Groups According to Period of Gestation

Period of gestation (in wk)	Control group	Study group		
			Pre-eclampsia	Eclampsia
6-12	10		—	—
13-24	10		2	2
25-32	3		3	10
33-38	4	10	16	10
>38 weeks	3		7	—

Table II shows A.F.P. levels at different weeks of getsation. Table shows raising levels of A.F.P. from 12 weeks and maximum at 38 weeks.

TABLE II

A.F.P. Levels in Pregnant Healthy Female During Different Periods of Gestation

Period of gestation (in wk)	No. of cases	A.F.P. Levels	
		Mean	S.D.
6-12	10	83.9	± 36.1
13-24	10	226.6	± 17.89
25-32	3	456.6	±146.9
33-38	4	377.5	± 49.9
>38 weeks	3	313.3	± 20.6

Table III shows serum alpha fetoprotein levels were low in toxaemia of pregnancy in different trimesters.

($p < .01$). Difference between eclampsia and pre-eclampsia was significant ($p < .05$) ($t = .2776$).

Discussion

Toxaemia of pregnancy is a disease known since antiquity and has been throughly and extensively studied. During last two years there has been a revolutional change in the understanding of its aetiopathogenesis.

In the present study, A.F.P. was estimated by single radio immuno diffusion technique using M-partigen immuno diffusion A.F.P. plates. A.F.P. was first detected at 8 weeks of pregnancy in healthy pregnant female. It was found that A.F.P. levels initially rose at 8 weeks of gestation and later declined thus it can be used for diagnosis of normal pregnancy and duration of pregnancy. In present series mean A.F.P. levels were 83.9 ± 36.13 mg/ml in first trimester, 226.6 ± 17.89 mg/ml in 2nd trimester and 456 ± 146.4 mg/ml in 3rd trimester were 590 mg/ml at 32 weeks of gestation. After 32 weeks levels showed a fall till term.

Maternal serum A.F.P. levels were lower in cases of eclampsia and pre-eclampsia. In eclampsia mean A.F.P. levels were 148 ± 39 mg/ml in 2nd tri-

TABLE III

A.F.P. Levels in Toxaemia of Pregnancy Accor ing to the Period of Gestation

Sl. No.	Period of gestation (in wk)	A.F.P. levels in mg/ml eclampsia			A.F.P. levels in pre-eclampsia mg/ml		
		No. of pt.	Mean	S.D.	No. of pt.	Mean	S.D.
1.	13-24	2	148.2	59.39	2	219.2	155
2.	25-30	10	122.2	92.39	3	130	240
3.	33-38	10	74.0	103.83	16	140.10	166.13
4.	>38	—	—	—	7	97.63	157

Table IV shows difference of A.F.P. levels in normal healthy pregnancy and toxaemia of pregnancy. The difference between normal pregnancies and eclampsia was highly significant ($t = 3.7414$)

TABLE IV

Comparison of Mean A.F.P. Levels in Normal Pregnancy Pre-eclampsia and Eclampsia

Group		A.F.P. levels in mg/ml	
Group A	Normal pregnancy	230	± 136.63
Group B	Toxaemia of pregnancy		
	C^1-Eclampsia	102.72 ±	96.12
	C^2-Preeclampsia	168	± 108.71

mester and 98.2 ± 95 mg/ml in 3rd trimester.

In pre-eclampsia mean alpha feto protein levels were 155 ± 49.2 mg/ml in 2nd trimester and 169.12 ± 104.01 in 3rd trimester. Difference between A.F.P. levels in eclampsia and pre-eclampsia was insignificant in 2nd trimester ($p > .05$) and significant in 3rd trimester ($p < .05$). Mean A.F.P. levels were maximum between 13-24 weeks of pregnancy in eclampsia and 25-32 weeks in pre-eclampsia. Difference between the mean A.F.P. in normal pregnancy cases and eclampsia was highly significant ($p < .01$). Difference between normal and pre-eclampsia was significant ($p < .05$). The peak of A.F.P. levels was attained eariler in eclampsia cases as compared to normal pregnancy as well as cases of pre-eclampsia. The levels goes on decreasing after 38 weeks of pregnancy in normal pregnancy and cases of pre-eclampsia and after 24 weeks of pregnancy in eclampsia (Table III).

Seppala (1975) measured A.F.P. levels in normal and toxaemia of pregnancy. Lower levels in cases of toxaemia of pregnancy can be explained by decreased uteroplacental circulation in toxaemia of pregnancy.

Rodeek *et al* (1976) worked on Maternal Serum A.F.P. and also found lower levels of A.F.P. in toxaemia of pregnancy.

Agarwal included a few cases of toxaemia of pregnancy also noted the lower levels in toxaemia of pregnancy.

Thus lower maternal serum alpha feto protein levels in toxaemia of pregnancy has opened up many avenues of research. The estimation of A.F.P. may be helpful in the diagnosis and management of toxaemia of pregnancy in the early stage.

References

1. Watler, B. N.: J. Obstet. Gynec. 1985.
2. Citlin, D. and Boesman, M.: J. Clin. Invest. 45: 1826, 1966.
3. Rodeek, C. H., Campbell and Biswas, S.: Brit. J. Obstet. Gynec. 83: 24, 1976.
4. Seppala, M.: J. Obstet. Gynec. 12: 613, 1973.