

MATERNAL SERUM ALPHA FOETOPROTEIN LEVELS IN NORMAL PREGNANCY AND VARIOUS TYPES OF ABORTIONS

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SUMMARY

Maternal serum AFP was estimated in 18 cases of Normal pregnancy and 36 cases of various types of abortions and vesicular mole. In normal pregnancy AFP started rising from 8th week of pregnancy, reached highest level between 28-30 weeks and then declined gradually till term. In threatened abortion there was no rise of AFP in first trimester but it was significantly raised in 2nd trimester while the levels were almost double of the usual pregnant level in cases of inevitable abortion even in 1st trimester. Hence, elevated AFP level in the trimester is more indicative of inevitable abortion while elevated 2nd trimester AFP level may be indicative of both threatened as well as inevitable abortion. In case of complete abortion AFP was significantly raised. In cases of habitual abortion it was raised where the cause was foetal in origin and not incompetent cervical os. In cases of missed abortion and vesicular mole AFP level was that of non-pregnant level because AFP is of foetal origin. About 90% of women showing aberrantly high or low AFP levels eventually aborted.

INTRODUCTION

Alpha foetoprotein (AFP) is an embryonic alpha structurally similar to albumin and specific to the foetus. It is the first major protein component to appear in foetal serum levels have been evaluated in foetal serum, amniotic fluid and in maternal serum. The concentration gradient ranges from mg/ml in foetus to micro g/ml in amniotic fluid to ng/ml in maternal serum.

In foetus its concentration is low during first 10 wks of gestation rises to highest level from about 10th to 20th week and decreases thereafter. These changes could arise either from difference in the total amount of foetal protein synthesised or from a disproportionate rate of the foetal growth in relation to relative increase of the synthesis of alpha globulin. However, AFP definitely appears to be concerned with the growth of embryo. We in this study have estimated the level of AFP in maternal serum in various types of abortions.

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MATERIAL AND METHOD

Subjects included 18 cases of normal pregnancy in whom there was no history of preeclampsia, diabetes, multiple pregnancy or delivery of a baby with congenital anomalies in previous pregnancy and in present pregnancy also there was no evidence of abortion preeclampsia, multiple pregnancy foetal distress and IUD. These 18 cases were taken as controls. The study group included 36 patients who gave history suggestive of threatened, inevitable, complete, habitual, missed abortion or vesicular mole. The diagnosis was confirmed clinically and if needed by ultrasound. Necessary investigations were done.

Quantitative immunological determination of AFP by means of a single radial immunodiffusion was done with the help of a reference curve plotted by using AFP standard curve, M-partigen immunodiffusion plates which contain monospecific antiserum to the plasma protein (AFP) in an agar gel layer were used. Technique used was that of Mancini (1985).

OBSERVATION & DISCUSSION

Mean age of patient in control and study groups was 27.3 and 28.2 years respectively.

15% of the cases were primigravida and 85% were multigravida. Seppala and Rouslahiti (1973, a) and Getlin (1975) have also reported similar findings.

AFP level in maternal serum started rising from 8th week onwards upto 30 weeks pregnancy after which it declined slowly till term (Table II). According to Garoff and Seppala (1973), Ishiguro (1973), Wald et al (1975), Brock (1976), Getlin (1975) the origin and regulation of AFP depends on the rate of synthesis and catabolism of AFP by the foetus, change in the permeability of foetomaternal barrier, the volume of body fluids, disturbance in the circulation of body fluids and foetomaternal transfusion. Fall of AFP during last week of pregnancy is due to its acceleration of degradation during this period (Massey et al, 1975).

AFP level in inevitable abortion in 1st trimester is significantly higher than normal pregnancy ($P < 0.001$). In 2nd trimester it is significantly higher in both threatened as well as inevitable abortion (Threatened $P < 0.05$, Inevitable $P < 0.001$). But AFP level in threatened abortion in 1st trimester was not significantly different from normal pregnancy (Table IV). Our findings are in conformity with those of Seppala and Rouslahiti (1972)

TABLE I

Showing Ring Diameter in different dilutions of standard (Human) and AFP concentration in these dilutions

Well No.	Standard dilution	Ring diam. in mm.	Ring diam. in mm ²	AFP ng/ml
1	2:4	1.6	2.8	50
2	1:2	4.0	16.0	500
3	1:1	5.6	31.8	1050

TABLE II

Showing maternal serum AFP concentration in normal pregnancy

Period of gestation	No. of patients	AFP level ng/ml Range	Mean	S.D. \pm
6-12	3	75.2-95.6	81.2	10.2
13-18	3	158.2-210.9	163.2	36.8
19-24	3	175.1-210.6	195.5	14.7
25-30	3	248.0-390.4	306.2	61.6
31-36	3	239.4-325.1	271.2	38.0
37-40	3	230.7-259.3	246.3	11.8

Cowchock et al, (1976). Thereafter, it is clear that elevated maternal serum AFP level in the 1st trimester is more indicative of inevitable abortion whereas elevated 2nd trimester AFP level may indicate both threatened as well as inevitable abortions.

AFP level in complete and habitual abortion both is significantly higher in 1st as well as in 2nd trimester (Table V). Seppala (1972 a) and Kjessler et al, (1977) pointed out that women with cervical incompetence often experience habitual abortion during the 2nd trimester and that AFP determination in these

women before the encirclage operation, as well as subsequent to it may distinguish between foetal maternal causes of abortions. Those cases of habitual abortion where an increase in maternal serum AFP was observed were more likely to be due to foetal cause rather than cervical incompetence. Out of 4 cases of habitual abortion there was only one case of cervical incompetence in our study.

AFP levels in missed abortion and vesicular mole were significantly lower as compared to normal pregnancy. Urine for preg-

TABLE III

Showing AFP level ng/ml in different types of abortions according to various gestational age groups

Period of gestation	Threatened abortion		Inevitable abortion		Complete abortion		Habitual abortion		Missed abortion		Vesicular Mole	
	No. of	AFP	No. of	AFP	No. of	AFP	No. of	AFP	No. of	AFP	No. of	AFP
6-12	5	72.8-95.6	5	131.8-152.4	-	-	-	-	-	220.0-28.0	-	-
13-18	4	230.6-256.2	4	340.2-380.9	2	416.6-427.6	2	235.3-257.0	2	62.6-69.4	2	23.5-39.5
19-24	-	-	-	-	3	422.9-482.2	2	285.0-298.9	-	-	3	23.3-29.3

TABLE IV

Showing AFP levels in normal pregnancy, Threatened abortion and Inevitable abortion

Period of Gestation in weeks	GP of patientxs	no. of Patients	AFP level ng/ml and	Mean	S.D. \pm
6-12	Normal pregnancy	3	75.2-95.6	81.2	10.2
	Threatened abortion	5	72.8-95.6	85.13	5.5
	Inevitable abortion	5	131.8-152.4	141.6	7.3
13-18	Normal pregnancy	3	158.2-210.9	163.2	36.8
	Threatened abortion	4	230.6-256.2	242.7	10.3
	Inevitable abortion	4	340.2-380.9	360.6	14.3

nancy test was done. It was negative in missed abortion and positive upto higher dilutions in cases of vesicular mole. Non-pregnant levels of AFP with the simultaneous presence of increased H.C.G. level would be diagnostic of vesicular mole.

Lidbjork et al (1977 b,c.), have demon-

strated that there is strong correlation between aberrantly high or low AFP levels and impending abortions. Among those who exhibited abnormal AFP levels more than 90% aborted eventually. We have also observed the same trend in our study.

TABLE V

Showing AFP levels in normal pregnancy, complete abortion a habitual abortion

Period of Gestation in weeks	GPs of patientxs	No. of Patients	AFP level ng/ml and	Mean	S.D. \pm
13-18	Normal pregnancy	3	158.2-210.9	163.2	36.8
	Complete Abortion	2	416.6-427.6	422.6	5.5
	Habitual Abortion	2	235.3-257.0	246.3	10.8
19-24	Normal Pregnancy	2	175.1-210.6	195.5	14.7
	Complete Abortion	3	422.4-482.2	455.1	24.1
	Habitual Abortion	2	285.0-298.4	292.1	6.7

TABLE VI

Showing Maternal Serum AFP level in normal pregnancy, Missed Abortion and Vesicular Mole

Period of Gestation in weeks	GP of patients	no. of Patients	AFP level ng/ml and	Mean	S.D. \pm
Normal Pregnancy		3	75.2-95.6	81.2	10.2
6-12 Missed Abortion		4	24.0-28.0	26.0	2.2
Normal Pregnancy		3	158.2-210.9	163.2	36.8
13-18 Missed Abortion		2	62.0-69.4	66.0	3.3
Vesicular Mole 2		23.5-34.5	30.0	4.5	
Normal Pregnancy		3	175.1-210.6	195.5	14.7
19-24 Vesicular Mole		3	23.3-29.3	26.6	2.46

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