

MATERNAL SERUM ALPHA FOETO PROTEIN LEVELS AND ABORTION

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SUMMARY

Maternal Serum Alpha Foeto Protein was estimated in 33 normal pregnant women and 63 cases of different types of abortions between 8 to 20 weeks of gestation. All the females were of known LMP and were having regular menstrual cycle before conception. In normal pregnancy MS AFP levels started rising from 8 weeks onward. In inevitable and threatened abortion MS AFP levels were found to be significantly raised at all weeks of gestation from 8 to 20 weeks ($p < .001$) as compared to normal pregnant females. On serial estimation of MS AFP, it was found that in threatened abortion patients as the bleeding stopped and pregnancy continued MS AFP levels declined. Where as when threatened abortion became inevitable rising titre of serum AFP was seen. Thus serial MS AFP levels in cases of threatened abortion could predict the outcome of threatened abortion. In cases of missed abortion MS AFP levels were found to be lower than levels in normal pregnant females of corresponding gestational age ($p < .01$).

INTRODUCTION

Alpha Foeto Protein is an embryonic alpha globulin which is structurally similar to albumin and it is specific to the foetus. It is the first major protein component to appear in foetal serum. In foetus, AFP production starts in yolk sac at 4-8 weeks of gestation. As yolk sac degenerates at 11.5 weeks, liver takes over the function of AFP

production. Foetal serum AFP starts rising from 6th week and reaches a peak level at 14 weeks after this it gradually falls till birth. The production of AFP by fetal liver continues to increase actually up to 20 weeks and thereafter remains constant up to 32 weeks, but this decrease in foetal serum AFP concentration is due to disproportionately large increase in fetal growth and volume of tissues. After 32 weeks, the production by liver falls sharply and fetal serum AFP

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concentration also falls rapidly (Getlin and Boerman 1966). At peak of fetal serum concentration (14 weeks), AFP levels in maternal serum are only slightly raised above normal adult non-pregnant levels (2-16ng/ml, Seppala and Ruoslahiti 1972). MS AFP level peaks at 32 weeks and then it drops slightly before term. AFP is transferred from foetus to mother. The transfer is mainly due to increased placental permeability. AFP can also be transferred from foetus to mother via amniotic fluid, this accounts for only 6% of total AFP. Thus AFP can also be detected in amniotic fluid (Getlin 1975).

In clinical practice bleeding in early pregnancy ending into different types of abortion is a major problem. It has been suggested that MS AFP levels reflect foetal well being and could be used to predict foetal outcome. The present study was carried out to find out the utility of MS AFP levels as diagnostic and prognostic marker for threatened, inevitable and missed abortions.

MATERIAL AND METHODS

96 patients of known LMP and regular menstrual period prior to conception were taken up for the study. These included 33 normal pregnant women of 8 to 20 weeks gestation as controls. In these controls there was no history of preeclampsia, diabetes, multiple pregnancy, or delivery of a baby with congenital anomalies in previous pregnancies and in present pregnancy. There was no evidence of abortion in any one of these 33 normal woman. Rest of 63 patients were of different types of abortions between the gestational age of 8-20 weeks. Their diagnosis was confirmed clinically and if needed by Ultra sound. Necessary investigations were done. 5 ml of venous blood from each patient was taken and was kept at room temperature for 4-12 hrs. to separate the serum. The tubes were then centrifuged at 3000 RPM for 10 minutes and the separated serum was stored at - 70°C in sterile tubes, containing a crystal of sodium azide. Maternal serum AFP was determined by ELISA technique. Enzygnost AFP kit was purchased

from Behring Werke AG Marburg, West Germany for detection of MS AFP levels. The results are given in I.U./ml. One I.U. of AFP was equivalent to 1.5mg.

OBSERVATION AND RESULTS

There was no significant difference in the age distribution of patients in normal and different types of abortion groups. Maximum number of patients in each category were in the age range of 21-25 years. Maternal serum AFP levels increased gradually from 8th to 20 weeks of gestations in normal pregnant women. (Table I).

Maternal serum AFP levels in threatened abortion (n=35) irrespective of their outcome, and in inevitable abortion (n=16) were found to be significantly elevated at all weeks of gestation (from 8 to 20 weeks) as compared to normal pregnant females of corresponding gestational age, ($p < .001$ in both groups). On the other hand MS AFP levels were significantly low as compared to normal pregnant females in cases of missed abortions (n=12) ($p < .01$). All the values were below .5xmedian (Table I). Our finding of elevated maternal serum AFP levels in threatened and inevitable abortion are similar to those of Seppala and Ruoslahiti (1972), Cowchock (1978 & 1976) and Sharma et al (1984).

FOLLOW UP OF THREATENED ABORTION PATIENTS

In our threatened abortion group (n=35) 18 patients aborted within 24 hours, 7 patients became inevitable within a week and ultimately aborted and in 10 patients pregnancy continued till term. We did not find any significant difference in initial values of AFP in patients with threatened abortion and inevitable abortion.

MS AFP levels in first samples from patients with threatened abortion which became inevitable (n=18) and those who presented with inevitable abortion (n=16), were higher than +2SD of the mean value for that gestational age in normal pregnant females.

In 7 cases of threatened abortion where abor-

TABLE I
Mean maternal serum AFP levels in patients
with abortion and normal controls.

Period of gestation	Normal pregnancy		Threatened abortion		Inevitable abortion		Missed abortion	
	n=33		n=35		n=16		n=12	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
	iu/ml		iu/ml		iu/ml		iu/ml	
8 weeks	2.57	±0.83	-	-	5.84	±1.15	1.79	±.12
10 weeks	5.69	-			14.42	±3.16		
12 weeks	10.98	±4.79	34.06	±0.22	22.94	±1.63	3.66	±1.67
14 weeks	16.98	±4.9	22.74	±2.46	32.06	±2.87	3.27	
16 weeks	12.88	±2.22	30.14	±2.16	32.10	±6.35	7.54	±3.03
18 weeks	17.76	±3.20	37.71		29.43	±6.95		
20 weeks	24.51	±2.62	30.73		45.63	±3.44	15.27	

TABLE II
Serial maternal serum AFP levels in patients
of threatened abortion which became inevitable

Initials	Weeks of gestation	Maternal serum AFP levels		Normal AFP	Mean + 2SD		
		Sample				Sample	Levels range
		I	II				
1. A.S.	10 weeks	10.699	14.463	5.692	-		
2. R.K.	14 weeks	33.380	33.677	10.501-24.353	26.789		
3. V.V.	14 weeks	33.323	34.463	10.501-24.353	26.789		
4. M.S.	16 weeks	34.859	39.014	14.647-20.665	22.329		
5. S.J.	16 weeks	21.387	36.027	14.647-20.665	22.329		
6. R.K.V.	18 weeks	21.338	36.697	13.380-25.825	24.162		
7. S.M.	18 weeks	20.176	42.387	13.380-25.825	24.162		

TABLE III
AFP levels in serial samples from patients
with threatened abortion who continued

TO TERM

Serial No.	Initials	Week of Gestation	Maternal (Levels) (Iu/ml)	Serum Sample 1	Serum Sample 2	AFP Sample 3	Mean + SD Level of controls
1.	V.S.	12 weeks	33.968	23.697	12.183	20.565	
2.	R.S.	14 weeks	19.119	8.450	-	26.789	
3.	B.	14 weeks	24.014	5.589	-	26.789	
4.	U.K.	14 weeks	23.380	22.112	11.161	26.789	
5.	S.D.	16 weeks	27.460	20.051	-	22.329	

tion became inevitable within a week after admission to the hospital, the levels of maternal serum AFP, showed a further rise in IInd serum sample as compared to Ist serum sample (Table II).

In 10 cases of threatened abortion bleeding stopped during the hospital stay. Out of these 5 patients could be followed till term. Two cases had growth retarded babies also. MS AFP levels returned to normal for corresponding gestational age. However, it took one week after the stoppage of bleeding for the values to come down (Table III). Thus serial AFP estimation in cases of threatened abortion could predict the outcome of threatened abortion.

Higher level of MS AFP in patients with threatened abortion may be due to a small leak of foetal blood into maternal circulation. As the foetal serum concentration is highest during 2nd trimester of pregnancy, even a very small leak of foetal serum (less than 100 μ L) into maternal serum can elevate the maternal serum AFP

levels considerably. This may be brought about by disruption of placenta which may be the primary event in cases of spontaneous abortion. In missed abortion perhaps early foetal death prevents the increase in foetal AFP levels.

CONCLUSION

MS AFP levels in cases of bleeding per vaginum in early pregnancy can differentiate in different types of abortion and serial estimation of MS AFP in threatened abortion may turn out to be a good predictor to know the outcome of threatened abortion.

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