ESTIMATION OF MUCOPROTEIN IN SERUM AND AMNIOTIC FLUID IN NORMAL PREGNANCY AND TOXAEMIA OF PREGNANCY

by

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Amniotic fluid has been considered as a dialysate of maternal and fetal plasma, its biochemical variations reflect on the protein constituents during pregnancy in normal and abnormal conditions. Various workers have reported on urea/creatinine and fetoproteins, but so far little attention was paid to mucoprotein constituents of amniotic fluid, inspite of the fact that mucoprotein level increases during pathological conditions of the body. The present study was conducted with the aim to detect level of mucoprotein in normal healthy females, in normal pregnancy and toxaemia of pregnancy and to find correlation of levels of mucoprotein to the severity of toxaemia and conditions of baby.

Material and Methods

The present study was conducted at Associated Group of Hospitals, Bikaner. Mucoprotein contents of serum and amniotic fluid was estimated by Varley's method (1969) in 100 cases. Patients were divided into 4 groups:

Group I: Non-pregnant group of 20 cases, served as control.

Group II: Normal pregnancy of II trimester—20 cases.

Group III: Normal pregnancy of III trimester—20 cases.

Group IV: A. Mild toxaemia—20 cases.
B. Severe toxaemia—20 cases.

In all cases, detailed clinical history and systemic examination was done. L.M.P., B.P. and height of uterus were noted. Group I, II and III were normotensive and free from any medical disease. Group IV was divided into mild/severe toxaemia of pregnancy according to classifications of American Committee of Maternal Welfare. Routine investigations like haemoglobin and urine for albumin and sugar were done in all cases. Special investigations like blood urea, uric acid, serum creatinine and fundoscopy were done in toxaemic group.

Weight, length and Apgar scoring of fetus was noted. In all cases, weight of placenta was taken.

Collection of Material

Taking aseptic precautions, 5 ml of venous blood was collected in Group I, while 5 ml of venous blood and 5 ml of amniotic fluid (collected by aminocentesis in Group II by A.R.M. or by spontaneous rupture of membranes in Groups III and IV) were collected. Mucoproteins were

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estimated on the same day by Varley's method (1969).

Observations

In the present study, it was observed that 45% of overall series and 65% of toxaemic group were of 21-25 years of age and 40% in toxaemic group and 26% in overall series were primiparas.

In Groups I, II and III, diastolic B.P. was 70 to 80 mm of Hg., while in toxaemic group, it varied from 90 to 170 mm of Hg. 40% of pre-eclamptics were having diastolic B.P. of 110 mm of Hg and 10% were having above 110 mm of Hg. The haemoglobin concentration in all patients was between 8 to 10 gm%.

Oedema was evident in seven cases of severe toxaemia, out of which six had eclampsia. Patient who had eclampsia, had massive albuminurea, raised level of blood urea, uric acid and creatinine and changes in fundus.

Discussion

The serum mucoprotein in control group of 20 cases, as observed in present series was between 70.4 mg to 112.2 mg/100 ml of blood and its mean was 85.19 ± 12.98 mg/100 ml (Table I) which was less than observed in Group II proved statistically significant.

The serum mucoprotein in normal II trimester pregnancy was between 78.1 to 148.5 mg% with mean of 108.18 ± 19.08 mg/100 ml of blood, while in III trimester pregnancy it was between 147.87 ± 26.71 mg per 100 ml (Table I). These findings are in accordance with Nir *et al* (1963). Amniotic mucoprotein in III trimester pregnancy was 145.2 to 234.2 mg/100 ml, mean 188.03 ± 24.73 mg/100 ml of blood (Table I). The raised levels in Group III in comparison to Group IV were statistically significant.

In toxaemia, amniotic and serum mucoprotein was between 217.8 to 405.9 mg/100 ml, mean of 319 ± 60.04 mg/100 ml and 160.6 to 231 mg/100 ml, mean 186.92 ± 21.24 (Table I). Mukherjee and Sinha (1973) reported similar findings. The serum and serum fluid mucoprotein in severe toxaemia was 197.97 ± 23.90 to 368 ± 58.41 mg/100 ml was quite higher as compared with mild toxaemia (195.94 ± 19.53 mg/100 ml to 271.37 ± 64.47 mg/100 ml) (Table II). These findings are in accordance with the findings of Dutta (1977).

The cause of raised mucoprotein in pre-eclampsia is immunological stress (Winzler, 1948), due to tissue proliferation (Shetler, 1953) or due to obstetric

TABLE I

Serum and Amniotic Mucoproteins Levels (in mg/100 ml) in Various Groups

Group	No. of cases	Serum mucoproteins			Amniotic mucoproteins		
		Mean	S.D.	S.E.	Mean	S.D.	S.E.
I	20	85.19	12.98	2.90	—	—	—
II	20	108.18	19.08	4.26	149.66	16.69	3.73
III	20	147.87	26.71	5.97	188.03	24.73	5.53
IV	40	186.92	21.24	4.75	319.75	60.04	13.43
B—Severe toxemia	20	175.94	19.53	—	271.37	64.47	—
A—Mild toxemia	20	197.97	23.90	—	368.04	58.51	—

stress (Good *et al*, 1974), due to occult meconeum in amniotic fluid or meconeum itself, which is due to fetal hypoxia (Mukherjee and Sinha, 1973) resulting placental insufficiency (Browns and Veall, 1953).

The serum and amniotic mucoprotein in severe toxaemia are significant at the level of 0.5 and 0.001%. This indicates that the mucoprotein level varies with the severity of toxaemia and a simple test of serum and amniotic fluid mucoprotein estimation may be an indicator of severity of toxaemia. The mean birth weight and the mean Apgar score as observed in the present study are lowered in babies of toxaemia group than in babies of normal pregnant mothers (Table II). This can be explained by theory of placental insufficiency (Browns and Veall, 1953). The lowering of these indices of fetal well-being are in direct relation to severity of toxaemia. At the same time, the mucoprotein values in serum and amniotic fluid were seen raised in direct proportion to the severity of toxaemia. This valuable observation may give a conclusion that serum and amniotic fluid mucoprotein may be an indication of severity of toxaemia and fetal well-being in toxaemic mothers.

Summary

The present study has been undertaken in normal and in toxaemia of pregnancy cases by estimating serum and amniotic fluid mucoprotein level (in 100 cases). The mucoprotein levels were higher in toxaemic group in comparison to normal pregnancy of II and III trimester. Increased level of mucoprotein and lowered mean birth weight, Apgar score in relation to severity concludes that mucoprotein level has reverse correlation with upgar score and birth weight and direct correlationship with severity of toxaemia.

TABLE II

Mean Level of Mucoprotein in Serum/Amniotic Fluid With Condition of Foetus in Normal and Toxaemic Groups

Group	No. of cases	Apgar score	Birth wt. in Kg.	Placental wt. in lbs.	Serum mucoprotein (mg/100 ml)	Amniotic mucoprotein (mg/100 ml)
III IV B—Severe pre-eclampsia	20	9.2/10	2.66	490.00	175.54	271.54
A—Mild pre-eclampsia	20	6.7/10	2.307	460.00	197.91	368.04

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