AMNIOTIC FLUID MUCOPROTEINS IN NORMAL AND TOXAEMIC PREGNANCY IN RELATION TO FETAL OUTCOME

by

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Introduction

Although estimation of amniotic fluid estriol has been claimed to be an accurate guide of fetal well being in pre-eclamptic toxaemia, but this estimation is beyond the scope of most of the hospitals particularly in developing countries. The protein of the liquor amnii has been investigated by a number of authors in normal and complicated pregnancies, the variation in the mucoprotein content has received scant attention. Mucoproteins are protein-carbohydrate complex and have a hexosamine content of over four per cent. The mucoprotein was originally isolated from blood serum but it is widely distributed in the cellular tissue of the body and characterized by its solubility in certain protein precipitant like perchloric acid, sulphosalicyclic acid any by heat. Bevis (1953) reported that besides albumin and globulin the amniotic fluid contains moderate amount of mucoprotein also.

Keeping in view the limited available literature on the study of mucoprotein level in liquor amnii, the present work has been undertaken in cases of normal pregnancy pre-eclamptic toxaemia, and eclampsia in order to assess the fetal status correlating with the severity of toxaemia and the mucoprotein content of amniotic fluid.

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Material and Methods

The study consists of 108 cases admitted to Government Medical College hospital Nagpur between February 1977 to May 1978.

After taking the detailed history and clinical examination, necessary investigations were carried out. These cases were divided into 4 groups.

GROUP I (Normal pregnancy) (51 cases)—

B.P. 120/80 m.m. of Hg without any systemic disease, 26 samples of clear liquor and 25 samples of meconium stained liquor obtained.

GROUP II (Mild and Moderate P.E.T.). In this group blood pressure ranged between 120/80 to 160/110 mm of Hg with edema and/or albuminuria (27 cases), liquor was clear in 12 cases and meconium stained in 15 cases.

GROUP III (Severe P.E.T.). Blood pressure above 160/110 mm of Hg (25 cases) with marked edema and/or protinuria,—liquor was clear in 12 patients and was meconium stained in 13 cases.

GROUP IV (Eclampsia). Five cases were studied. All had meconium in liquor.

With aseptic precaution amniotic fluid was collected either by amniotomy during active stage of cervical dilatation or at caesarean section in a sterile bottle and colour was noted.

After delivery apgar score and birth weight of new born were recorded.

Estimation of mucoprotein was done by the method described by Winzler and Vastey (1967).

Observations and Results

Observations of present study are given in the following Tables.

As seen from the Table clear liquor in toxaemic patient showed higher levels of mucoproteins compared to normal cases. Further, mean mucoprotein content of meconium stained liquor was more than that of clear liquor in all groups of cases.

Table III shows that there is negative correlation between apgar score of newborn babies and mucoprotein levels in clear samples and there was no correlation between mean Apgar score and mucoprotein level in cases with meconium stained liquor. Mean birth weight of newborn babies was found to be lower in mild and moderate P.E.T. as well as in severe P.E.T. as compared to normal pregnancy and there is negative correlation between mucoprotein levels and mean birth weight in clear liquor series. No correlation was observed between mean

TABLE I

Mucoprotein Levels in Normal Pregnancy and Different Degrees of Toxaemia

S. No.	Group of Cases	No. of Cases	Mean Mucoprotein in mgm%
1.	Normal preg.	51 (47.22%)	185.02
2.	Mild and Mod. P.E.T.	27 (25%)	238.46
3.	Severe P.E.T.	25 (23.98%)	390.06
4.	Eclampsia	5 (4.62%)	541.20

About Table shows mucoprotein levels in normal pregnancy and different degrees of toxaemia.

birth weight and mucoprotein level in normal and toxaemic pregnancy with meconium stained liquor.

TABLE II

Comparison of Mean Mucoprotein Content of Liquor Between Meconium Stained and Clear Sample in Normal and Toxaemic Pregnancy

Group of Cases	Clear Sample		Meconium stained samples	
	No. of cases	Mean Mucoprotein in mgm% with S.D.	No. of cases	Mean Mucoprotein in mgm% with S.D.
Normal Preg.	25	153.56 ± 7.52	26	217.96 ± 21.82
Mild and Moderate P.E.T.	12	228.75 ± 10.63	15	325.92 ± 12.03
Severe P.E.T.	12	364.41 ± 9.80	13	414.76 ± 16.42
Eclampsia	—	—	5	541.20

TABLE III

Apgar Score and Birth Weight of Newborn Babies in Normal Pregnancy and in Toxaemic Pregnancy in Clear and Meconium Stained liquor

Group of cases	Clear Sample				Meconium Stained			
	No. of cases	Mucoprotein level in mgm%	Mean Apgar Score	Wt.	No. of cases	Mucoprotein Level in mgm%	Mean Apgar Score	Wt.
Normal Preg.	25	153.56	8	2.69 kg	26	217.96	7	2.25 kg.
Mild and Moderate P.E.T.	12	228.75	7.6	2.56 kg.	15	325.92	7.7	2.2 kg.
Severe P.E.T.	12	364.41	6.5	1.9 kg.	13	414.76	7.1	2.4 kg.

TABLE IV

Apgar Score, Birth Weight and Mucoprotein Levels in Eclamptic Patient

S. No.	No. of fits	Fetal Outcome	Apgar Score	Wt.	Mucoprotein Levels in mgm%
1.	1	Live baby	8	2.6 kg.	500
2.	2	-do-	4	2.2 kg.	500
3.	3	Fresh stillborn		2 kg.	512
4.	6	Macerated stillborn		2 kg.	514
5.	12	-do-		2.5 kg.	680

As seen from Table IV no correlation was observed between mucoprotein levels, Apgar score and birth weight of babies in eclamptic patients all of whom had thickly meconium stained liquor.

Discussion

Bevis (1953) reported that amniotic fluid contains moderate amount of mucoprotein but its importance in toxaemia of pregnancy is yet to draw due attention. Sinha and Mukharjee (1973) observed that meconium stained fluid had a high level of mucoprotein, meconium itself being a rich source of mucoprotein. Even when the fluid was clear, mucoprotein content was higher in pre-eclamptic toxaemia than in normal pregnancy. Mean Apgar score of the babies born to toxaemic mothers with clear liquor was significantly lower than in normal pregnancy. There was a negative correlation between the Apgar score of the new born infant and the mucoprotein content of amniotic fluid, as well as between the birth weight of the newborn infant and the mucoprotein content of the amniotic fluid, indicating that mucoprotein content of amniotic fluid tends to be higher in babies with low Apgar scores and low birth weight.

DasGupta (1975) observed the amniotic fluid mucoprotein level in normal pregnancy to be 155.62 mgm% and 150.82 mgm% in toxaemic group with no statistical significance. Dutta *et al* (1977) observed mean amniotic fluid mucoprotein level 186.2 mgm% in normal pregnancy, 300 mgm% and 350 mgm% in mild, moderate, and severe pre-eclamptic toxaemias and 347 mgm% in eclampsia, showing raised values with increasing severity of toxaemia with statistical significance between severe P.E.T. and normal pregnancy. A negative correlation coefficient between the mucoprotein levels of amniotic fluid and Apgar score of new born was observed.

In the present series, mean mucoprotein content was higher in pre-eclamptic toxaemia and eclampsia compared with normal pregnancy and linear relationship was also observed between the degree of toxaemia and mucoprotein levels. Mucoprotein level was found to be increased with increasing severity of toxaemia. Increased mean mucoprotein levels were observed in meconium stained samples as compared to clear samples in normal as well as in toxaemic pregnancies. It was also noted that inspite of the sample being clear, mean mucoprotein level showed a rise with increasing severity of toxaemia.

Mean Apgar score and birth weight were found to be lower in control cases with meconium stained liquor as compared to control cases with clear liquor. Negative correlation was observed between Apgar score and mean mucoprotein levels in patients with increasing severity of toxaemia with clear liquor as well as between birth weight and mean mucoprotein level in the same series. No such correlation was observed in cases with increasing severity of toxaemia with meconium stained liquor and also in eclamptic patients.

Conclusion

An extensive study of this subject in cases of chronic fetal distress may prove that routine detection of mucoprotein levels in amniotic fluid may be taken as an useful index in detecting severity of fetal distress and may help in timely induction of labour.

Reason for rise in mucoprotein content is not known, specially in toxaemic patients with clear liquor. Considering placental insufficiency in toxaemia as a

factor leading to fetal asphyxia, it is likely that mucoprotein content of clear liquor may be raised by occult meconium which is not enough to stain the liquor. Mucoprotein content of meconium stained liquor may be raised because of meconium which is itself a rich source of mucoprotein.

Raised mucoprotein may be a reflection of active synthesis or sudden mobilisation of mucoprotein from placental tissue due to intrinsic changes in the walls of placental blood vessels leading to fetal asphyxia.

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