MUCOPROTEIN CONTENT OF AMNIOTIC FLUID

by

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Introduction

The origin of liquor amnii being both from maternal and foetal sources the biochemical variations reflect on the protein balance during pregnancy more so in toxaemias of pregnancy.

The amniotic fluid contains a specific component of a glycoprotein nature. While processing these compounds it is possible to isolate mucoids by phenol extraction and subsequent alcohol fractionation.

Heron (1966) observed the presence of glycoprotein in liquor from rhesus sensitized pregnancies only.

Lambotte and Uhlenbruck (1966) isolated a new class of hexosamine rick glycoprotein called "aminomucoids".

The mucoproteins are the combination of carbohydrate (Hexosamine) moieties which contain more than 4 per cent hexosamine.

The mucoprotein was originally isolated from blood serum, but it is widely distributed in the cellular tissue of the body and characterised by its solubility in certain protein precipitants like perchloric acid, sulphosalicylic acid and trichloracetic acid and by being not readily precipitated by heat.

Bevis (1953) reported that besides albumin and globulin the amniotic fluid contains moderate amount of mucoprotein.

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 foetal status correlating with the severity of toxaemia and the mucoprotein content of amniotic fluid.

Material and Method

The study consists of 100 cases including 25 cases of toxaemias of pregnancy.

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

Group I: Normal pregnancy (75 cases)—BP 120/80 mm Hg and without any systemic disease.

Group II: Mild pre-eclamptic toxaemia (8 cases) BP below 140/90 mm of mercury with or without oedema/albuminuria.

Group III: Moderate and severe pre-eclamptic toxaemia (8 cases)—BP ranging between 140 mm of Hg to 200 mm of Hg systolic and 96 mm of Hg to 130 mm

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Accepted for Publication on 1.3.1977.

of Hg diastolic with oedema and albuminuria.

Group IV: Eclampsia (9 cases) cases.

With aseptic precautions the amniotic fluid was collected from the above cases either by amniotomy during labour or at ceasarean section in a sterile bottle.

After delivery the birth weight of the baby was taken and the apgar score of the new born was recorded.

Estimation of mucoprotein was done according to the method described by Winzler *et al* (1948) and Varley (1967).

Observations and Results

The observations and statistical analysis of present study are given in the following Tables.

Table I shows mucoprotein level in 75 cases of normal pregnancy ranging from 100 to 300 mgm% with an average of 186.21 mgm%.

Table II shows comparison of the mucoprotein contant of amniotic fluid between normal pregnancy and different degrees of toxaemia and their statistical values indicating mucoprotein increasing with severity of toxaemia. Statistically the values were insignificant except in moderate and severe PET where it was statistically significant ($t = 4.73$).

Table III shows that mean apgar score of new born babies of normal pregnant cases is 8 while that of toxaemic cases is 5.3.

TABLE I

Mucoprotein Concentration (mgm%) of Amniotic Fluid in 75 Cases of Normal Pregnancy

Mucoprotein in mgm%	No. of cases	Range (mgm%)	Mean (mgm%)
Upto 100	7		
101 to 149	7		
150 to 199	19	100 to 300	186.21
200 to 249	27		
250 to 300	15		

TABLE II

Comparison of Mean Amniotic Fluid Mucoprotein Levels of Normal Pregnant Cases With Different Degrees of Toxaemia as well as Between Different Groups of Cases

S. No.	Groups of cases	No. of cases	Mean liquor mucoprotein level (mgm%)	S.D.	S.T.
1.	Normal pregnancy	75	186.21	53.45	6.22
2.	Mild P.E.T.	8	300.00	53.50	18.91
3.	Moderate-severe P.E.T.	8	350.00	96.31	34.04
4.	Eclampsia	9	347.00	82.20	29.05

Comparison between the groups		t	df
t	Group I and II	1.18 NS	80
t	Group I and III	4.73**	80
t	Group I and IV	2.08 NS	80
t	Group II and III	1.28 NS	14
t	Group II and IV	0.69 NS	14
t	Group III and IV	0.34 NS	14

TABLE III
Mean Apgar Score of New Born Babies

Groups of cases	No. of cases	Range	Mean
1. Normal pregnancy	75	6-10	8
2. Toxaemia of pregnancy	25	4- 9	5.3

The negative correlation co-efficient between the amniotic fluid mucoprotein level and apgar score was observed in eclamptic series (Table IV).

TABLE IV
Correlation co-Efficient in Different Degrees of Toxaemia Between Mean-Liquor Mucoprotein Level and Apgar Score

Mild P.E.T.	0.297 NS
Moderate and Severe P.E.T.	0.432 NS
Eclampsia	0.207 NS

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.

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.

In the above study the mean amniotic fluid mucoprotein level was 186.2 mgm% in normal pregnancy, 300 mgm% and 350 mgm% in mild and moderate and severe preeclamptic toxaemias and 347 mgm% in eclampsia, showing raised values with increasing severity of toxaemia. There was a statistical significance between severe P.E.T. and normal pregnancy ($t = 4.73$).

By observing the status of new born just after delivery the apgar score was 8.4 in normal pregnancy and 5.3 in toxaemia of pregnancy. A negative correlation co-efficient between the mucoprotein levels of amniotic fluid and apgar score of new born ($r = 0.027$) was observed. Similar were the observations of Mukherjee and Sinha (1973).

The cause of high mucoprotein level in amniotic fluid can be considered to be placental insufficiency in toxaemia leading to foetal hypoxia as noted by the lowered apgar scoring.

The raised mucoprotein content of liquor amnii may be a reflection of active synthesis or sudden mobilization of mucoprotein from placental tissue due to intrinsic changes in the walls of the placental blood vessels, leading to foetal hypoxia, as noted by apgar score.

Summary and Conclusions

The present study has been undertaken in 100 cases comprising of 75 cases of normal pregnancy and 25 cases of toxaemia of pregnancy with a view to observe the mucoprotein concentration in amniotic fluid and its reflection upon the severity of toxaemia and foetal status.

The mean amniotic fluid mucoprotein levels rose with the increased severity of toxaemia of pregnancy.

The negative correlation co-efficient between the amniotic fluid mucoprotein and apgar score was observed in eclamptic series.

Acknowledgement

We thank Professor (Miss) K. Gupta, M.S., Head of the Department of Obstetric and Gynaecology, Medical College, Jabalpur, for permitting us to publish this paper.

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