

# STUDY OF AMNIOTIC FLUID MUCOPROTEIN IN NORMAL AND TOXAEMIC PREGNANCY AND ITS RELATION TO FOETAL OUTCOME

by

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## SUMMARY

Amniotic fluid mucoprotein was studied in 95 cases of normal and 55 cases of toxæmic pregnancy to find out its relation with severity of toxæmia and foetal outcome. Mucoprotein was markedly increased in toxæmia and the increase showed a proportional relation with increasing severity of toxæmia. The foetal outcome, judged on the basis of apgar score and birth weight of the new born, was found to be poor with increased amniotic mucoprotein.

### *Introduction*

It is known that mucoprotein is increased in blood in a number of pathologic conditions such as cancer, infections, rheumatoid arthritis, ankylosing spondylitis etc. and decreased in infective hepatitis, cirrhosis and some other conditions. Mucoprotein as a normal constituent of amniotic fluid was reported by Bevis in 1953 but he had not attempted its quantitative estimation. In recent years amniotic fluid examination has gained importance for the assessment of foetal well being because the origin of the fluid is both maternal and foetal and therefore any variation in its normal constituents would obviously reflect on the exact foetal condition. Mucoprotein in amniotic fluid has been studied recently by several workers

in cases of pregnancy. Some of them have observed that in cases of toxæmia in which serum and amniotic fluid mucoprotein levels were increased the foetal outcome was poor. However, not much work has been done regarding amniotic fluid mucoproteins in different types of pregnancy and also some of the reports available are conflicting.

The present work was undertaken to study the mucoprotein content of amniotic fluid in normal and toxæmic pregnancy and to find out its relation with the severity of toxæmia and foetal outcome.

### *Material and Methods*

One hundred and fifty cases admitted to obstetric wards of Swaroop Rani Nehru and Kamla Nehru Memorial Hospitals Allahabad were studied. These cases included normal and toxæmic pregnancies and were divided into the following four groups.

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1. *Normal pregnancy* (95 cases): blood pressure 120/80 mm Hg without any systemic disease.
2. *Mild and moderate preeclamptic toxæmia* (PET 30 cases): blood pressure 120/80 to 150/100 mm Hg with oedema and/or albuminuria.
3. *Severe preeclamptic toxæmia* (PET 15 cases): blood pressure 160/120 mm Hg with marked oedema and/or albuminuria.
4. *Eclampsia* (10 cases)

A detailed clinical history was taken and a complete general and obstetrical examination and routine investigations were done in each patient. In toxæmic cases, serum urea, creatinine and fundoscopy were also done.

For the evaluation of foetal development the foetal weight was calculated by the well known Johnson's formula.

#### Collection of Amniotic Fluid

Amniotic fluid was collected aseptically with an autoclaved all glass syringe and 18 gauze needle either directly from the bag of waters or during induction of labour. In some, it was collected at the time of caesarean section or by amniocentesis. Only clear and meconium stained samples were selected for analysis; blood stained ones were rejected.

After delivery Apgar score and birth

weight of the newborn baby was recorded and congenital anomalies if any were looked for. Placental weight was noted and placenta was examined for any obvious abnormalities.

For the assessment of foetal condition, Apgar scoring was done as follows. Each of the positive signs was given a maximum of two points.

A score of 10 indicates an infant in the best possible condition. Babies in good general condition scored 8 to 10 and did not need resuscitation except throat suction. Babies with a fair general condition had a score between 4 and 7 and needed resuscitation. Babies in poor general condition scored less than 4 and needed active management.

Amniotic mucoprotein was determined by the procedure as described by Varley (1969).

#### Results and Discussion

Mucoprotein concentration of amniotic fluid in normal and toxæmic pregnancy has been studied to find out its relation with toxæmia and foetal outcome. The results of amniotic mucoprotein, Apgar score and birth weight obtained in different types of pregnancies are summarized in Table I. The findings of other workers in this field are given in Table II.

Apgar Scoring

Sign	Points		
	0	1	2
1. Heart rate	Absent	Below 100	Over 100
2. Respiratory effort	Absent	Slow and irregular	Good crying
3. Muscle tone	Limp	Some flexion extremities	Active motion
4. Response to catheter in nostril (tested after oropharynx is clear)	No response	Grimace	Cough or sneezing
5. Colour	Blue pale	Body pink, extremities blue	Completely pink

TABLE I

Group	No. of cases	Mucoprotein (mg/100 ml) Range, mean $\pm$ S.D.	Apgar Score Range, Mean	Birth weight Range, mean
Normal pregnancy	95	122.0 — 242.0 175.4 $\pm$ 30.8	6-10 8.6	1.5-3.7 3.1
Mild PET	30	175.0 — 302.0 231.5 $\pm$ 34.2	4-9 7.1	1.5-3.5 2.8
Severe PET	15	243.4 — 352.0 288.6 $\pm$ 31.6	0-7 5.7	1.9-3.0 2.4
Eclampsia	10	344.0 — 390.0 258.2 $\pm$ 13.2	0-6 1.3	1.5-2.2 1.7

TABLE II

Workers	Mean amniotic mucoprotein (mg/100 ml)			
	Normal pregnancy	Mild PET	Severe PET	Eclampsia
1. Dutta <i>et al</i> (1971)	186	300	350	347
2. Das Gupta (1975)	155	150	—	—
3. Mardikar and Dubey (1980)	185	238	396	541
4. Sarin and Sharma (1983)	188	386	271	—
5. Sinha and Mukherjee (1973)	180	233	—	—
6. Present study (1985)	175	231	288	358

The amniotic fluid was found to be clear and colourless in cases of normal pregnancy. However, in a few cases the fluid was meconium stained, but these cases had foetal distress. In cases of toxemia both clear and meconium stained liquor was obtained but it was found that with increasing severity of toxemia the fluid samples were mostly meconium stained and thus in eclampsia not a single case with clear liquor was obtained. The presence of meconium in the liquor may be because of foetal distress caused by placental insufficiency. Brown *et al* (1953) held that placental insufficiency is one of the causative factors for foetal distress and passage of meconium in liquor.

Mucoprotein concentration in meconium stained liquor was found to be

significantly increased than the clear ones in normal as well as toxemic pregnancy. In normal pregnancy the mean mucoprotein value in clear liquor was  $167.94 \pm 23.13$  mg/100 ml and in meconium stained  $200 \pm 25.75$  mg/100 ml, whereas in mild PET it was  $209.63 \pm 24.42$  mg and  $260.22 \pm 21.53$  mg/100 ml respectively in clear and meconium stained liquor; in severe PET values were  $260.39 \pm 70.84$  for clear liquor and  $308.74 \pm 22.12$  for stained ones. In eclampsia where all the liquor samples were meconium stained, mean value was  $358.25 \pm 13.20$  mg/100 ml. The overall mean value (clear and stained liquor samples) in normal pregnancy was found to be  $175.4 \pm 30.8$  mg/100 ml. Almost similar values have been reported by other workers in normal pregnancy

(Table II). Sinha and Mukherjee postulated that the presence of occult or overt meconium in the liquor is responsible for high mucoprotein level, meconium itself being a rich source of mucoprotein.

Mucoprotein level was found to be markedly raised in cases of toxæmia as compared to normal pregnancy ( $P < 0.001$ ) and also amongst different groups of toxæmia in relation to each other, irrespective of whether the liquor was clear or stained. This increase was found to be directly related to the increasing severity of toxæmia. The reports of other workers in cases of toxæmia are varied. The present finding is in conformity with that of Mardikar *et al* (1980) who have also observed a proportional rise of mucoprotein with the severity of toxæmia, although their mucoprotein levels were higher than the values obtained in the present study. Das Gupta (1975) did not observe any significant change in mucoprotein levels between normal and toxæmic pregnancy. Whereas Dutta *et al* (1971), Sinha and Mukherjee (1973) and Sarin *et al* (1983) have found significant increase in mucoprotein in toxæmic pregnancy but did not observe any correlation with the severity of toxæmia (vide Table II). Most of these workers have reported mucoprotein levels in cases of toxæmia but have not classified their cases according to the severity.

The foetal outcome was judged by

Apgar score and birth weight of the new born. It was found that Apgar score and birth weight decreased with increasing severity of toxæmia and mucoprotein level (Table I). It is evident that the foetal outcome is inversely related to the severity of toxæmia as well as to amniotic mucoprotein. Thus foetal outcome was found poor with increased mucoprotein level. It should be noted however, that this relation was only true for all groups of toxæmia which had clear liquor. No such correlation was seen between foetal outcome and mucoprotein levels in meconium stained fluids of the toxæmic group. The reports of previous workers in this field also corroborate this finding.

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