

# AMNIOTIC FLUID TRANSAMINASES (GOT, GPT) IN NORMAL AND ABNORMAL PREGNANCIES

by

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## Introduction

Amniotic fluid has been the subject of study over years taken as an inert fluid, later the importance of physical and biochemical properties were taken up in the active management of normal and abnormal pregnancies. Many enzymes have been discovered in it, but during last few years studies concerning enzymatic activity in amniotic fluid have provided insight into the interaction of the foetus and the milieu and all the more a valuable asset in determination of foeto-maternal jeopardy. Glutamic Oxalacetic Transaminase (GOT) and Glutamic Pyruvic Transaminase (GPT) are amongst the few less studied enzymes. The significance of these enzymes is well documented (Lin, 1964-estimated GOT and GPT with proteins in 3rd trimester). Geyer and Schneider (1970) reported the normal values. Similarly, Thaler *et al* (1979) estimated GOT and GPT in amniotic fluid and gave their normal values

with wide range. Enzymes as we know are very sensitive indices especially transaminases for any sort of cellular damage thus providing an accurate insight of foetal activity and jeopardy in intrauterine life.

The present investigations were undertaken to study the transaminases in amniotic fluid in normal and abnormal pregnancies.

## Material and Methods

The present study embraced 75 pregnant women with a gestation period ranging from 28 to 40 weeks irrespective of age and parity but with known LMP, attending the State Zenana Hospital, Jaipur. The cases were divided into two groups—A and B.

Group A: 25 Normal pregnant women.

Group B: 50 Cases of abnormal pregnancies i.e. toxæmias (15), eclampsia (9), post-maturity (7), Rh-sensitization (3), twins (12) hydramnios (4).

Detailed obstetric, personal and menstrual history was taken of these patients and routine general systemic, abdominal examination was done. Specimens of amniotic fluid were collected in sterile vials by any of the following methods:

— Aspiration from sac by L.P. needle No. 18, 20.

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Accepted for publication on 20-3-82.

— Amniocentesis at the time of caesarean section.

— Artificial rupture of membranes.

laboratory of S.M.S. Medical College Hospital, Jaipur.

#### Observations

Samples contaminated with blood, meconium and urine were discarded.

Biochemical estimations were carried out within 4 to 6 hours of collection of samples by Reitman and Granke's Colorimetric Method (1957) in biochemistry

The present studies were carried out in two groups—A and B. Different statistical tests were applied to ascertain the degree of significance of the enzymes in relation to normal pregnancies and the results thus obtained are presented in Tables I and II.

TABLE I  
GOT Levels in Normal and Abnormal Pregnancies

Cases	Mean $\pm$ S.D.	t	p	Significance
Normal	11.80 $\pm$ 2.40	—	—	
Prematurity	13.02 $\pm$ 3.11	1.02	>0.05	Not Significant
Postmaturity	13.50 $\pm$ 0.72	1.70	<0.05	Just Significant
Twins	13.60 $\pm$ 2.17	2.73	<0.01	Significant
Hydramnios	9.30 $\pm$ 0.62	4.39	<0.001	Highly Significant
PET	13.50 $\pm$ 1.25	5.15	<0.0005	Very Highly Significant
ECLAMPSIA	14.80 $\pm$ 1.25	2.56	<0.01	Significant
Rh-Negative	16.30 $\pm$ 0.50	12.86	<0.001	Highly Significant

TABLE II  
GPT Levels in Normal and Abnormal Pregnancies (KU/ml)

Cases	Mean $\pm$ S.D.	t	p	Significance
Normal	6.7 $\pm$ 1.75	—	—	
Prematurity	7.6 $\pm$ 1.32	1.62	>0.05	Not Significant
Postmaturity	7.6 $\pm$ 0.55	1.70	<0.05	Just Significant
Twins	7.8 $\pm$ 1.03	2.39	<0.025	Highly Significant
Hydramnios	6.4 $\pm$ 0.97	4.17	<0.001	Highly Significant
PET	7.6 $\pm$ 0.58	2.37	<0.025	Highly Significant
Eclampsia	8.2 $\pm$ 0.94	3.19	<0.005	Highly Significant
Rh-Negative	9.0 $\pm$ 0.20	6.22	<0.001	Highly Significant



### Discussion

In the present study the normal value of GPT was  $6.7 \pm 1.7$  KU/ml/min which is higher than those estimated by Geyer and Schneider (1970) i.e.  $1.6 \pm 0.9$  mU/ml, but is lower in comparison of the study conducted by Thaler *et al* (1970) 9.11 IU/litre.

GOT values were  $11.8 \pm 2.4$  KU/ml supporting the findings of Lin (1964) and Geyer and Schneider (1970). These values were lower than that of Thaler *et al* (1979).

The range of GOT was from 7.9 to 14.8 KU/ml, while that of GPT was 4.0 to 10.0 KU/ml with these findings irrespective of period of gestation, parity, age and socio-economic status etc.

As evident from Table I and II enzymatic activity in pre-term pregnancies was slightly higher but when statistically analysed they prove not to be significant, while in cases of post-maturity transaminase activity was definitely higher ( $p < 0.025$ ) favouring the concept of decline in placental function with post-datism.

There is a highly significant value of the enzymes in twin pregnancies, the probable explanation lies in the fact that most of these cases were either premature, low birth weight or stillborn. Since no work has been reported on this aspect, comparative study could not be made. Although only a few cases of hydramnios were available but there was undoubtedly lower enzyme activity when test of significance applied ( $p < 0.001$ ) it was highly significant which could be due to the dilution factor or disturbance in the foeto-placental circulation or site of origin of amniotic fluid. GOT levels in PET varied from 10.8 to 15.4 KU/ml, mean being  $13.5 \pm 1.25$  KU/ml statistically which is highly significant ( $p < 0.0005$ ), in com-

parison GPT varied from 6.8 to 8.8 KU/ml with mean  $7.6 \pm 0.58$  KU/ml which too is highly significant (Table II). Borglin (1958) found abnormally high values in few cases with toxæmia of pregnancies. On the basis of our observations we can say that due to the altered permeability of the foeto-placental barrier, thus enabling the passage of larger enzymatic molecules in much the same way as the glomerulus of damaged kidney allows the passage of large molecules. In eclampsia the mean GOT was  $14.8 \pm 1.25$  KU/ml and GPT was  $8.2 \pm 0.94$  KU/ml, thus, revealing the increase in enzymatic activity with the severity of toxæmia. Placental insufficiency due to pregnancy induced hypertension causing placental necrosis as naked eye examination of placenta showed few to multiple infarcts, thereby releasing enzymes in liquor. The foetal outcome was also poor in these cases.

As shown in Tables I and II, the mean GOT was  $16.3 \pm 0.50$  KU/ml with variation of 15.8 to 16.8 which was definitely higher than normal while the GPT was  $.90 \pm 0.2$  KU/ml. Although a small number in this series to make definite conclusions, highly significant values (GOT  $p < 0.001$ , and GPT  $p < 0.001$ ) emphasize the basis of these enzymes as a diagnostic and prognostic index in Rh-incompatibility.

### Conclusions

Transaminase levels have been estimated in amniotic fluid in normal and abnormal pregnancies by Reitman and Frankel Colorimetric Method. Findings can be summed up as:

1. The average transaminase activity was estimated as  $11.8 \pm 2.40$  KU/ml/min. for GOT and  $6.7 \pm 1.75$  KU/ml/min. for GPT.
2. No relationship could be established

with the age, gravidity and socioeconomic status of the patient, sex of the child and placental weight.

3. Enzymatic activity showed a significant rise with the advancing period of gestation and a rising trend from lower to higher weight group.

4. Transaminase and the Apgar Score had a fine correlation which can be of immense help in predicting foetal prognosis.

5. In cases of post-maturity there was increase in the enzymatic activity which could be due to impairment of placental functions.

6. Presence of two foetuses could explain the rise of enzymatic values in twin pregnancies.

7. A significant decline was observed in GOT and GPT levels in hydramnios which could be due to dilution and foetal ill-being.

8. A very interesting and significant correlation was seen between normal and cases of toxæmia, the value was higher, which could be due to placental insufficiency and necrosis.

9. In few cases of Rh-negative there was a great significance of estimation of GOT and GPT as the values were high which could be of diagnostic and prognostic aid.

10. Therefore, transaminase amniotic fluid establishes the promising field of enzymic study so as to bring to lime-light the importance of these in foeto-maternal jeopardy as a diagnostic and prognostic aid.

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