TRANSAMINASE ACTIVITY IN NORMAL AND ABNORMAL PREGNANCY

by

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The release of transaminases from the damaged tissue and the significance of S.G.O.T. and S.G.P.T. as indices of cell death has been well documented. The measurement of enzyme activity in body fluids is often of importance in clinical practice. Derangement of liver function in pregnancy has been a controversial subject. S.G.O.T. and S.G.P.T. are very sensitive indices of hepatocellular injury. The attempts to elucidate the factors, responsible for the elevation of serum enzyme levels in disease have also included the studies of physiological states e.g. pregnancy and growth. Heimback and Prezyna (1960) rejected the maternal liver damage as the source of increased enzyme level in labour, since their subjects showed normal S.G.P.T. level. Meade and Rosalki (1963) also do not regard maternal liver damage responsible for increased enzyme value. Heimback and Prezyna (1960) suggested uterine muscle as a source of enzyme while, according to Little (1959) a placental origin seems more likely.

Present study is directed towards finding out the variation in serum levels in normal and abnormal pregnancy and to ascertain the relationship, if any, between the transaminase activity and course of pregnancy and the complications.

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Material and Methods

Cases were selected from the patients attending the antenatal clinic, Gynaecological out patient department and those admitted in Queen Mary's Hospital, irrespective of age, parity and Socioeconomic status and without any systemic pathology.

Following group of cases were studied.

1. Control cases-normal non-pregnant adult females.
2. Pregnant patients in various trimesters of normal pregnancy, in labour and in postpartum period.
3. Pregnancy with following complications.
   (a) Pre-eclamptic toxaemia
   (b) Eclampsia
   (c) Accidental haemorrhage
   (d) Placenta previa
   (e) Anaemia
   (f) Hydraminos
   (g) Twin pregnancy
   (h) Hydatidiform mole
   (i) Essential hypertension
   (j) Chronic renal disease
   (k) Cord blood of new born babies

(whose mother's blood was taken during labour) to have a comparative idea between the maternal serum enzyme level and cord blood enzyme level.

The estimation of transaminases was done by the colorimetric method of Reitman and Frankel (1957), the values were expressed in Karmen units. Total 126 cases were studied.

No change in transaminase activity was found during the course of normal pregnancy, it remained within normal limits in all the trimesters of pregnancy, during active labour and postpartum periods. Some workers (Prezyna and Hemback and Prezyna (1960) have reported variable rises in enzyme levels during pregnancy. In the present series, maximum activity was found during labour which may be attributed to muscular exertion during labour which may be attributed to muscular exertion during labour. The levels came to initial level on the 4th or 5th post partum day as shown in (Table 1).

Five cases out of 30 of normal pregnancy were having low levels of transaminases (below 10 units/cc). The low levels in pregnant females have been ascribed to pyridoxin deficiency (Glanding, *et al*, 1955). Pyridoxal phosphate is the co-enzyme necessary for the transaminase activity, the levels of pyridoxal phosphate in the leucocytes of pregnant women are abnormally low, while those of the fetus are higher (Wachstein and Gudaitis, 1952; Knutsan *et al*, 1958). The lower levels may therefore reflect the lack of co-enzyme rather than low levels of enzyme. A study of transaminase activity was done in cord blood of 10 neonates. The activity was found to be comparatively higher in neonates than in their respective mothers as shown in Table II.

Transaminase levels were found to be raised to varying degree in cases of pre-eclamptic toxamia and eclampsia. The most important underlying change in toxaemia is generalised arteriolar constriction affecting the heart, liver and kidney with resulting tissue hypoxia leading to elevation of enzyme level. This elevation may also be attributed to liver damage in pre-eclamptic toxaemia and eclampsia (Dass and Bhagwanani, 1964).

TABLE I

Comparison of Values Obtained in Various Trimesters of Normal Pregnancy, Labour Post-partum Period

	S.G.O.T. units/cc			S.G.O.P.T. units/cc		
	Mean	Max.	Min.	Mean	Max.	Min.
Controls	18.3	30	8	13.5	22	5
1st Trim.	19.7	32	10	17.9	28	6
2nd Trim.	21.4	40	10	17.9	30	10
3rd Trim.	25.6	48	9	19.8	35	6
Intra partum	31.4	48	18	25.4	38	16
Post Partum						
1st day	20.8	28	12	18.4	26	18
2nd day	27.2	36	18	23.5	30	20
3rd day	24.0	36	16	18.4	28	10
4th day	20.5	28	12	15.0	20	9
5th day	17.2	20	10	12.4	18	6

TABLE II

Transaminase Activity in Mothers and Neonates (Units/cc)

	Mother		Baby	
	S.G.O.T.	S.G.P.T.	S.G.O.T.	S.G.P.T.
Mean	31.4	25.4	38.0	26.6
Max.	48.0	38.0	58.0	40.0
Minimum	18.0	16.0	26.0	16.0

Though lot of work has been done but the results are inconsistant. Some investigators have found increased enzyme activity, while others have found no significant change.

In eclampsia, the enzyme levels were found to be significantly raised. A definite co-relation was found between the severity of the disease, number of flts and degree of proteinuria as shown in Table III. Bowen *et al,* 1957, Nawal Kishore *et al,* 1969, John and Morrison, 1971 have also reported marked elevation of enzyme activity.

Cases of accidental haemorrhage showed rise of transaminase activity, which may be attributed to the tissue necrosis (damage of decidua, placenta, occasionaly myometrium) and removal of placental barrier due to ruptured membranes. On the other hand, in cases of placenta previa normal values were obtained, as shown in Table IV.

TABLE III

Transaminase Activity in Pre-Eclamtic Toxaemia and Eclamptic

	Mean units/cc		Maximum		Minimum	
	S.G.O.T.	S.G.P.T.	S.G.O.T.	S.G.P.T.	S.G.O.T.	S.G.P.T.
Toxemia						
(a) Mild	44.8	35.4	60	45	25	18
(b) Moderate	53.6	39.8	65	60	35	25
(c) Severe	72.3	59.3	96	74	34	30
Eclampsia	113.2	96.0	128	104	98	86

TABLE IV

Transaminase Activity in Ante-partum Haemorrhage

	Mean		Maximum		Minimum	
	S.G.O.T. Units/cc	S.G.P.T.	S.G.O.T.	S.G.P.T.	S.G.O.T.	S.G.P.T.
Accidental Haemorrhage	67.7	45.5	108	75	50	30
Placenta Previa	21.4	20.8	30	30	9	12

In cases of hydramnios, postmaturity, anaemia, vesicular mole and twin pregnancy normal values were obtained.

Cases of pregnancy with essential hypertension showed normal enzymatic activity. One case of chronic nephritis was studied which showed marked elevation of enzyme level. Claman and Garson (1962) have also found the rising values.

Conclusion

The importance of serum enzyme studies as diagnostic aid in clinical medicine is steadily on the increase. It is logical to conclude that investigators would eventually include enzyme determinations as a very important diagnostic tool in obstetrics as well.

In normal pregnancy, the transaminase levels remain within normal limits in different trimesters of pregnancy.

Out of all the complicated pregnancies, the variations in transaminase levels were found to be significant in those cases where there was damage of tissues, irrespective of causative factor.

A definite co-relation was found between the severity of condition and transaminase level, in cases of pre-eclamptic toxaemia and eclampsia, while no change was seen in cases of essential hypertension so these enzyme levels can be of value in differentiating the two conditions.

In accidental haemorrhage, a relationship was observed between the degree of severity of the disease and enzyme level, while it was found to be normal in placenta previa. Transaminase levels are not affected by the degree of placental separation in placenta previa or by increased placental surface as in twin pregnancy. It remains normal in other pregnancy complications except the pre-eclamptic toxaemia, eclampsia accidental haemorrhage and chronic nephritis. Serial estimations are more important than the random readings. Estimation of tissue transaminase activity, especially in the uterus and placenta in different physiological and pathological conditions will definitely throw light in evaluating and understanding the nature of transaminase activity in normal and abnormal pregnancy.

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