

EVALUATION OF SERUM AND AMNIOTIC FLUID ALKALINE PHOSPHATASE ACTIVITY IN TOXAEMIAS OF PREGNANCY

by

SURINDER KAUR SANDHU

and

AARTI HARJA

Introduction

Improvement in perinatal mortality would occur if a satisfactory placental function test could be devised to determine the correct time for delivery in patients whose placental function may be balanced against the risk of premature delivery. A dependable and easily conducted test of placental function is one of the urgent needs in obstetrics these days. Currently, a number of promising fetal assessment techniques like computers and microassessors in combination with heart rate monitors, telemetry etc. are under trial. These sophisticated techniques may not be available to us in near future. Estimation of alkaline phosphatase has been suggested as an index of placental function. Heat stable alkaline phosphatase which is produced by human trophoblast appears to reflect the placental function accurately.

In severe toxæmias of pregnancy there is expected to be a compromise of placental function. Therefore, this study was undertaken in two comparable groups of severe toxæmias of pregnancy and compared with controls to formulate a standard of values of the enzyme in maternal

serum and amniotic fluid and to correlate it with the fetal outcome.

Material And Methods

Fifty cases of normal term pregnancy were taken as controls. Cases of severe toxæmia of pregnancy were divided into two groups (a) 16 cases were with clear liquor (b) 8 cases were with meconium stained liquor. These two groups were comparable to each other regarding the degree of toxæmia and maturity of pregnancy. Amniotic fluid was taken at the time of caesarean section or collected by amniotomy. Venous blood was taken with dry sterilized syringe. Estimation of total, heat stable and heat labile alkaline phosphatase (TAP, HSAP, HLAP) was done by the method of Kind and King (1954) in both serum and amniotic fluid.

Observations

Table I: Shows TAP, HSAP, HLAP in normal pregnancy group of 50 cases.

Table II: Shows TAP, HSAP & HLAP in severe toxæmia comprising 16 cases of non-meconium stained liquor group and 8 cases of meconium stained liquor group.

Table III: Shows relation of serum HSAP with mean appgar score in non-meconium stained toxæmia group.

From: Department of Obstetrics and Gynaecology, Medical College, Amritsar.

Accepted for publication on 20-8-84.

TABLE I
Alkaline Phosphatase, Total, Heat Stable and Heat Labile in Normal Pregnancy Group
Total cases 50

	Alkaline phosphatase (K.A.U./100 ml)					
	Serum			Liquor		
	TAP	HSAP	HLAP	TAP	HSAP	HLAP
Range	12.2-20.3	6.0-14.2	5.7-8	1.8-7.95	1.02-4.0	0.7-3.95
Mean	15.59	9.26	6.46	2.77	1.43	1.34
S.D. ±	2.82	2.15	0.46	0.89	0.44	0.69
S.E. ±	0.395	0.301	0.065	0.125	0.063	0.09
Foetal Outcome:	Normal babies	— 50	Mean birth weight		— 2907 gms	
	Asphyxiated	— Nil	Mean placental weight		— 502 gms	
	Dead	— Nil	Mean apgar score		— 8.7	

TABLE II
Alkaline Phosphate (K.A.U./100 ml) Total, Heat Stable and Heat Labile in Severe Toxaemia Group
(BLPL—160/100 to 220/130; Albuminuria ++ to +++; Oedema ++ to +++)

	Non-meconium stained liquor group —16 cases					
	Serum			Liquor		
	TAP	HSAP	HLAP	TAP	HSAP	HLAP
Range	18.6- 28.9	11.0- 22.5	5.6- 7.6	3.5- 8.2	2.0- 6.2	1.25- 3.0
Mean	23.79	17.13	6.66	5.33	3.38	1.95
S.D. ±	2.35	18.48	6.51	1.68	1.30	0.64
S.E. ±	0.83	0.82	0.19	0.59	0.46	0.22
Foetal outcome:	Normal	— 6	Mean birth weight		— 2610 gms	
	Asphyxiated	— 10	Mean placental weight		— 413 gms	
	Dead	— Nil	Mean apgar score		— 5.9	

TABLE II (Contd.)
Alkaline Phosphate (K.A.U./100 ml) Total, Heat Stable and Heat Labile in Severe Toxaemia Group
(BLPL—160/100 to 220/130; Albuminuria ++ to +++; Oedema ++ to +++)

	Meconium stained liquor group—8 cases					
	Serum			Liquor		
	TAP	HSAP	HLAP	TAP	HSAP	HLAP
Range	26.6- 32.2	20.2- 26.0	6.0- 7.2	64.6- 240.4	28.2- 92.0	38.4- 154.4
Mean	29.30	23.00	6.30	157.1	57.54	99.56
S.D. ±	2.29	2.42	0.38	71.70	21.97	52.41
S.E. ±	0.93	0.98	0.15	29.27	8.97	22.39
t	4.42	4.59	0.15	5.18	6.25	4.35
P	<0.01	<0.01	>0.05	<0.01	<0.01	<0.01
Foetal outcome:	Normal	— 1	Mean birth weight		— 2352 gm	
	Asphyxiated	— 3	Mean placental weight		— 358 gms	
	Dead	— 4	Mean apgar score		— 3.1	

TABLE III

Relation of Serum HSAP With Mean Apgar Score in Non-meconium Stained Toxaemia Group

Range of HSAP in K.A.U./100 ml	No. of cases	Mean apgar score
11 - 15	5	7.6
15.1 - 19	5	6.4
19.1 - 23	6	5.3

Table IV: shows relation of liquor HSAP and liquor HLAP with mean apgar score in non-meconium stained toxaemia group.

TABLE IV

Relation of Liquor HSAP and Liquor HLAP With Mean Apgar Score in Non-meconium Stained Toxaemia Group

Range of values in K.A.U./100 ml	No. of cases	Mean apgar score
HSAP: 2-2.99	6	7.1
3-3.99	6	6.1
4 and above	4	5.5
HLAP: Less than 2	10	7.0
2 and above	6	5.3

Serum TAP and HSAP are significantly raised in meconium stained group when compared to non-meconium stained group. HLAP of serum, however, did not show a significant change. Regarding amniotic fluid all the three fractions show a marked rise in meconium stained group when compared to non-meconium stained group.

In 2 cases where liquor though equally meconium stained showed not very high values (TAP 64.6 K. A. U|100 ml and 68.6 K.A.U|100 ml) gave a better fetal outcome than those where values were markedly raised.

Both the groups when compared to normal controls showed a poor fetal out-

come, lower placental weight, lower birth weight and low apgar score.

Discussion

Serum HSAP of more than 15 K.A.U./100 ml, liquor HSAP of more than 3 K.A.U./100 ml and liquor HLAP of more than 2 K.A.U./100 ml in non-meconium stained group of severe toxaemia indicate a compromise of placental function and an urgent need to delivery. Outcome in this group was all live babies though 10 of them were asphyxiated but could be revived. Not a single baby was lost in this group. In a comparable severe toxaemia group when liquor was stained with meconium the values of TAP and HSAP in serum and TAP, HSAP and HLAP in liquor shot up markedly and the foetal prognosis was dismal inspite of early attempt at delivery. The higher the values of alkaline phosphatase in these patients the worse is the prognosis.

Curzen and Marris (1966) state that 78% cases of severe pre-eclampsia showed higher values of serum HSAP. Our value of HSAP as 17.13 K.A.U./100 ml in serum in severe toxaemia group is the same as 17.2 K.A.U./100 ml Sammour *et al* (1975) reported by Zuckerman *et al* (1965) also showed increased HSAP activity in serum.

Roopnarine Singh (1972) showed HSAP in liquor in toxaemia as 3.78 K.A.U./100 ml. which is consistent with our value of 3.39 K.A.U./100 ml. Our TAP value of liquor in toxaemias of 5.18 K.A.U./100 ml is higher than that of Beckman *et al* (1976) namely 3.74 K.A.U./100 ml.

None of the authors who have worked on alkaline phosphatase activity in toxaemia has done all the components and

therefore it is difficult to compare our work with previous authors. We have tried to formulate values of all the fractions of alkaline phosphatase in serum and amniotic fluid in toxaeimias of pregnancy.

References

1. Beckman, G., Beckman, L. and Lofstrand L.: Acta. Obstet. Gynecol. Scand. 57: 1, 1978.

2. Curzen, P. and Marris, I.: J. Obstet Gynec. Brit. C'wth. 73: 640, 1966.
3. King, P. B. N. and King, E. J.: J. Clin. Path. 7: 324, 1954.
4. Roopnarine Singh, S., Morris, D. and Matadial, L.: J. Obstet. Gynec. Brit. C'Wth. 79: 29, 1972.
5. Sammour, M. B., Mohyi, A. R., Fawzi, K. K. and Mohamed, M. Obd-El-Fattah: Acta. Obstet. Gynec. Scand. 54: 393, 1975.
6. Zuckerman, H., Sadovaky, E. and Kalhner, B.: Obstet. Gynec. 25: 819, 1965.

SUMMARY

This of Dhara's study was studied for their obstetric practices and were assessed for their training needs. 50% of the data showed their desire to take up training.

It is felt from this study that there is a need to develop a continuous training programme for FBA (FB) in rural as well as urban areas. This will lead to decrease in maternal and infant mortality and morbidity and certainly help in decreasing the neonatal mortality rate and achieving the goal of Health for All by year 2000 AD.

It is felt from this study that there is a need to develop a continuous training programme for FBA (FB) in rural as well as urban areas. This will lead to decrease in maternal and infant mortality and morbidity and certainly help in decreasing the neonatal mortality rate and achieving the goal of Health for All by year 2000 AD.

It is felt from this study that there is a need to develop a continuous training programme for FBA (FB) in rural as well as urban areas. This will lead to decrease in maternal and infant mortality and morbidity and certainly help in decreasing the neonatal mortality rate and achieving the goal of Health for All by year 2000 AD.

It is felt from this study that there is a need to develop a continuous training programme for FBA (FB) in rural as well as urban areas. This will lead to decrease in maternal and infant mortality and morbidity and certainly help in decreasing the neonatal mortality rate and achieving the goal of Health for All by year 2000 AD.

It is felt from this study that there is a need to develop a continuous training programme for FBA (FB) in rural as well as urban areas. This will lead to decrease in maternal and infant mortality and morbidity and certainly help in decreasing the neonatal mortality rate and achieving the goal of Health for All by year 2000 AD.

It is felt from this study that there is a need to develop a continuous training programme for FBA (FB) in rural as well as urban areas. This will lead to decrease in maternal and infant mortality and morbidity and certainly help in decreasing the neonatal mortality rate and achieving the goal of Health for All by year 2000 AD.