

ASSESSMENT OF FETO-PLACENTAL FUNCTION IN NORMAL AND DIABETIC GRAVIDAS

(Heat Stable Alkaline Phosphatase)

by

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Introduction

Coryn in 1934 reported that an isoenzyme of alkaline phosphatase is present in maternal serum. Beck and Clark (1950) and Boyer (1964) stated that the 50% alkaline phosphatase during later half of pregnancy was of placental origin. Lister in 1967 localised that the enzyme is present in microvilli of syncytiotrophoblast. Neale *et al* (1964) discovered that alkaline phosphatase from other sources were heat labile and tended to be almost entirely activated with 30 minutes at 56°C. McMaster *et al* (1964) showed that during pregnancy, rise in enzyme was due to heat resistant fraction. Messers (1967), Curzen and Morris (1968) and Hunter (1969) suggested that the assay of alkaline phosphatase in maternal serum might be valuable, as an indicator of placental function and fetal well-being.

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Material and Method

This paper comprises the study of serial serum heat stable alkaline phosphatase in diabetic pregnant women. These women had bad obstetric history, such as habitual abortion, premature still-birth, full term still birth. These women had antidiabetic treatment according to severity of the disease. These drugs are oral antidiabetic, plain insulin, Lente insulin. The control of diabetes is assessed on the basis of post-lunch blood sugar.

One hundred and five normal pregnant women were studied. This includes 15 women in every gestation from 12 weeks to term. These women had normal glucose tolerance test.

In diabetic subjects, the estimation of heat stable alkaline phosphatase (HSAP) was done serially. The study started with 8 pregnant diabetic women at 12 weeks gestation. Six cases were added at 16 weeks gestation. Eleven more cases were added to this serial study at 20 weeks of gestation.

All sera were inactivated at 65°C for half an hour and then precessed by King and King's method for alkaline phosphatase (Microanalysis in Medical Biochem. V Ed., p. 104).

Results

Heat Stable Alkaline Phosphatase in Normal and Diabetic Pregnant Women
(Units: KAU/100 ml)

Gestation	12 weeks	16 weeks	20 weeks	24 weeks	28 weeks	32 weeks	Full term
Normal pregnancy	1.38	1.87	2.50	2.99	3.59	4.10	6.50
Mean \pm S.D.	± 0.53	± 0.33	± 0.60	± 0.57	± 1.03	± 1.43	± 1.84
Diabetic pregnancy	0.97	1.48	2.00	2.65	3.14	3.72	5.24
Mean \pm S.D.	± 0.38	± 0.51	± 0.73	± 0.84	± 0.95	± 1.09	± 1.87

Differences between normal pregnancy and diabetic pregnancy are insignificant.

Heat Stable Alkaline Phosphatase of Diabetic Pregnant Patients on Various Drugs
(K.A. Units/100 ml)

Gestation	Normal	Oral	Planin insulin	Lente insulin
12 weeks	1.38	1.09	0.5	0.8
16 "	1.87	1.59	1.0	1.25
20 "	2.50	2.22	1.32	1.87
24 "	2.99	2.69	1.77	2.52
28 "	3.59	3.42	2.40	3.02
32 "	4.10	4.04	2.87	3.55
Full term	6.50	5.89	4.50	4.95

Discussion

It is a known fact that under prolonged stress condition, there is alteration of carbohydrate metabolism and in the renal function. Due to this, 80% of normal pregnant women excrete glucose and lactose in urine during late pregnancy. Toxic effect due to disturbed carbohydrate metabolism and due to lack of insulin has an adverse effect if the woman is pregnant, on both fetus and on the mother itself. However, these studies have proved, that when diabetes is controlled by administering the proper well tolerated antidiabetic drugs like phenformin hydrochloride, plain insulin and Lente insulin, the disturbed menstrual cycles are corrected and thereby help conception and the

toxic effects are minimised. As heat stable alkaline phosphatase is of placental origin, it is observed from results of the follow-up studies, that differences in normal pregnancy group and diabetic group are not significant. This therefore proves that pregnancy in diabetic group progresses without any complications, as fetoplacental function proves to be normal and subsequent results after delivery also indicates the normal development of babies both in weight and health.

Summary

A study of 105 normal gravida and 25 diabetic pregnant women were carried out in order to assess the fetoplacental function. The sera of these patients were

analysed for heat stable alkaline phosphatase. The differences in values between the two groups were insignificant which could confirm the normal progress of pregnancy.

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