

OXYTOCINASE IN HIGH RISK PREGNANCY

by

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SUMMARY

In the management of High Risk Pregnancy (HRP) patients, we studied a Placental enzyme called "Oxytocinase" in the maternal serum. Cystine amino peptidase i.e. serum oxytocinase is produced in increasing amounts during pregnancy and its concentration in the maternal blood is directly proportional to the functional capacity of the placenta. In our study we found a good correlation of the serum oxytocinase values and diagnosis of the patient and outcome of the pregnancy.

Introduction

This study was carried out to assess the significance of the values of serial estimation of oxytocinase in the maternal serum in the management of H.R.P. patients. Since the levels of oxytocinase directly reflect the functioning of the fetoplacental unit it is a parameter in monitoring H.R.P. cases.

Oxytocinase Cap (Cystine amino peptidase) is an enzyme produced by the placenta in increasing amounts during pregnancy and its concentration in maternal blood is directly proportional to the functioning capacity of the placenta. Normal range was obtained by estimating the levels at various gestational periods, starting from 28 to 40 weeks of normal pregnancies.

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The procedure for estimation of oxytocinase is simpler and shorter as compared to urinary oestriol and it requires only 0.6 ml. of serum sample rather than 24 hours collection of urine sample. It may provide a better avenue for the management of H.R.P. patients in case the two parameters are closely parallel in their values in the assessment of placental function or the assessment of fetoplacental unit.

Finally the evaluation of the significance of the values of serum oxytocinase was done by correlating the results with the outcome of the pregnancy.

Material and Methods

This study was carried out in 82 patients with high risk pregnancy attending H.R.P. Clinic during a period of one year from October 1980 to October 1981. The total number of samples collected was 270. On an average 3 estimations of oxytocinase

were done per patient starting from 26 weeks onwards. The patients consisted of (Table I).

TABLE I

Pre-eclampsia and hypertension	30
I.U.G.R.	6
Heart disease	2
Postmaturity	7
BOH	35
Diabetes	2

3 ml. of blood was collected in heparin.

The calorimetric method of determining the Serum Oxytocinase was first described by Tuppy and Nesvedba in 1957. The whole procedure lasted 8½ hours.

The method used by us for the above studies was the rapid method by Babuna and Yenan 1966. Babuna and Yenan have modified the method by Tuppy and Nesvedba and thus reduced the procedure to 3 to 4 hours. The procedure depends upon the conversion of substrate (L-Cystin-di-B-Naphthylamide) by the enzyme in serum and liberation of — naphthylamine, a colourless product at the end of reaction. This is followed by a coupling reaction with subsequent conversion of — naphthylamine to an azo-dye which is measured spectrophotometrically.

Results

The total number of samples studied was 270. The levels of serum oxytocinase were compared with the predetermined, mean values of the enzyme at different periods of normal pregnancies. Shown in Table II.

TABLE II

	Average	Mean
26 wks.	102 to 240	177.2
28 wks.	140 to 251	207
30 wks.	181 to 267	217
32 wks.	168 to 340	257.1
34 wks.	292 to 456	338.8
36 wks.	324 to 523	412.1
30-40 wks.	347 to 569	452.41

Results of the values of serum oxytocinase were correlated with the outcome of pregnancy in terms of foetal weight and its condition at birth. Among these 82 patients the nature of deliveries are shown in Table III.

TABLE III

L.S.C.S.	21
Still birth	3
Normal delivery	40
Forceps	7
Premature	9
Breech	1
Abortion	1

There was a good correlation between the serum oxytocinase values and the outcome of the pregnancy in 63 patients. All these patients in graph I had a full term delivery with a mature foetus and the serum oxytocinase values were within normal range.

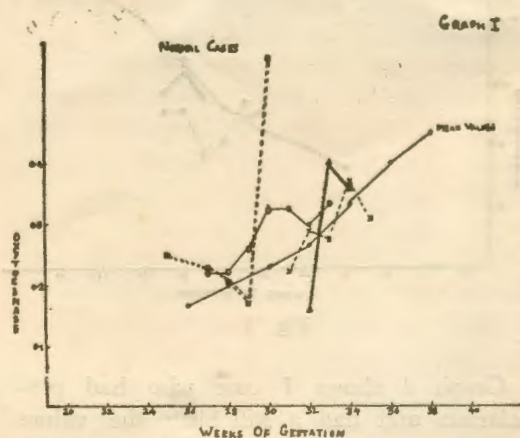


Fig. 1

But in 5 patients in graph 2 with a mature foetus the values of serum oxytocinase were low for that period of gestation.

GRAPH II

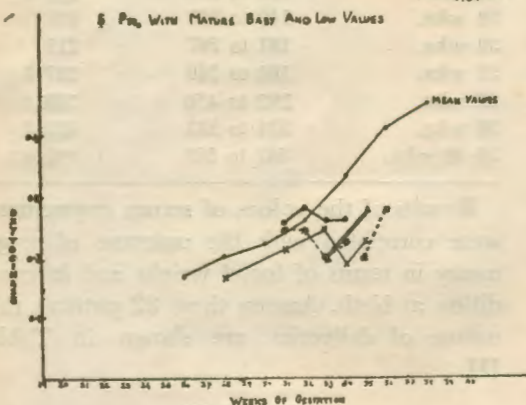


Fig. 2

In 2 cases which are in graph 3 (of IUGR) the values remained continuously lower than normal for that particular period of gestation and correlated with the outcome. But in other 2 cases of IUGR the values of serum oxytocinase remained normal and thus did not correlate with the outcome.

GRAPH III

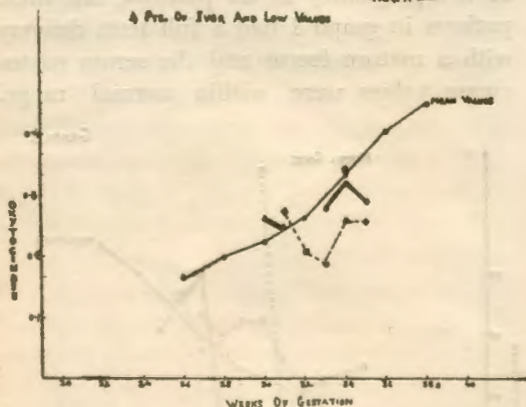


Fig. 3

Graph 4 shows 1 case who had pre-eclampsia and had a still birth the values were low to begin with and later showed a fall. In another case of IUGR who had

still birth, the serum oxytocinase values remained very low throughout the latter weeks of pregnancy. Contrary to these findings one patient with pre-eclampsia had normal values and a still birth.

CASES OF STILL BIRTH

GRAPH IV

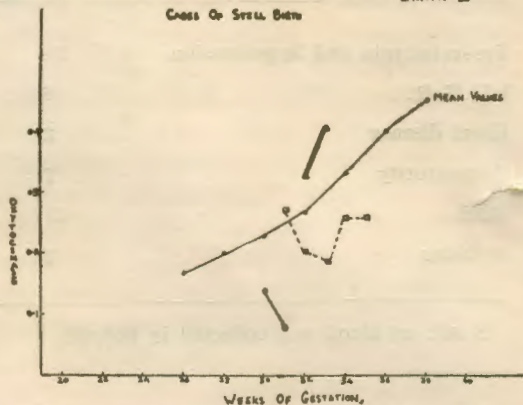


Fig. 4

Graph 5 shows 5 cases of premature deliveries whose serum oxytocinase values were low for the corresponding periods of gestation and all of them had low birth weight babies. While in 2 cases of premature delivery the values were high and did not correlate with the outcome of the pregnancies.

GRAPH V

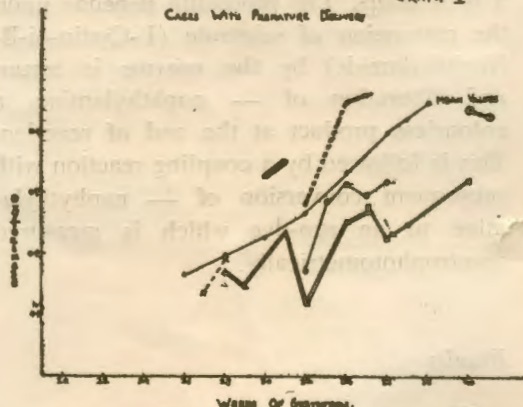


Fig. 6

On the whole there was a good correlation of the serum oxytocinase values with the outcome of pregnancy in 87.8% (72 cases), of the cases.

Discussion

A normally functioning placenta is the most important necessity for a normal course of pregnancy and foetal outcome. Since the enzyme oxytocinase is synthesised in placenta, it can be used as indicator of placental function. The normal gradual rise in its levels with the increasing gestation could be a good indicator of diminished placental activity. There are controversial reports regarding the serum oxytocinase values and their correlation with placental weight and with infant weight in toxemia of pregnancy. Spellecy *et al* (1977) and Shahani and Merchant in (1979) showed a good correlation with the low values and the fetal outcome and placental weight in 70% of toxemia cases but in 20% low levels of serum oxytocinase were associated with normal placental function.

The pre-eclamptic patients demonstrate a mean oxytocinase activity about 30% lower than the normal mean Ichaiotis and Lamprinopows (1964) other studies suggested that the decrease in oxytocinase levels in pre-eclamptic gravidas reported in these studies may be caused by the more common occurrence of placental dysfunction and fetal compromise in the patients who have their pregnancies complicated by pre-eclampsia.

Several studies reports that a few selected cases of pre-eclampsia and related "Placental insufficiency" were associated with subnormal oxytocinase levels (Babuna and Yenen 1966), Cater *et al* 1974 and Hensleigh and Krantz 1970).

Hensleigh and Krantz (1970) found a good correlation in case of IUGR and hydramnios but stated that oxytocinase levels alone cannot prognosticate fetal anomalies or still births. It can give warning signal but because of its slow half life a single test may not be able to indicate an impending danger to the fetal life. Studies of Curzen and Varma (1973) in their findings

suggest that the more severely growth retarded fetuses, especially those with signs of fetal distress are more likely to have decreasing enzyme levels.

Pefruco *et al* (1973) reported that oxytocinase determinations were more accurate in predicting intrauterine growth retardation than was oestrogen excretion.

In our study, we found a good correlation of the serum oxytocinase values with the outcome of the pregnancy in 87.8% of cases.

However, a single value of serum oxytocinase can not be taken as an indicator of placental function or foetal condition. A serial estimation of its level in H.R.P. cases can be used as one of the parameters in monitoring the fetal state along with the other biophysical and biochemical methods.

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