

RELATIONSHIP BETWEEN PLASMA PROTEINS AND PLASMA CYSTINE AMINOPEPTIDASE (OXYTOCINASE) IN NORMAL PREGNANCY

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Introduction

During normal pregnancy placenta produces cystine aminopeptidase (CAP). Concentration of this enzyme increases with advancing gestational period of normal pregnancy (Josephides and Turkington (1967), Malkani *et al* (1971), Ryden (1972), Curzen and Varma (1973), Shahani and Merchant (1979). Since this enzyme diffuses in the maternal plasma, so it is a good parameter to assess the fetoplacental function. Present work was undertaken to correlate this enzyme with plasma protein levels in the normal pregnancy.

Materials

Study was carried out on non-pregnant and pregnant women who were attending antenatal clinic or were admitted in the wards of the Queen Mary's Hospital, Lucknow. Aim of the test was explained to each woman. Five non-pregnant healthy women served as controls, while 64 cases were pregnant women, details of whom are shown below.

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Accepted for publication on 11-11-80.

| Normal. Pregnancy | No. of Cases |
|-------------------------------|--------------|
| First trimester | 8 |
| Second trimester | 12 |
| Third trimester | 16 |
| Normal labour | 10 |
| Puerperium (within 1 week) | 12 |
| Puerperium (within 4-6 weeks) | 6 |
| Total | 64 |

Methodology

Five ml blood was collected in heparinized tubes and plasma was separated by centrifugation (4000 r.p.m. for 5 minutes). Plasma oxytocinase was measured according to the method of Babuna and Yemen (1966).

The method is based on the enzyme released of naphthylamine. The free naphthylamine is diazotized by a modification of Bratton Marshall procedure. The product thus formed is coupled with n(naphthyl) ethylene diamine dihydrochloride to yield stable blue azo dye which is measured spectrophotometrically at 565 nm Uv2 (Carl Zeiss, East Germany) Enzyme was expressed as mg/100 ml of plasma/hr. Plasma protein concentration was measured by modified technique of Breener *et al* (1969) using 1 microliter specially designed glass pippets.

Levels of statistical significance were determined using student 't' test.

Results

Results of this study are summarized in Table I. In 64 women, plasma proteins

the two is not statistically significant. However, if plasma oxytocinase is expressed as per gram of plasma proteins, difference between the two is statistically significant. Plasma oxytocinase continues to rise to statistical significant proportions in

TABLE I
Plasma Oxytocinase and Plasma Protein Profile During Different Stages of Normal Pregnancy

| | Plasma proteins gm% | Plasma oxytocinase mg/100 ml/hr | Plasma oxytocinase/ gm of plasma proteins |
|--------------------|------------------------|------------------------------------|--|
| Non-pregnant state | 7.2 ± 0.11 (5) | 0.63 ± 0.11 (5) | 0.08 ± 0.01 (8) ** |
| First trimester | 6.9 ± 0.14 (8) ** | 0.83 ± 0.05 (8) *** | 0.11 ± 0.01 (8) *** |
| Second trimester | 7.4 ± 0.17 (12) | 1.49 ± 0.09 (12) *** | 0.20 ± 0.01 (12) *** |
| Third trimester | 6.7 ± 0.16 (16) | 3.85 ± 0.46 (16) *** | 0.59 ± 0.07 (16) *** |
| Puerperium | 7.5 ± 0.27 (10) | 5.40 ± 0.71 (10) *** | 0.73 ± 0.08 (10) *** |
| First week | 6.7 ± 0.15 (10) | 2.70 ± 0.43 (10) | 0.39 ± 0.04 (10) |
| Fourth week | 6.7 ± 0.10 (6) | 0.71 ± 0.05 (6) | 0.10 ± 0.01 (6) |

(n) No. of Cases Included in the Study

* p < 0.05

** p < 0.02

*** p < 0.01

and plasma oxytocinase were simultaneously measured. Plasma protein level in 5 non-pregnant women was 7.2 ± 0.11 gm%, while in first trimester it was 6.9 ± 0.14 gm%. However, during second trimester of pregnancy, plasma protein levels were less. The difference between first and second trimesters of pregnancy in plasma proteins levels is statistically significant p < 0.02. In all other stages of the pregnancy plasma protein levels were within the normal limits.

Plasma oxytocinase in the 5 control non-pregnant women was 0.63 ± 0.11 mg/100 ml/hr. its values were slightly higher in the first trimester 0.83 ± 0.05 mg/100 ml/hr, although the difference between

the second and third trimesters of pregnancy. p < 0.01. Same pattern is observed when enzyme is expressed as per gram of plasma proteins.

During puerperium values remain higher 5.4 ± 0.71 mg/100 ml/hr. Decline starts from the first week of the puerperium and in the fourth week values are nearly normal to non-pregnant levels 0.71 ± 0.05 mg/100 ml/hr as shown in Table I.

Discussion

Plasma protein levels in non-pregnant state and first trimester are within normal limits. However, during the second tri-

mester plasma proteins decrease to statistically significant levels. This decrease may be due to the organogenesis in the second trimester of pregnancy. In the third trimester, levels are similar to the first trimester; these findings are quite different from the one reported by Yunus *et al* (1978), who have reported serum proteins by Nesslerization method where 0.5 ml of blood is needed, whereas in this study only 1 μ l of plasma has been used, thereby reducing the volume distributed errors. It is also possible that difference may be due to the different nutritional daily allowances of the two populations studied.

Oxytocinase when expressed per gram of plasma proteins has shown that from first trimester the values are statistically significant, while in most of the studies the statistical significance is observed after the first trimester of pregnancy. Plasma oxytocinase remains elevated in the second and third trimesters and in puerperium of normal pregnancy. Values are near normal levels after four weeks of the normal delivery, these findings are similar as reported by Riad (1962), Melander (1961), Babuna and Yenen (1966), Shahani and Merchant (1979). No correlation between plasma oxytocinase and plasma proteins could be found in the literature. However, elevated levels were found right from the first trimester when enzyme was expressed as per gram of plasma proteins.

Summary

Sixty-four normal healthy and preg-

nant women in different trimesters of pregnancy were simultaneously screened for plasma protein and plasma oxytocinase profile. Levels of plasma proteins decreased in the first and third trimesters when compared to non-pregnant values. However, level was slightly increased in the second trimester. Plasma oxytocinase when expressed/gm of plasma proteins were statistically significant in all the three trimesters of normal pregnancy. Levels remained elevated up to the third week of puerperium, but were within normal limits in the fourth week.

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