

ROLE OF 5-HYDROXYTRYPTAMINE IN TOXAEMIA OF PREGNANCY

T. K. BHATTACHARYYA* AND P. K. DEBNATH**

**Department of Pharmacology,
School of Tropical Medicine,
Calcutta - 700 073*

and

***Department of Internal Medicine,
J.B. Roy State Ayurvedic Medical College Hospital,
Calcutta - 700 004*

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Abstract: 5-HT concentration in blood of 24 randomly selected pregnant women presenting with signs and symptoms of toxæmia of pregnancy were estimated and compared with 30 normal pregnant women. As such 5-HT level increases with the progress of pregnancy and in toxæmia group in comparison to normal pregnancy. A change in the degree of oedema from moderate to severe could bring a statistically significant change in blood pressure and serum 5-HT level. Increased 5-HT plays a role in toxæmia as well as in normal pregnancy and some of the toxic effects observed in toxæmia of pregnancy are due to the effects of 5-HT.

Key words : toxæmia of pregnancy 5-HT serotonin

INTRODUCTION

The presence of serotonin (5-Hydroxytryptamine, 5-HT) in the mammalian reproductive system (1) had stimulated investigators to find out its role in the normal physiological functions and in diseased state in obstetrics. Attempts have been made to implicate 5-HT in toxæmia of pregnancy (2) also, although Israel (3) failed to observe such role. In certain studies relating to 5-HIAA (a metabolic product of 5-HT) excretion (3) in urine of normal vis-a-vis toxæmia of pregnancy, no definite correlation with 5-HT and its excretion in normal as well as toxæmia of pregnancy (3, 4) could be established. A conclusive role of 5-HT in maintenance and termination of pregnancy could not be established as none of available data relating uterine

and placental 5-HT content in human being (1) could show the values at different stages of pregnancy in any systematic manner.

This prompted the authors to study the role of 5-HT in normal and toxæmia of pregnancy.

METHODS

The study was conducted on 30 normal pregnant mothers and 24 patients with different grades of toxæmia attending antenatal O.P.Ds at J.B. Roy State Ayurvedic Medical College Hospital, Calcutta and S.S. K.M. Hospital, Calcutta. The age ranged from 18 to 24 years and the subjects were otherwise healthy with average built and nutrition and of different socio-economic status. The criteria to grade the toxæmic

*Corresponding Author

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patients were based on blood pressure and oedema. The patients were grouped according to the period of gestation : 32-34 wks and 35-39 wks. The period of gestation was calculated from the first day of the last menstrual period. Blood samples were analysed for 5-HT spectrofluorometrically following the method of Snyder et al (5).

RESULTS

The blood 5-HT concentration ($\mu\text{g/ml}$) in normal and toxaemia of pregnancy in different

TABLE I : 5-HT concentration ($\mu\text{g/ml}$) in normal and toxaemia of pregnancy in different periods of gestation.

Week of gestation	<i>(n)</i>	Blood 5-HT concentration (Mean \pm S. E. M.)		Toxaemia
		normal	<i>(n)</i>	
32-34	15	0.289 \pm 0.032	12	0.398 \pm 0.059
35-39	15	0.331 \pm 0.041	12	0.439 \pm 0.052
Pooled	30	0.297 \pm 0.038	24	0.423 \pm 0.065

TABLE II : Relationship between blood 5-HT concentration and blood pressure with grades of oedema in toxaemia of pregnancy.
(Mean \pm S. E. M.)

Degree of oedema	<i>(n)</i>	Blood pressure (mm of Hg)		Serum 5-HT ($\mu\text{g/ml}$)
		Systolic	Diastolic	
Control	24	120.63 \pm 3.95	78.55 \pm 3.49	0.308 \pm 0.027
Moderate (++)	14	138.67 \pm 4.97*	101.33 \pm 4.65*	0.365 \pm 0.036
Severe (+++)	10	159.33 \pm 5.02**	128.53 \pm 5.64**	0.509 \pm 0.042**

P value v/s control : * < 0.01, ** < 0.001

gestational periods (32 - 34 and 35 - 39 wks) are not significantly different although an apparent increase was observed in toxaemia groups (Table I). The relationship between blood 5-HT concentration and blood pressure with oedema is shown in Table II. Worsening of oedema seems to play a significant role in blood pressure as well as blood 5-HT content.

DISCUSSION

Reports suggesting increase in 5-HT concentration with the progress of pregnancy (6) and more so with toxaemia of pregnancy (2) and the demonstrated ability of increased 5-HT to induce foetal death and deformity in pregnant rats and mice with carcinoid syndrome (4) hints at a strong possible role of 5-HT in the pathophysiology of gestation including toxaemia of pregnancy. Also, an increase in 5-HT level in toxaemia (4, 7) and antagonizing effect of specific 5-HT inhibitors (2) in pregnancy, suggest a possible

influence of 5-HT in toxaemia of pregnancy. 5-HT regulates certain physiological functions and some of its effects in toxaemia and normal pregnancy are direct. Imbalance in the production of vasoactive PGs (thromboxane A_2 and prostacyclin) (8) leading to the vasoconstriction of small arteries and platelet activation observed in toxaemia of pregnancy, may also be 5-HT mediated, atleast to a significant extent like some other physiological functions widely discussed.

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