SERUM SIALIC ACID LEVELS IN NORMAL PREGNANT AND NON-PREGNANT WOMEN

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Summary: Serum sialic acid estimation was done in 97 pregnant and 61 non-pregnant healthy women. A progressive rise in the level was observed as the pregnancy advanced. The rise was higher in subjects above 30 years of age. Non-pregnant women weighing more than 50 *kg* had a significantly higher serum sialic acid level, but the contrast was reversed during pregnancy and puerperium.

Key words : sialic acid pregnant and non-pregnant women

INTRODUCTION

Serum sialic acid is a protein bound carbohydrate and may be considered a monosaccharide (3,10). Its presence in many tissues of men and animals suggests that it may have an important biological role (17).

There are only a few reports in the literature regarding the significance and role of sialic acid during pregnancy (4,7,12). An attempt has been made in the present study to observe the variation, if any, in the serum sialic acid levels in various trimesters of uncomplicated pregnancy and during the post partum period, and to correlate these values with the age and weight of subject.

MATERIALS AND METHODS

The study was conducted on normal women in the age group of 20 to 40 years. Of the 158 women investigated, 97 were pregnant and 61 non-pregnant. Two *ml* of blood was collected from the antecubital vein with a dry syringe and transferred into a sterilized dry vial and allowed to clot. Serum was collected and analyzed for total sialic acid on the same day.

Estimation of sialic acid was done by thiobarbituric acid method (13) which is a sensitive and specific procedure for determining total, bound and free sialic acid (5,8,19). For preparation of the standard curve, N-acetyl neuraminic acid was obtained from Patel Chest Institute, Delhi. Optical density was read at 550 $m\mu$ in Spectronic 20 Colorimeter (Bosche & Lomb).

RESULTS AND DISCUSSION

Table I shows the total serum sialic acid levels in normal pregnant, non-pregnant and puerperal subjects. Total serum sialic acid concentrations reported by various authors show a wide scatter (1,4,9,11,16). In the present study, the level in the non-pregnant group (mean±standard error) was 61.6±1.7 *mg* %, whereas in the pregnant group, a progressive rise was observed as the pregnancy advanced. The values for 1st, 2nd and 3rd trimester (mean±standard error) were 65.3±1.8 *mg*, 71.4±1.9 *mg* and 81.9±2 *mg*% respectively. The increase was statistically significant ($P<0.05$). Other workers

TABLE I : Total serum sialic acid levels in normal women.

Category	*No. of observations (n)*	*Sialic acid level (mg/100 ml)*		
		Mean	*S.D.*	*S.E.*
I. Non-pregnant	30	61.6	9.2	1.7
II. Pregnant :				
(a) 1st trimester	30	65.3*	9.9	1.8
(b) 2nd trimester	31	71.4**	10.9	1.9
(c) 3rd trimester	36	81.9***	12.5	2.0
III. Puerperium	31	74.3****	11.8	2.1

*P < 0.05 (compared to non-pregnant)
**P < 0.05 (compared to 1st trimester)
***P < 0.05 (compared to 2nd trimester)
****P < 0.05 (compared to 3rd trimester)

(4,12) have reported a similar increase during pregnancy but the subjects have not been followed up after delivery. We observed a fall in the sialic acid level after delivery in all the subjects. This fall was significantly more in multigravidae than in primigravidae (Table II). Increased concentration of serum sialic acid during pregnancy could be due to formation of a sialomucin barrier at the fetomaternal interface by alpha and beta globulins of the mother and raised level of human chorionic gonadotropin and alpha fetoprotein,

which contain variable amounts of sialic acid (6,12). The reason for the higher levels of the acid in primigravidae during puerperium is not clear.

TABLE II : Total serum sialic acid levels in primigravidae and multigravidae.

Category	*Serum sialic acid (mg %) (mean ± S.E.)*	
	Primigravidae	*Multigravidae*
1st trimester	65.3±4.8	65.3±1.9
2nd trimester	68.6±4.6	72.4±2.0
3rd trimester	82.1±3.2	81.8±2.6
Puerperium	80.1±2.5	69.5±2.7

Table III shows the levels of serum sialic acid in subjects below and above 30 years of age. The basic trend of the rise during pregnancy was observed in both the groups but the rise was significantly higher in subjects above 30 years of age. A similar rise has been reported earlier by some workers (2), but not by others (14, 15).

TABLE III : Total serum sialic acid levels in women of various age groups.

Category	*Sialic acid level (mg%)*	
	Age below 30 yr	*Age above 30 yr*
I. Non-pregnant	59.5±2.3	64.0±3.1
II. Pregnant :		
(a) 1st trimester	62.5±2.6	68.9±1.8
(b) 2nd trimester	70.7±2.4	73.1±2.9
(c) 3rd trimester	81.4±2.1	85.8±6.6
III. Puerperium	74.4±2.2	74.0±6.1

We have not come across any work relating the serum sialic acid with the weight of the subject. We have attempted to correlate the two parameters and the results are shown in Table IV. The subjects were divided in two groups, viz. below and above 50 *kg* body weight. Non-pregnant women weighing more than 50 *kg* had a significantly higher

serum sialic acid level, but the contrast was reversed during pregnancy and puerperium. The gain in weight during pregnancy is presumed to be due to retention of water (18). Therefore, the lower values of serum sialic acid in pregnant subjects over 50 *kg* body weight could be due to hemodilution.

TABLE IV : Total serum sialic acid levels in women in relation to body weight.

Category	*Sialic acid level (mg%) (Mean±S.E.)*	
	Weight below 50 kg	*Weight above 50 kg*
I. Non-pregnant	58.3±2.7	64.1±1.8
II. Pregnant :		
(a) 1st trimester	66.8±1.9	64.0±2.8
(b) 2nd trimester	74.1±2.9	69.4±2.5
(c) 3rd trimester	89.6±4.2	79.3±2.1
III. Puerperium	76.8±2.5	72.5±3.0

Relationship between period of gestation and serum sialic acid was worked out with the help of Personian Correlation coefficient which worked out to be positive ($r = +0.536$). For prediction of serum sialic acid level (Y) for a given period of gestation (X) or vice versa, the regression equations are as under :

$$Y = 0.654\ X + 59.715$$
$$X = 0.440\ Y - 11.324$$

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