



Study of Serum Copper Level in Normal And Abnormal Pregnancy.

KEYWORDS

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ABSTRACT *OBJECTIVE: To investigate changes in Serum Copper Level in non-pregnant and pregnant women (different trimester and period of gestation) of different age group.*

METHODS: The study was conducted in department of Gynecology, RNT Medical College, Udaipur (Rajasthan)

RESULTS: Results were evaluated and compared Serum Copper Level in non-pregnant and pregnant woman (I, II and III trimester) and it was found to be significant.

CONCLUSION: In present study changes in Serum Copper Level is important in diagnosis and medical management, and nutritional status of non-pregnant and pregnant woman.

INTRODUCTION

Placental insufficiency can be detected by estimation of Chorionic Gonadotropin, Pregnanediol, Progesterone and Estrogen concentrations in maternal serum or urine. Maternal serum copper level determination predict placental functions and it is important in diagnosis, medical management of intrauterine Foetal condition (James A et al 1996). The increased level of copper during pregnancy and its bound (95%) to ceruloplasmin, an enzyme with an oxidative effect, maternal serum copper level in pregnancy have been reported in literature Baierstreri R. (1963), D Jerome et al (1965), Friedman S et al (1969), Thieme R et al (1973), Kapoor (1977), A-Guo et al (2004) and R Janghorban (2015).

Other enzymes which increase in pregnancy such as ceruloplasmin and histaminase and very sensitive indicator of normal pregnancy and placental function, but these assay and enzymes is very costly. However, determination of serum copper level is simple, sensitive and not requires well equipped and expensive laboratory and chemicals. In present work was undertaken to evaluate Serum Copper Level in non-pregnant and pregnant women.

MATERIAL AND METHOD

The present study was conducted in the department of Gyenecology RNT Medical College Udaipur (Rajasthan). The subjects of study were 120 and selected from outdoor, antenatal centre and ward. All healthy women not suffering from any infectious disease, anemia, leukemia, lever disease and malignant disease were included in present study.

SELECTION OF CASES

The cases were divided into following main groups:-

1. Normal non-pregnant women having normal menstrual cycle.
2. Pregnant women in different trimester of pregnancy.

Detailed history of the patients regarding the period of amenorrhea, associated complains, menstrual history

and obstetric history was noted in self constructed questionnaire. General examination and systemic examination was done. Blood pressure of the cases was carefully noted.

SAMPLE COLLECTION

Blood was collected by venipuncture from the patients (pregnant women and non-pregnant women). Serum was separated, centrifuged and serum copper estimated.

COPPER ESTIMATION

Serum copper was done by method of Eden and Green (1940). The copper is released from its linkage to protein by mean of Hydrochloric acid, the protein is precipitated by trichloro-acetic acid and copper is extracted from the protein free fluid obtained into an amyl alcohol ether mixture as a golden yellow colored complex with sodium dithiocarbamate. The amount of this formed is read colourimetrically. Sodium pyrophosphate was added to prevent interference from iron.

RESULT

In our study Serum Copper Level estimated in 120 cases. Among them 60 were non-pregnant and 60 were pregnant women. Serum Copper Level during normal pregnancy are given in Table-1.

In non-pregnant woman Serum Copper (mean \pm S.D.) was 122 ± 4.82 $\mu\text{g/dL}$ and in different trimester of pregnancy (1st, 2nd and 3rd trimester) it was found to be (mean \pm S.D) 153.28 ± 3.45 , 251.10 ± 4.32 and 271.18 ± 5.29 $\mu\text{g/dL}$ respectively. (Table-1)

Changes in Serum Copper Level in normal pregnancy according to period of gestation are given in Table-2. It was significantly increases.

A significant correlation were found among different groups non pregnant (group- 1) and pregnant women(group-2) in I trimester II trimester and III trimester of pregnancy. When these groups were compared (group1 Vs group2, group1 Vs group3, group1 Vs group4)

Table-1: Serum Copper Level during normal pregnancy.

Groups	Time of estimation	No. of cases	Serum Copper Level (µg/dL)
1	Non-pregnant	60	122.00 ± 4.82
2	I – Trimester	60	153.28 ± 3.45
3	II – Trimester	-	251.10 ± 4.32
4	III – Trimester	-	271.18 ± 5.29

P-Value: *Gp-1 Vs Gp-2 < .001, *Gp-1 Vs Gp-3 < .001, *Gp-1 Vs Gp-4 < .001
 (*Significant correlation) .

Group 2, Group 3, and group 4 = Same groups of pregnant women but in different trimester of pregnancy (I- trimester, II-trimester, III- trimester)

Table-2: Changes in Serum Copper Level in normal pregnancy (According to period of gestation)

Week of gestation	Mean value Serum Copper (µg/dL)	Range (µg/dL)
4	110.50	96-120
6	146.00	136-156
8	160.00	154-160
10	168.00	160-176
12	178.00	174-180
14	212.66	206-224
16	216.66	206-228
18	226.21	224-236
20	233.01	230-236
22	240.01	230-238
24	252.30	242-260
26	253.83	240-258
28	253.50	250-256
30	256.78	254-260
32	263.52	260-268
34	273.77	266-288
36	308.00	286-380

DISCUSSION

Copper is not only essential micronutrient but also significant value during pregnancy either normal pregnancy or abnormal pregnancy.

In present study we determined level of Serum Copper in normal non-pregnant woman and pregnant woman. In our study Serum Copper Level in non-pregnant woman was found to be 122.02 ± 4.82 µg/dL (mean ± S.D.). Other worker reported level of Copper in Serum such as Vukelic et al (2012), 11.6-25.8 µg/L, while Belesteri R et al (1963), Stoyan (1968), Kapoor et al (1977) reported Serum Copper Level which is similar to our study. According to R. Janghrban S (2015) lower Copper Level found in pregnant woman is due to iron supplementation, however, Izzeldin Ishraga (2015) reported that higher Copper level 251.2 µg/dL (mean) which is similar to present study. Ai-Guo ma et al (2004) reported that higher Copper Iron ratio in anaemic pregnant women may be attributed to the fact that iron deficiency increases Copper levels in the maternal liver, serum and placenta, however Gambling I 2003 demonstrated

that Copper Oxidase which is believed to fulfill the function of hephestin in placenta is regulated by Copper and Iron. National Academy of Nutrition U.S.A. (1990) reported that no Copper deficiency in pregnant women.

Table-2 in present study shows that changes in Serum Copper Level in normal pregnancy in different week of gestation (4 to 36 weeks) were found to be significant. Its level rises from 4 week to 36 week of pregnancy. Jung-eris (1974) reported Serum Copper Level in 343 in normal pregnant women in last trimester and demonstrated that gradual rise in the Serum Copper Level in pregnancy is caused by endogenous Oestrogen secretion.

CONCLUSION

In present study we concluded that Serum Copper Level in non-pregnant and pregnant women is important parameter and In pregnant women Serum Copper Level is higher than non-pregnant women. Serum Copper value is not only simple sensitive and specific parameter but also important in management of normal pregnancy.

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