ESTIMATION OF SERUM COPPER LEVEL IN CASES OF THREATENED ABORTION

By

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SUMMARY

Serum copper level was estimated in 100 cases of threatened abortion, 30 cases of normal pregnancy and in 10 non-pregnant cases. It shows that serum copper level is significantly higher in pregnant women than in non pregnant cases. It increases with advancement of pregnancy and serum copper level is lower in cases of threatened abortion than in normal pregnant cases of same gestational age. A rise of serum copper level after 15 days of first sample in cases of threatened abortion who continued pregnancy uninterrupted is a good prognostic sign and indicates a favourable outcome.

Introduction

Copper is a trace element forming integral part of several enzymes and co-factors and is widely distributed in all organs and tissues of the body. It has a biocatalytic property on the cell and plays an important part in the process of growth. Copper has an importance in the defensive reactions of organisms against different infections and particularly in the production of specific antibodies. There is a rapid rise of serum copper in the third month of gestation, a slow increase there after with a peak in the ninth month followed by a decrease in serum copper level.

Serum copper and urinary oestradiol levels run parallel to each other as far as foetal well being in concerned.

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In present study estimation of serum copper level was done as a prognostic aid in cases of threatened abortion.

Material and Methods

Serum copper was estimated in 140 cases of the present study of Eden and Green Technique (1940) by using a reagent diethyldithio-carbonate.

Observations

In present study serum copper was estimated in 140 cases. Out of which 10 were normal non-pregnant, 30 were of normal pregnancy and 100 cases were of threatened abortion. Mean serum copper value of non pregnant women was 114.5 μgm% with a range of 100.5 to 120.5 μgm% (Table I).

Thirty normal pregnant cases were studied upto 20 weeks of gestation.

TABLE I

Mean Serum Copper Levels at Different Periods of Gestation of Normal Pregnancy and at the Time of Labour

Gestation in weeks	No. of cases	Range in microgram%	Mean in Microgram%
Non-pregnant	10	100.5—120.5	114.15
6 Weeks	8	110.0—192.0	150.6
8 Weeks	6	122.5—204.0	165.5
10 Weeks	2	155.5—212.0	183.75
12 Weeks	4	180.5—260.0	220.5
14 Weeks	2	200.5—266.0	230.25
16 Weeks	4	230.0—265.0	242.8
18 Weeks	2	215.5—270.5	243.00
20 Weeks	2	220.5—280.0	250.25
22 Weeks	1	252.5	252.5
24 Weeks	3	240.0—284.5	262.25
26 Weeks	2	252.0—296.0	274.00
28 Weeks	2	258.0—298.5	278.25
32 Weeks	4	268.0—304.5	298.25
36 Weeks	8	272.0—320.0	297.81
Full term	4	264.5—275.0	270.37
During Labour	6	295.0—275.0	252.70

They all were random sampled and were studied in further weeks of gestation and in labour. An increase of serum copper was seen as pregnancy advanced. A steep rise was seen between 10-16 weeks of gestation, at term serum copper level decreased and was notably reduced during labour (Table I).

Mean serum copper level was lower in threatened abortion cases than in normal pregnancy of the same gestational period betwen 8 to 14 weeks but there was no significant difference at 6 weeks (Table II).

There was not much difference in the mean serum copper level of threatened abortion cases who aborted and in those who continued pregnancy.

Serum copper level showed an increase after 15 days of admission in cases who continued pregnancy uninterrupted indicating an improvement in placental function and oestrogen production (Table III). In present study all cases of 6 weeks gestation aborted (Table III).

Out of 100 cases of threatened abortion 42 aborted. In 30 cases abortion occurred with in 10 days of admission, in 8 cases it occurred between 2-3 weeks after admission and in 4 cases evacuation was done for missed abortion 3-5 weeks after admission, pregnancy continued after viability in 58 cases. There were 6 premature births 12 patients had L.S.C.S. for different foetal and maternal indications at 38 weeks to 40 weeks. Rest 40 cases had normal vaginal deliveries. All babies were born alive and healthy and had no congenital anomaly. Pregnancy continued in those cases where serum copper level was more than the mean value for the same period of normal ges-

TABLE II

Serum Copper Level (ugm%) in Cases of Normal Pregnancy (up to 14 Weeks) and Threatened Abortion of Same Gestational Age

Gestation in weeks	No. of cases	Serum copper in μgm%			P Value
		Range	Mean	± S.D.	
6 Weeks					
Normal Preg. (N.P.)	8	110.0-192.0	150.6	17.72	Not
Threatened Preg. (Th. Ab.)	8	91-142	126.00	10.05	significant
8 Weeks					
N.P.	6	122.5-204.0	165.5	15.96	<0.05
Th. Ab.	14	120.0-180.0	152.57	7.88	
10 Weeks					
N.P.	2	155.5-212.0	183.75	15.03	<0.001
Th. Ab.	20	144.0-196.0	170.0	9.53	
12 Weeks					
N.P.	4	180.5-260.0	220:5	19.84	<0.001
Th. Ab.	18	160.0-240.0	182.5	10.15	
14 Weeks					
N.P.	2	200.5-260.0	230.25	16.83	<0.001
Th. Ab.	14	170.0-208.0	189.05	9.53	

N.P. = Normal Pregnancy.
Th. Ab. = Threatened abortion.

TABLE III

Showing Mean Serum Copper in μgm% at First Visit and After 15 Days in Cases of Threatened Abortion Who Continued Pregnancy

Period of Gestation	No. of cases	Serum copper level in microgram %				P value between 1 and 2
		Initial (I)		After 15 days (II)		
		Mean	± S.D.	Mean	± S.D.	
8	10	158.00	7.35	172.50	6.84	<0.01
10	8	173.25	10.80	190.00	8.83	<0.01
12	12	186.00	10.32	196.66	12.19	<0.01
14	7	188.05	9.53	200.28	19.84	<0.001
16	9	201 8	10.4	247.9	8.15	<0.01
18-20	12	192.87	14.30	259.7	8.15	<0.01

tation while those who aborted had serum copper level lower than the mean value for the same period of normal gestation (Table IV).

Discussion

Mean serum copper level in non-pregnant women of present study is 114.5 μgm% which is similar to Kapoor *et al* (1977). Present study shows a rise of serum copper level as early as 6 weeks of gestation and significantly higher level at 8, 10, 12, 14 and 16 weeks of gestation. It is comparable to the findings of Kapoor *et al* (1977), Sneh Lata *et al* (1985). In our study serum copper level showed a

TABLE IV

Serum Copper Values in Cases Threatened Abortion in Relation to Mean Value in Normal Pregnancy for Same Gestation and Out Come of Threatened Abortion

Wks of gestation	Total No. of cases of Threatened abortion	No. of cases with serum copper level more than mean value in normal pregnancy	Outcome of threatened abortion		No. with serum copper level less than mean value in normal pregnancy	Outcome of threatened abortion	
			Aborted	Full term delivery		Aborted	Full term delivery
6	8	nil	—	—	8	8	nil
8	14	10	—	10	4	4	—
10	20	8	—	8	12	12	—
12	18	12	—	12	6	6	—
14	14	7	—	7	7	7	—
16	12	9	—	9	3	3	—
18	8	8	—	8	nil	—	—
20	6	4	—	4	2	2	—
Total	100	58	—	58	42	42	—

steep rise between 10-16 weeks followed by a slow and gradual rise till 36 weeks of pregnancy. Bhar *et al* (1975) had similar findings.

In our study a fall of serum copper level was noticed at term and at the time of delivery De Jearge (1965) and O'Leavy (1969) were of the same opinion.

Mean serum copper level in threatened abortion of our group was significantly lower than the normal pregnancy of the same period of gestation. It is similar to the findings of Sneh Lata (1985). Schanker *et al* (1971) also reported low serum copper level in cases of placental dysfunction and observed hypocupereamia in spontaneous abortion cases. Bhar *et al* (1975) found no significant difference in serum copper level of two, who aborted and those who continued upto 13-14 weeks, but a difference of 30-40% was observed between 16-21 weeks of gestation.

Friedman *et al* (1969) observed a lower mean serum copper level in those who continued pregnancy. In our study, those cases of threatened abortion who continued pregnancy showed a significant rise ($P < 0.01$) in serum copper level after 15 days of admission. Similar results were obtained Sneh Lata *et al* (1985).

Conclusion

Thus it is concluded that serial estimation of serum copper may aid in evaluating any placental insufficiency but an early diagnosis of impending abortion on the basis of single serum copper estimation may not be possible. However a low serum copper level in cases of threat-

ened abortion is a poor prognostic sign. Though a normal or high level does not necessarily indicate a successful out come. But a rise 15 days after first sample indicates an improvement in placental function and oestrogen production.

References

1. Bhar, S. K., Eduljee, S. Y. and Bhatt, I. N. J. Obstet. Gynec. India, **25: 451, 1975.**
2. De Jovge, F. P.: Obstet. Gynec. **26: 225, 1965.**
3. Eden, A. and Green, H.: J. Biochem., **34: 1202, 1940.**
4. Friedman, S., Bahary, C., Eckerlind, B. and Gens, B.: Obstet. Gynec. **33: 189, 1969.**
5. Kapoor, M., Kishore, N. and Gupta, K.: J. Obstet. Gynec. Inda, **27: 367, 1977.**
6. O'Leary, J. A.: Am. J. Obstet. Gynec. **105: 636, 1969.**
7. Schanker, J. G., Jangreis, E. and Polishuk, W. Z.: Am. J. Obstet. and Gynec. **107: 2, 1971.**