

## SIGNIFICANCE OF MATERNAL AND CORD BLOOD UREA IN TOXEMIA OF PREGNANCY AND FOETAL OUTCOME

by

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Toxemia of pregnancy is a major factor responsible for foetal loss. Incidence of foetal loss becomes high with the severity of the disease. To detect the severity of disease and to forecast about the foetal well being, blood urea level estimation may be a simple and reliable test. Urea being the end product of protein metabolism its excretion depends upon adequate renal function. In severe toxemia there is reduced renal flow and impairment of urea clearance which results in retention of urea in the body.

The present study is undertaken to know whether blood urea level may be taken as reliable indicator of severity of disease and to know the relation between blood urea and foetal outcome.

### Material and Methods

The present study was undertaken at A.G. Hospitals, Bikaner from January 1977 to May, 1977. The investigations were carried out in patients having gestation between 28-41 weeks. The cases were studied under following groups.

- |                                  |    |
|----------------------------------|----|
| (1) Non-pregnant healthy females | 20 |
| (2) Normal pregnancy             | 20 |

- |                          |    |
|--------------------------|----|
| (3) Toxemia of pregnancy | 50 |
| Mild                     | 35 |
| Severe                   | 15 |
| (5 Cases of eclampsia)   |    |

Non-pregnant healthy females of reproductive age group were selected from the out-patient department. The cases of normal and toxemia pregnancy were taken from ward. In all the cases a detailed case history and thorough physical examination was done. Blood pressure and gestational period was recorded. Length and weight of baby were taken in normal and toxemic groups. Cases of toxemia of pregnancy were divided into mild and severe groups based on the criteria described by American Committee of maternal welfare (Eastman and Hellman).

### Investigation

Haemoglobin estimation and urine examination for albumin and sugar was done in all the cases. When albumin was present on heat test, quantitative estimation for albumin was done in gm per 24 hours' urine. Blood urea was determined by the urea Nesslerisation Method. Maternal blood urea (MBU) was done first time after the admission of patient and again at the time of delivery. Cord blood urea (CBU) was estimated by taking the blood from the umbilical vein just after the delivery in normal and toxemic groups.

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## Observations

## Toxemic Group

TABLE I  
Age

No. of cases	15-25 years	26-35 years	36 or above
50	35	10	5
Percentage	70.0	20.0	10.0

TABLE II  
Parity

No. of cases	Ist	IInd	IIIrd	IVth or above
50	28	8	3	11
Percentage	56.0	16.0	6.0	22.00

TABLE III  
Maternal and Cord Blood Urea

No. of cases	M.B.U. mg/100 ml		C.B.U. mg/100 ml	
	Mean	SD	Mean	SD
Non-pregnant	22.0	2.0	—	—
Normal pregnancy	17.7	2.46	17.6	2.5
Toxaemia				
Mild	23.29	4.2	23.98	5.12
Severe	30.26	4.9	30.3	5.4

TABLE IV  
Relationship of Maternal and Cord Blood Urea with Degree of Hypertension

Systolic B.P.	No. of cases	M.B.U. mg/100 ml		C.B.U. mg/100 ml	
		Mean	S.D.	Mean	S.D.
140	23	22.0	1.69	23.7	4.26
150	12	25.75	5.63	25.09	6.66
160	6	30.67	4.71	26.84	4.8
170	2	29.5	5.0	31.0	1.23
180	4	30.67	2.3	32.0	1.63
190	1	37.0	0.0	35.0	0.00
210	3	30.67	7.33	33.67	7.6

TABLE V

Relation Between Duration of Pregnancy, Weight of Baby, Cord Blood Urea and Perinatal Loss in Normal and Toxaemic Groups

Duration of preg. in weeks	Normal pregnancy				Toxaemia of pregnancy			
	No. of cases	Mean weight in gm	Mean C.B.U.	Perinatal loss	No. of cases	Mean weight in gm	Mean C.B.U.	Perinatal loss
28	—	—	—	—	3	1666.66	33.67	2
30	—	—	—	—	4	1805	33.5	2
34	—	—	—	—	12	2510	25.09	2
36	6	3233.33	16.67	—	6	2570	26.84	1
38	—	—	—	—	2	3150	29.5	1
40	11	3427	16.18	—	23	2778	23.7	—
41	3	4267	18.0	—	—	—	—	—

TABLE VI  
Type of Perinatal Loss

Macerated dead born	2
Fresh dead born	2
Stillbirth	2
Perinatal mortality	2
	8
Total No. of babies	= 50
Percentage	= 16

et al (1976) 25.08 mg/100 ml. No relation was observed with age and parity.

*Normal pregnancy*

During normal pregnancy fall in blood urea level was observed in present series. Our findings are confirmed by the observation of other authors. (Table VII).

TABLE VII

		M.B.U.		C.B.U.	
		Mean	SI S.D.	Mean	S.D.
1. Dieckman	1957	12 mg	—	—	—
2. Riedal	1963	16 mg	—	—	—
3. Saxena and Khardiwal	1971	27.466	—	—	—
4. Sinha and Mukherjee	1973	13.80	1.49	14.35	0.39
5. Sharma et al	1976	19.75	5.4	19.98	5.18
6. Present series	1977	17.7	2.16	17.6	2.5

*Comments*

*Non-pregnant Group*

In the present study blood urea level in normal non-pregnant women ranged from 1 to 26 mg/100 ml with mean value of  $22.0 \pm 2$  mg/100 ml. This level was lower than the values reported by Dieckman (1952) 25-68 mg/100 ml and Sharma

Fall in blood urea level was observed by Kishore and Tandon (1965). This fall was probably due to increased urea clearance (Eastman and Hillman, 1967). Juvale and Gokhale (1964) studied the urea clearance test in normal pregnancy and toxemia and they failed to detect any difference while Purandare and Agashe (1959) reported decreased urea

clearance in toxemia.

In present series range of M.B.U. was 13 mg to 21 mg/100 ml with mean value of  $17.7 \text{ mg} \pm 2.46 \text{ mg}/100 \text{ ml}$ . C.B.U. of same group was ranging from 13 mg to 21 mg/100 ml with mean value of  $17.6 \text{ mg} \pm 2.5 \text{ mg}/100 \text{ ml}$ .

There was very little difference between the M.B.U. and C.B.U. of normal pregnancy group (17.7 mg to 17.6 mg/100 ml), but this level was lower than the non-pregnant group 22 mg/100 ml).

No relation between age, parity and gestational age was detected.

#### *Toxemia of Pregnancy*

M.B.U. and C.B.U. were high in this group in comparison to normal pregnancy. This level was higher in severe toxemia and eclampsia group.

In present series 70% of patients were between 15-25 years of age, range of age group was from 16 to 43 years. Sharma *et al* (1976) found 69.6% of patients belonging to same age group.

Toxemia is disease of primigravida. Eastman reported 77% of cases were primiparae. Sharma *et al* (1976) reported that 70% of cases were primigravida. In present series 56% of patients were primigravida and 22% multiparas.

Oedema of feet was present in all the cases but 6 cases were having generalised oedema; 10% of cases were not having albumin in their urine and diagnosis was made on basis of hypertension and oedema feet. 70% of cases were having albumin in urine from 0.5 to 1.99 gm/24 hours and 20% were having 2-4 gm/24 hours. About the hypertension, 70% of cases were having Systolic B.P. 140 to 159 mm/Hg; 30% were having more than 160 mm/Hg.

Regarding the M.B.U., it was  $23.29 \text{ mg}/100 \text{ ml} \pm 4.2 \text{ mg}/100 \text{ ml}$  in cases of mild

toxemia. This level was higher than that in normal pregnancy group but little different from that in non-pregnant group.

In severe toxemia group M.B.U. was  $30.26 \text{ mg} \pm 4.9 \text{ mg}/100 \text{ ml}$ . This level was higher than that in normal pregnancy and non-pregnant groups.

High M.B.U. may be because of the retention of N.P.N. in the body during toxemia because of impaired renal function. Purandare and Agashe (1959) reported decreased urea clearance in cases of toxemia but Juvele and Gokhale (1964) failed to detect any difference. High M.B.U. in toxemia was also reported by Dieckman (1957), Kishore and Tandon (1965), Saxena and Khardiwal (1971), Sinha and Mukherjee (1973) and Sharma *et al* (1976).

C.B.U. levels were higher in toxemia group but there was little difference in the C.B.U. and M.B.U. (Sinha and Mukherjee, 1973; and Sharma *et al*, 1976). C.B.U. level in normal pregnancy was  $17.6 \pm 2.5 \text{ mg}$  and during mild and severe toxemia the levels were 23.98 mg and 30.3 mg/100 ml respectively. Rise in C.B.U. can be due to rise in M.B.U. and due to increased breakdown of protein in the foetal system. This also indicates the impaired excretion.

Our findings are confirmed by Sinha and Mukherjee (1973) and Sharma *et al* (1976).

There was increase in the M.B.U. and C.B.U. with degree of hypertension. It was 22 mg/100 ml with B.P. 140 mm/Hg while 30.6 mg/100 ml with BP 210 mm Hg. These findings were confirmed by various observers from time to time.

About the foetal outcome, there was definite relationship between the severity of toxemia and the weight and C.B.U. of foetuses. Low birth weight and high C.B.U. were seen in toxemia group babies

when compared to same gestational age group of normal pregnancy (Sinha and Mukherjee, 1973; Kilpatrick and Mackay, 1965). This low birth weight was because of placental insufficiency and also because of induction of labour before 36 weeks of gestation.

No maternal death has occurred in this group. Perinatal loss was 16%, 4 fetuses were dead born (2 were macerated dead born) 2 were stillbirths and 2 fetuses died during the 1st week of extrauterine life due to prematurity.

#### Summary

(1) Blood urea (M.B.U. and C.B.U.) was estimated in 20 normal pregnancy and 50 toxemic cases.

(2) M.B.U. and C.B.U. were higher in toxemia pregnancy in comparison to normal pregnancy.

(3) The rise of blood urea level was parallel with the rise of blood pressure.

(4) Low birth weight and high C.B.U. level were directly related to the severity of toxemia.

(5) No maternal death occurred in the series.

(6) Perinatal loss was 16%.

(7) Blood urea level reflects the severity of toxemia and forecasts the foetal outcome.

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