PROTEIN-BOUND IODINE LEVELS IN MOTHERS AND INFANTS AT BIRTH

BY

I. KESSEL and W. M. POLITZER

From the Department of Paediatrics, University of the Witwatersrand, and the Queen Victoria Maternity Hospital, Johannesburg, South Africa, and the South African Institute for Medical Research

(RECEIVED FOR PUBLICATION MARCH 25, 1957)

The protein-bound iodine level in the blood is important in relation to thyroid gland activity.

Various aspects of blood iodine are discussed by Samson Wright (1952). Iodine is present in the blood in the hormone form of thyroxine and diiodotyrosine bound with albumin and precipitated out with the serum proteins, the protein-bound or precipitable iodine; the normal range of this hormone iodine is 3.5 to 8 μ g. per 100 ml.

Kennedy and Hayles (1948) mention that protein-bound iodine levels may be raised to values of 10 to 12 μ g. per 100 ml. during pregnancy and in early infancy.

Iodine is also found in the blood as inorganic

iodide or filterable iodine, the level of which is dependent on iodine intake; this is not related to thyroid gland activity as is the protein-bound iodine. In patients with hypothyroidism the protein-bound iodine levels are reduced; in hyperthyroidism the level is raised.

The present report represents a study to determine normal levels of protein-bound iodine in the serum of mothers taken within an hour of the delivery of an infant and the levels in the serum of umbilical cord blood of their infants taken immediately after delivery. The protein-bound iodine was determined by the method of Connor, Swenson, Park, Gangloff, Lieberman and Curtis (1949) as modified by Van Zyl (1953). Table 1 presents the

TABLE 1
OBSTETRIC HISTORIES OF THE SERIES

Case No.	Age of Mother (years)	Parity	Sex of Infant	Birth Weight of Infant (lb. oz.)	Protein-bound Level in Mother (μ g./100 ml.)	Protein-bound Level in Infant (μ g./100 ml.)
1	24	Primigravida + 1 miscarriage	M.	6 0 $\frac{1}{2}$	7.2	4.3
2	22	Primigravida	F.	6 12 $\frac{1}{2}$	6.2	3.8
3	20	Primigravida	F.	7 13	12.2	9.0
4	27	Primigravida + 1 miscarriage	M.	6 9	4.9	2.3
5	39	7	M.	7 13 $\frac{1}{2}$	5.7	4.9
6	26	Primigravida	M.	7 10 $\frac{1}{2}$	7.0	9.0
7	24	3	M.	9 8	8.0	10.3
8	22	Primigravida	M.	6 5 $\frac{1}{2}$	9.1	11.6
9	18	Primigravida	F.	7 2	11.6	4.5
10	24	1	M.	7 15	3.0	3.5
11	28	3	M.	9 12 $\frac{1}{2}$	9.5	8.2
12	24	Primigravida	F.	6 12 $\frac{1}{2}$	10.3	9.6
13	25	2	M.	6 1	7.8	6.7
14	39	5 + 2 miscarriages	M.	8 15	11.0	8.5
15	33	2 + 3 miscarriages	F.	7 0	4.1	3.5
16	37	8	F.	9 13 $\frac{1}{2}$	8.3	4.0
17	18	Primigravida	M.	7 13 $\frac{1}{2}$	7.0	5.1
18	25	Primigravida + 1 miscarriage	M.	6 15 $\frac{1}{2}$	9.4	9.2
19	35	Primigravida	M.	5 15 $\frac{1}{2}$	6.2	4.9
20	34	7	F.	6 11 $\frac{1}{2}$	3.8	3.2
21	26	Primigravida	M.	6 13 $\frac{1}{2}$	12.4	4.4
22	22	Primigravida	M.	6 7	12.0	4.0
23	18	Primigravida	M.	8 0 $\frac{1}{2}$	7.5	7.9
24	27	Primigravida	M.	8 9	7.5	5.6
25	20	Primigravida	M.	8 15 $\frac{1}{2}$	5.7	4.4
26	32	1	M.	8 1	7.8	7.3
27	25	1	M.	7 4	5.3	3.7
28	26	Primigravida	M.	8 6 $\frac{1}{2}$	10.7	4.2
29	32	Para 2 + 1 ectopic	F.	6 12 $\frac{1}{2}$	5.7	6.6
30	19	Primigravida	F.	7 10 $\frac{1}{2}$	4.1	3.6
31	33	4	F.	7 14	5.0	4.7
32	29	3	F.	7 8 $\frac{1}{2}$	3.8	2.4
33	27	Primigravida	F.	7 2 $\frac{1}{2}$	5.6	2.0

details of the age and parity of the mothers and the sex and birth weights of the infants.

Discussion

Thirty-three cases were included in this study. In six cases the protein-bound iodine level was higher in the infant's cord blood than in the mother's blood; these cases were all males. The protein-bound iodine levels in the mother's blood ranged from 3.0 to 12.4 $\mu\text{g. per 100 ml.}$ and in the infant's cord blood from 2.0 to 11.6 $\mu\text{g.}$ In 21 of the mothers and also in 21 infants the protein-bound iodine level range was between 3.5 and 8 $\mu\text{g. per 100 ml.}$ and in only one mother and four infants was the level below 3.5 $\mu\text{g. per 100 ml.}$ In 11

mothers and eight infants the level was over 8.0 $\mu\text{g. per 100 ml.}$

Summary

Protein-bound iodine levels in the blood of mothers and their newborn infants were studied with a view to establishing a normal pattern.

We wish to thank the Director of the Institute for his interest, Prof. C. S. Heyns, Dr. L. G. R. van Dongen and Dr. F. Daubenton for allowing us the facilities at the Queen Victoria Maternity Hospital, the labour ward staff for their kind cooperation and Mrs. J. K. Purchase for her technical assistance.

REFERENCES

- Connor, A. C., Swenson, R. E., Park, C. W., Gangloff, E. C., Lieberman, R. and Curtis, G. M. (1949). *Surgery*, 25, 510.
Kennedy, R. L. J. and Hayles, A. B. (1948). *Brennemann's Practice of Pediatrics*, vol. 1, Chapter 38, p. 6. Hagerstown, Maryland.
Van Zyl, A. (1953). *S. Afr. J. med. Sci.*, 18, 61.
Wright, Samson (1952). *Applied Physiology*, 9th ed., p. 976. London.