

# **HORMONE PROFILE OF T<sub>3</sub>, T<sub>4</sub> AT THE END OF PREGNANCY AND DURING PUERPERIUM**

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Some Authors (<sup>1, 2</sup>) in several researches have noticed that, after administration of estrogens, TBG carrier capacity of T<sub>4</sub> increases up to values 2.5 times higher than basal values.

Others (<sup>2, 3, 4</sup>) have pointed out that the administration of androgens out of pregnancy determines a meaningful decrease of TBG serum levels and, consequently, of T<sub>4</sub> bound to this carrier globulin.

Starting from the above considerations and relying on the fact that the data of the international literature on T<sub>3</sub>, T<sub>4</sub> and TBG behaviour at the end of pregnancy and during puerperium are lacking in part, we trusted, as purpose of our clinic research, the idea of exploring the thyroid hormone parameter both during pregnancy and puerperium, in normal conditions and after administration of androgens modulated by estrogens.

## **MATERIAL AND METHODS**

Our research has been based on the study of T<sub>3</sub>, T<sub>4</sub> and TBG behaviour at the end of pregnancy and during puerperium (after 96 h and 144 h from delivery) in 25 pregnant women aged between 18 and 37 years. 14 out of 25 were primigravidae, and 11 multigravidae. Weeks of pregnancy: 38th and 41st. 15 patients had physiological delivery and 10 patients underwent cesarean section. The patients have been randomly divided into two groups: the first control group included 10 women, the second one 15 women. The second group has been treated according to the following experimental test: after 96 h from delivery enantate testosterone has been administered (360 mg), together with valerianate estradiol (16 mg) — in one intramuscular administration. T<sub>3</sub>, T<sub>4</sub> and TBG have been dosed at the end of pregnancy after 96 h and 144 h from delivery (radioimmuno-logical assay — RIA Sorin Kits).

## **SUMMARY**

The Authors have studied the T<sub>3</sub>, T<sub>4</sub> and TBG behaviour at the end of pregnancy and after 96 h and 144 h from delivery in 25 pregnant women.

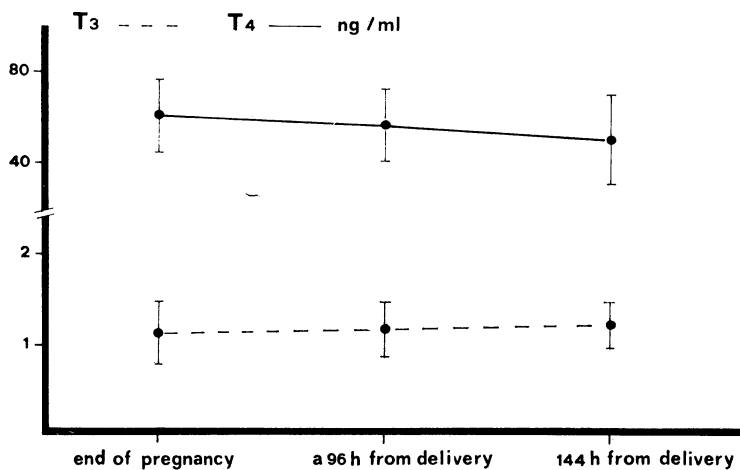
The patients have been randomly divided into two groups: the first was studied in basal conditions and the second after administration of enantate testosterone and valerianate estradiol.

In the first group T<sub>3</sub> and T<sub>4</sub> values increased slightly. A higher increase was noticed from the 96th h to the 144th h from delivery.

In the second group T<sub>3</sub> and T<sub>4</sub> values were discording.

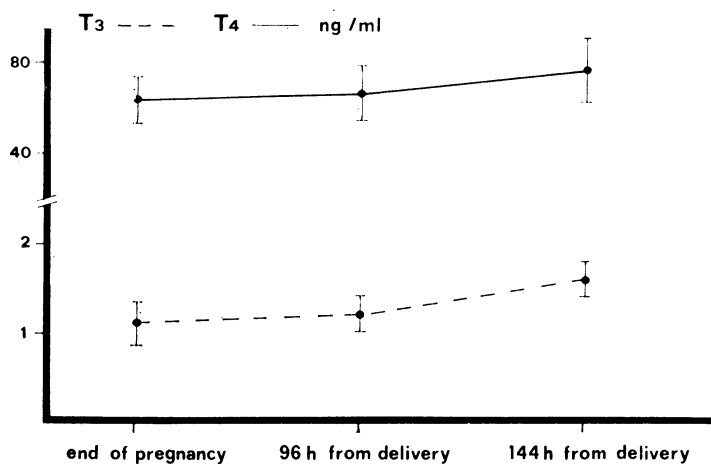
## **RESULTS**

Our data have been obtained relying on standard error, correlation index (Student-t) and average values (T<sub>3</sub> and T<sub>4</sub> respectively) between end of pregnancy, 96th and 144th from delivery.



COMPARISON GROUP.	STAND. ERR.	GRAD. OF LIB.	t
T3: end of pregnancy and a 96 h from delivery	0.25	28	0.21 < 0.05
T3: end of pregnancy and a 144 h from delivery	0.26	28	0.52 < 0.05
T4: end of pregnancy and a 96 h from delivery	10.28	28	0.10 < 0.05
T4: end of pregnancy and a 144 h from delivery	12.35	28	1.88 < 0.05

**HORMONAL PROFILE OF T<sub>3</sub> AND T<sub>4</sub> AT TERM OF PREGNANCY AND IN PUERPERIUM IN 15 PATIENTS TREATED WITH ENANTATE TESTOSTERONE AND VALERIANATE ESTRADIOL (Tab.1)**



COMPARISON GROUP.	STAN. ERR.	GRAD. OF. LIB.	t
T <sub>3</sub> : end of pregnancy and a 96h from delivery	0.33	18	0.45 < 0.05
T <sub>3</sub> : end of pregnancy and a 144h from delivery	0.32	18	5.78 > 0.01
T <sub>4</sub> : end of pregnancy and a 96 h from delivery	9.89	18	0.45 < 0.05
T <sub>4</sub> : end of pregnancy and a 144 h from delivery	9.48	18	5.43 > 0.01

**HORMONAL PROFILE OF T<sub>3</sub> AND T<sub>4</sub> AT THE END OF PREGNANCY AND IN PUERPERIUM IN 10 CONTROL PATIENTS (Tab.2)**

TAB.1A		HORMONE PROFILE OF $T_3$ , OF $T_4$ AND TBG AT THE END OF PREGNANCY AND DURING PUERPERIUM IN 15 PATIENTS TREATED WITH ENANTATE TESTOSTERONE (360 mg), VALERIANATE ESTRADIOL (16 mg).								
CASE	SUBJECT	PLASMATIC RANGES (ng/ml)								
		AT THE END OF PREGNANCY			AFTER 96 h FROM DELIVERY			AFTER 144 h FROM DELIVERY		
		$T_3$	$T_4$	TBG	$T_3$	$T_4$	TBG	$T_3$	$T_4$	TBG
1	G.E. AGE: 35 MULTIGRAVIDA - CESAREAN SECTION	1.35	68	51.37	1.50	70	52.58	1.30	60	46.50
2	R.M. AGE: 25 PRIMIGRAVIDA - CESAREAN SECTION	0.82	66	50.13	0.76	70	52.58	0.75	56	44.06
3	V.S. AGE: 27 PRIMIGRAVIDA - SPONTANEOUS DELIVERY	1.15	52	41.63	1.10	47	38.59	1.30	42	35.55
4	C.A. AGE: 30 MULTIGRAVIDA - SPONTANEOUS DELIVERY	0.90	61	47.11	0.65	62	47.72	0.60	58	45.28
5	P.G. AGE: 28 PRIMIGRAVIDA - SPONTANEOUS DELIVERY	1.12	65	49.54	1.10	68	51.37	1.20	62	47.72

### 1st Group

#### $T_3$

If we consider statistically  $T_3$  hormone profile we notice that correlation index is absolutely not representative between end of pregnancy and 96 h from delivery ( $t=0.45<0.05$ ) respective average:  $1.17\pm0.39$  and  $1.20\pm0.27$ . Whereas correlation index is interesting between  $T_3$  at the end of pregnancy and after 144 h from delivery ( $t=5.78>0.01$ ) with average values of  $1.17\pm0.39$  and  $1.54\pm0.24$  respectively (table 2).

#### $T_4$

No significance of  $T_4$  between end of pregnancy and 96 h from delivery ( $t=0.45<0.05$ ) with average of  $68.50\pm9.83$  and  $69.40\pm9.94$ . The approach of the ending phase of pregnancy and 144 h from delivery is interesting ( $t=5.43>0.01$ ) with values average of  $68.50\pm9.83$  and  $78.70\pm9.13$  (table 2).

In 10 cases out of 10,  $T_4$  value between the 96th h and the 144th h from delivery

is increased;  $T_3$  value is decreased in just one case, while is increased in the remaining 9 cases (table 2A and 2B).

### 2nd Group

#### $T_3$

No correlation between end of pregnancy and after 96 h from delivery ( $t=0.21<0.05$ ) with average value of  $1.17\pm0.21$  and  $1.19\pm0.29$ . Equally no correlation between ending phase of pregnancy and after 144 h from delivery ( $t=0.52<0.05$ ) with average of  $1.17\pm0.21$  and  $1.22\pm0.29$  (table 1).

In 5 cases we noticed an increase of  $T_3$  values between the 96th and the 144th h from delivery with average of  $+30.03\%$ , in 9 cases a decrease with average of  $-10.22\%$  while in a sole case  $T_3$  value remained constant (table 1A, 1B, 1C).

#### $T_4$

No statistic significance between end of pregnancy and 96th h from delivery ( $t=0.10<0.05$ ) with average of  $62.06\pm9.22$  and  $61.66\pm11.24$ . Still no statistic

TAB.1B		HORMONE PROFILE OF T <sub>3</sub> , OF T <sub>4</sub> AND TBG AT THE END OF PREGNANCY AND DURING PUERPERIUM IN 15 PATIENTS TREATED WITH ENANTATE TESTOSTERONE (360 mg), VALERIANATE ESTRADIOL (16 mg).								
CASE	SUBJECT	PLASMATIC RANGES (ng/ml)								
		AT THE END OF PREGNANCY			AFTER 96 h FROM DELIVERY			AFTER 144 h FROM DELIVERY		
		T <sub>3</sub>	T <sub>4</sub>	TBG	T <sub>3</sub>	T <sub>4</sub>	TBG	T <sub>3</sub>	T <sub>4</sub>	TBG
6	D.G. AGE: 37 MULTIGRAVIDA- SPONTANEOUS DELIVERY	1.25	70	52.58	1.20	72	53.58	1.10	60	46.50
7	P.A. AGE: 21 PRIMIGRAVIDA- CESAREAN SECTION	1.05	48	39.20	1.10	46	37.98	1.10	42	35.55
8	M.C. AGE: 29 PRIMIGRAVIDA- CESAREAN SECTION	1.50	64	48.93	1.65	66	50.11	1.50	53	42.24
9	V.D. AGE: 18 PRIMIGRAVIDA SPONTANEOUS DELIVERY	1.10	62	47.72	1.20	50	40.41	1.00	46	37.98
10	G.E. AGE: 21 PRIMIGRAVIDA SPONTANEOUS DELIVERY	1.12	46	37.98	1.20	46	37.98	1.10	42	35.55

TAB.1C		HORMONE PROFILE OF T <sub>3</sub> , OF T <sub>4</sub> AND TBG AT THE END OF PREGNANCY AND DURING PUERPERIUM IN 15 PATIENTS TREATED WITH ENANTATE TESTOSTERONE (360 mg), VALERIANATE ESTRADIOL (16 mg).								
CASE	SUBJECT	PLASMATIC RANGES (ng/ml)								
		AT THE END OF PREGNANCY			AFTER 96 h FROM DELIVERY			AFTER 144 h FROM DELIVERY		
		T <sub>3</sub>	T <sub>4</sub>	TBG	T <sub>3</sub>	T <sub>4</sub>	TBG	T <sub>3</sub>	T <sub>4</sub>	TBG
11	P.A. AGE: 30 PRIMIGRAVIDA- CESAREAN SECTION	0.76	61	47.11	0.76	60	46.50	1.40	70	52.58
12	M.A. AGE: 28 MULTIGRAVIDA- SPONTANEOUS DELIVERY	1.30	70	52.58	1.40	70	52.58	1.70	80	58.67
13	P.G. AGE: 32 MULTIGRAVIDA- SPONTANEOUS DELIVERY	1.40	70	52.58	1.50	72	53.80	1.20	42	35.55
14	L.M. AGE: 35 MULTIGRAVIDA- SPONTANEOUS DELIVERY	1.50	78	57.45	1.70	80	58.67	1.65	46	37.98
15	G.V. AGE: 21 PRIMIGRAVIDA- CESAREAN SECTION	1.30	50	40.41	1.10	46	37.98	1.50	44	36.76

TAB. 2A		HORMONE PROFILE OF $T_3$ , OF $T_4$ AND TBG AT THE END OF PREGNANCY AND DURING PUERPERIUM IN 10 CONTROL PATIENTS.								
CASE	SUBJECT	PLASMATIC RANGES (ng/ml)								
		AT THE END OF PREGNANCY			AFTER 96 h FROM DELIVERY			AFTER 144 h FROM DELIVERY		
		$T_3$	$T_4$	TBG	$T_3$	$T_4$	TBG	$T_3$	$T_4$	TBG
1	G.F. AGE: 35 MULTIGRAVIDA- SPONTANEOUS DELIVERY	1.00	54	42.85	1.05	52	41.63	0.95	90	64.75
2	L.R. AGE: 20 PRIMIGRAVIDA- CESAREAN SECTION	1.05	70	52.58	1.00	74	55.02	1.50	75	55.62
3	R.S. AGE: 32 MULTIGRAVIDA- SPONTANEOUS DELIVERY	0.98	72	53.80	1.00	70	52.58	1.50	73	54.41
4	L.M. AGE: 29 PRIMIGRAVIDA- CESAREAN SECTION	0.75	62	47.72	1.50	63	48.32	1.70	64	48.33
5	M.E. AGE: 33 MULTIGRAVIDA- CESAREAN SECTION	0.82	70	52.58	1.05	73	54.41	1.80	78	57.45

TAB. 2B		HORMONE PROFILE OF $T_3$ , OF $T_4$ AND TBG AT THE END OF PREGNANCY AND DURING PUERPERIUM IN 10 CONTROL PATIENTS.								
CASE	SUBJECT	PLASMATIC RANGES (ng/ml)								
		AT THE END OF PREGNANCY			AFTER 96 h FROM DELIVERY			AFTER 144 h FROM DELIVERY		
		$T_3$	$T_4$	TBG	$T_3$	$T_4$	TBG	$T_3$	$T_4$	TBG
6	L.C. AGE: 29 MULTIGRAVIDA- SPONTANEOUS DELIVERY	0.73	59	45.89	0.76	60	46.50	1.40	70	52.58
7	G.M. AGE: 24 PRIMIGRAVIDA- SPONTANEOUS DELIVERY	1.70	70	52.58	1.50	72	53.80	1.70	80	58.67
8	R.A. AGE: 26 PRIMIGRAVIDA- SPONTANEOUS DELIVERY	1.30	69	51.97	1.20	70	52.58	1.40	82	59.88
9	L.G. AGE: 34 MULTIGRAVIDA- SPONTANEOUS DELIVERY	1.80	68	51.37	1.50	70	52.58	1.80	80	58.67
10	F.L. AGE: 25 PRIMIGRAVIDA- CESAREAN SECTION	1.60	91	65.36	1.50	90	64.75	1.70	95	67.79

significance of T<sub>4</sub> between end of pregnancy and after 144 h from delivery ( $t=1.88<0.05$ ) with average values of  $62.06\pm 9.22$  and  $53.53\pm 10.21$  (table 1). In 2 cases (out of 15) we noticed an increase in T<sub>4</sub> between the 96th h and the 144th h from delivery with an average of +7.14%.

In 13 cases T<sub>4</sub> decreased with an average of -17.8% (table 1A, 1B, 1C).

## CONCLUSION

By the data obtained we believe that at the end of pregnancy and during early puerperium, in normal conditions, T<sub>3</sub> values increase slightly and that such an increase is higher from the 96th h to the 144th h from delivery. In the same space of time the increase of T<sub>4</sub> is higher. TBG values show a similar behaviour. After estro-androgenic stimulation T<sub>3</sub> increased in 5 cases, decreased in 9 and was constant in 1 case.

T<sub>4</sub> increased in 2 cases and decreased in the remaining 13 cases with a per-

centage of 13.33% and 86.67% respectively of our second group of patients; the percentage was the same for TBG values.

Our data seem to agree with the data of Keitel and Sherer, Federman, Engbring and Engstrom concerning a female population out of pregnancy.

Furthermore the positivity of 13.33% mentioned (increase of T<sub>4</sub> values after administration of androgens), could mean, according to our data as well as to Dowling researches, a reasonable persistent level of estrogens depending from the pregnancy factor not yet fully removed by the expulsion of the placenta.

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