A PRELIMINARY REPORT ON THE ESTIMATION OF CHORIONIC GONADOTROPHIN IN TOXAEMIA OF PREGNANCY

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The main source of the gonadotrophic principle which floods the body during pregnancy is the placenta and not the pituitary. The placenta is also the source of oestrogen and progestin. It is believed that the cytotrophoblast or the Langhan's cells take the place of the anterior lobe and liberate the chorionic gonadotrophin (C.G.), whereas the syncytiotrophoblast takes up the functions of the ovary and liberates oestrogen and progestin.

Smith and Smith postulate that, in addition to the independent production of oestrogen and progestin from the placenta during pregnancy, the C.G. is also converted into the folliculoid and the leuteoid fractions, when there is a demand, to maintain a constant supply in the body. As it is well known that the Langhan's cells in the later months of pregnancy are few and far between, if they are present at all, the declining C.G. levels in serum and urine, as the pregnancy advances, are a natural consequence.

The normal level during the later months of pregnancy varies from 4,000 to 11,000 I.U. A value beyond this range is abnormal and some sort of obstetrical accident may be apprehended.

White and Hunt in 1943 got high C.G. level in the urine of pregnant diabetics. Smith and Smith in 1944 obtained high C.G. level with low blood oestrogen and low yield of urinary pregnanediol in pre-eclamptics.

This hormonal aberration in abnormal pregnancy is difficult to understand. The renal clearance of C.G. in toxaemia has been found by Loraine to be within normal limits. It is 1.00 ml./min. or less. This figure is typical of protein clearance.

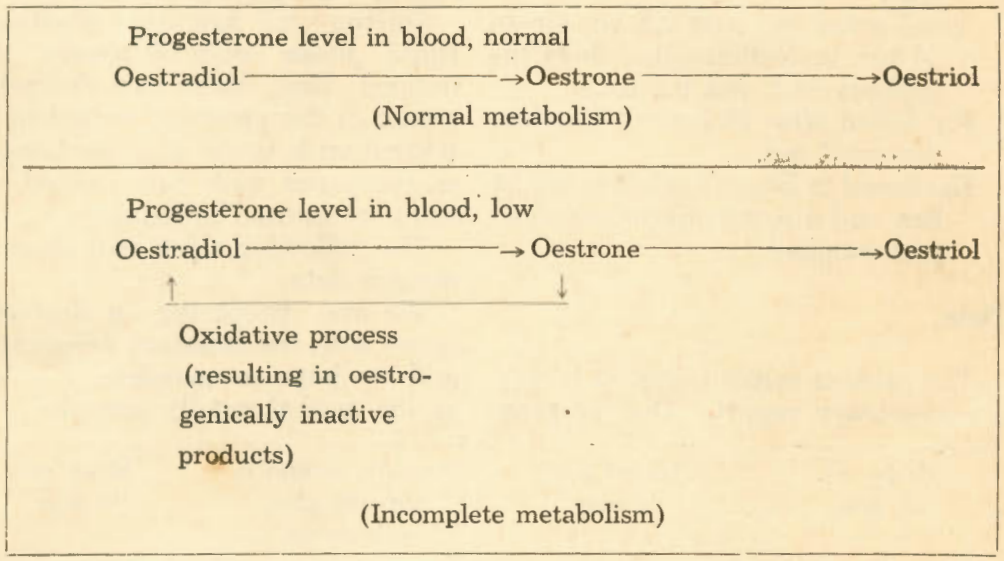
There are two schools of thought amongst those who believe in the endocrinological theories of the etiology of pre-eclampsia.

1. Some believe that this rise in C.G. with the fall of the placental sterioids is compensatory, similar to the reciprocal behaviour of the anterior pituitary and the gonads.

2. Others believe that the rise is

not due to an actual increased production but is due to accumulation owing to the deficient utilisation of C.G. resulting in decreased production of oestrogen and progestin.

To explain the latter contention Smith and Smith have described the metabolism of gonadotrophins and the steroids in a very illustrative manner.



Thus just as a priming action of oestrogen is necesary for the full progestational activity, progesterone is also necessary for the proper metabolism of oestrogen.

This oxidation product, due to defective metabolism of oestrogen, results from a reversible oestrone—oestradiol reaction. It is an oestrone -lactone and is said to be oestrogenically inactive but it mobilises the pituitary gonadotrophin in the non-pregnant condition and the chorionic gonadotrophin during pregnancy for the necessary supply of oestrogen and progestin to maintain the body equilibrium.

So both in a non-pregnant woman and in a normal pregnant woman, a fall in progesterone level in the blood means increased production of inactive oestrogen and thus an increased utilisation of gonadotrophins, pituitary or chorionic.

But in a case of toxaemia of late pregnancy the inactive oestrogen level has been found to be low, inspite of the low pregnanediol level in urine. This low level of inactive oestrogen in toxaemia is probably due to the low level of the total oestrogen production by the placenta in such conditions.

Necessarily C.G. is incompletely utilised resulting in its accumulation in the system and hence the rise in blood and urine level.

Technique. There are various methods of C.G. assay.

(1) Ovarian hyperaemia of the Smiths.

(2) The increase in uterine weight

of Delfs.

(3) The increase in prostatic weight of immature male rats as described by Loraine.

We have selected the prostatic weight technique of Loraine. It is presented in a tabulated form.

Use 3 to 5 rats for each specimen of urine.

Age 20—30 days. Weight 25—30 mgs.

Total urine injected 0.5 cc. (from 24 hrs. collection), in 3 daily injections (0.2 and 0.1 c.c.).

Rat killed after 96 hours. Prostate dissected out.

Hardened in Bouin's solution for 24 hrs. and prostatic tissue removed and weighed.

Data.

The present communication is only a preliminary report. Our progress with C.G. work has been slow.

In the biological methods the crux of the problem is the animal colony with the very difficult task of feeding and breeding.

In our present work we have no dearth of human material, we mean, the urine of pre-eclamptics; but we are very much handicapped by the animal factor—the immature male rats of the right age and weight.

During the last nine months we could make only 30 assays. It is noticed that there is a distinct increase in the prostatic weight in rats treated with urine of pre-eclamptics, as compared with rats treated with urine of normal pregnancy.

The following table will show our meagre data.

We are preparing a dose-effect curve with the standard preparations and we hope to complete it as soon as the animal supply permits.

Body wt. in gms.	Actual p.wt. in mgs.	Prostatic weight in mg./100 gms. of body wt.	Mean wt. in mgs.
29.5	24.0	94.1	89.7 (Interpolated on dose effect curve and expressed in I.U.)
26.0	22.4	86.1	
27.5	24.6	89.4	

	Average body wt. in gms.	Average prostatic wt. in mgms.	Prostatic wt. in mg./100 gms. of body wt.
Normal ratio (10 cases) 21 to 26 days old (untreated)	22.0	13.8	62.9
10 groups treated with normal preg. urine (21 to 28 days old) ..	23.5	18.6	79.1
10 groups treated with urine of pre-eclamptics (22 to 30 days old) ..	25.8	26.5	102.8

From our data we find the work rather interesting and we expect to draw some conclusion when we complete this investigation.

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