XXXIV. HORMONES IN THE URINE FOLLOWING OOPHORECTOMY DURING PREGNANCY.

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THE operation of bilateral oophorectomy during pregnancy is not commonly performed, yet there is a large number of cases on record. In the majority, the pregnancy was carried to term without interruption. Very few cases, however, have been reported in which any attempt has been made to study the hormones present in blood and urine after operation. So far as we are aware, only four such cases have been studied; these are reported by Amati [1928], Waldstein [1929], Szarka [1930] and Saidl [1932]. Table I gives a summary of their results.

Table I.

Authority	Age of patient	Clinical condition	Hormones pre-operation	Hormones post-operation			
				A.L.H.		Oestrone	
				Blood	Urine	Blood	Urine
Amati [1928]	?	Dermoid cysts	—	—	—	Present	—
Waldstein [1929]	26	Dermoid cysts	—	0.6 ml. Serum positive	1.8 ml. Positive	1-2 ml. Positive	400-500 M.U. per litre
Szarka [1930]	33	Dermoid cysts	—	—	—	5 ml. 4 units	1 ml. Positive
Saidl [1932]	23	Dermoid cysts	A.L.H. 900 M.U. per litre Ov.H. 500 M.U. per litre	—	650-1250 M.U. per litre	Positive in 1.8 ml.	450-680 M.U. per litre

* Weaker solution not tried.

Through the kindness of Mr Aleck Bourne it was made possible for us, during the autumn of 1932, to study a fifth case of this type. In this instance bilateral oophorectomy was performed about three months after conception.

Unfortunately, after the patient's discharge from hospital she returned to her home, some fifty miles from London, and a further move about three months later brought the experiment to an end. The period during which specimens have been obtainable is about 108 days, beginning 112 days after the last menstruation and ending about 50 days before delivery.

Owing to the available stocks of experimental animals the estimations of hypophyseal hormone were carried out first, and it is these only on which a report is now made. A small number of oestrone estimations were carried out as described below.

Clinical details.

Mrs K. M. Age 36, Nullipara. Admitted to hospital on account of abdominal pain and swelling.

Operation 27. ix. 32 by Mr Aleck Bourne—Bilateral oophorectomy. Pathologically these were found to consist of multiple lutein cysts. Convalescence was uneventful and patient returned home on 17th day. Delivery at ten months of a normal, healthy child. The child was not breast-fed.

*Examination of urine and blood.**A. Pre-operative.*

(1) *Urine.* Since information of the approaching operation was only received a few hours before it actually occurred only a small quantity of urine was available for test. There was sufficient for a rough oestrone test (7 rats only), giving a value of 2000 M.U. per litre. Tested for hypophyseal hormone, a positive result was obtained with 0.18 ml. urine.

(2) *Blood.* No blood was obtained for test before operation.

B. Post-operative.

The tests for hypophyseal hormone were carried out using batches of five infantile mice, 21 days old on first day of test. Each animal received 6 doses of 0.3 ml. of urine (or diluted urine) during 48 hours. They were killed after 96 hours and the ovaries examined with a hand lens. The total number of corpora lutea or haemorrhagica in the group of five mice has been recorded in the table, together with total weight in mg. of 8 ovaries and 8 uterine horns.

A few further tests, not included in Table II, were carried out, in the hope of obtaining a better qualitative result by the use of larger numbers of mice. The last such test, 112 days after operation gave, out of 48 mice, 12 showing positive results, *i.e.* presence of corpora lutea or haemorrhagica.

Table II. *Response to injections.*

(Indicated by 1 unit for every 10 (or fraction of 10) C.L. or C.H.)

Days post-operation	Total wt. of mice g.	Wt. of genitalia g.	Undiluted urine	Diluted 1 in 5	Diluted 1 in 10	Diluted 1 in 20	Minimum effective vol. urine	
0	—	—	6	4	1	0	0.06	Oestrone test. 2000 M.U. per litre
1	(a) 37.8 (b) 39.5	0.175 —	9 —	5 —	4 —	0 —	0.06 —	
2	50.1	2.240	10	3	3	2	0.03	Oestrone test. 1400 M.U. per litre
*6	45.5	0.133	4	1	0	0	0.12	
9	45.6	0.233	3	0	0	0	0.60	
14	39.0	0.230	4	1	0	0	0.08	
16	43.6	0.262	5	1	0	0	0.08	
	49.3	0.221	3	1	0	0	0.08	
21	54.0	0.260	4	—	—	—	—	
				1 in 5	1 in 10	—	—	
27	45.4	0.262	4	—	—	—	—	Blood. Hypophyseal hormone positive (0.03 ml. serum)
	44.0	0.298	3	0	0	—	—	
29	43.5	0.137	7	1	1	—	0.06	
	48.0	0.209	6	0	0	—	0.6	
*33	48.5	0.187	4	—	—	—	—	
35	49.0	0.264	3	0	0	—	0.6	
	46.5	0.166	5	—	—	—	—	
40	40.5	0.280	2	0	0	—	0.6	
47	(a) 90.2 (b) —	0.141 0.199	6 4	1 —	0 —	— —	0.3 —	
54	41.6	0.243	4	1	0	—	0.3	Oestrone test. 1300 M.U. per litre
*62	46.5	0.129	5	1	0	—	0.3	
69	44.6	0.194	4	1	0	—	0.3	
73	46.2	0.202	4	1	0	—	0.3	
			Dilution 1 in 2.5					
80	—	—	3	—	—	—	—	

* Indicates approximate time of menstrual period in absence of pregnancy.

Examination of Table II brings to light that there is no significant change in the excretion of hypophyseal hormone brought about by the operation, apart from a very brief rise on the first and second days after operation.

Comparison of present results with earlier workers.

The experiments of Amati were not quantitative and his results have since been confirmed and amplified. Waldstein's figure for oestrone, while agreeing with that of Saidl, is lower than that obtained in the present case. In this connection it must be pointed out that no details of oestrone assay are given by Saidl, and that Waldstein appears to have used the method of diminishing doses—i.e. in a batch of animals each one receives a different dose, and the smallest dose to give a positive reaction is taken as containing 1 unit. This method is now known to give unreliable results. In regard to our own figure, i.e. 1400 M.U. per litre, it must be admitted that a relatively small number of animals (30) was employed, but it is probably more accurate than an estimation by the method of diminishing doses. The figures for anterior lobe hormone (A.L.H.) given by Saidl show that he obtained a steady increase from 150 to 1250 M.U. per litre in the course of 10 days after operation.

In the present case a similar, but smaller and shorter rise was noted. Owing to lack of detail regarding the "unit" adopted it is impossible to compare directly our figures with those of Saidl. It may be added that a response similar to those of Table II has been obtained by us with urine from normal pregnant women.

SUMMARY.

1. The operation of bilateral oophorectomy in pregnancy does not bring about any change in the anterior hypophyseal hormone content of the urine.
2. The oestrone content of the urine is definitely decreased.

It is a pleasure to express our gratitude to Mr Aleck Bourne for his courtesy in drawing our attention to this case and permitting us to publish our results, and to Mr E. R. E. Spence for his careful work in the animal experiments.

REFERENCES.

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