

## A TRIAL OF BUDD'S PREGNANCY TEST

by

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It has been the practice for several years past to place reliance on various animal tests for diagnosis of pregnancy, which in many instances have yielded false positive or false negative reactions, mainly because of the indifference to the animal's living conditions and certain seasonal variations, that usually vitiate the tests. Special handling of the test animals is required, besides the seasonal unreliability period is different in different parts of the world.

The various biological tests are — the Aschheim — Zondek test, the Freidman-Lapham test, the Frank test and the various toad tests. The accuracy of these tests varies from 95 to 98%.

Recently, a number of reports have appeared attesting the efficiency of immunological tests for pregnancy. Attempts at evolving immunological tests for pregnancy were made very early in this century, but were futile until human chorionic gonadotro-

phin was obtained in relatively pure form. The antibodies were then produced by injecting this either intravenously or intramuscularly in rabbits. Production of antibodies was found to be enhanced by using Freund's or Ramon's adjuvant. Various immunological reactions were described using the above antigen/antibody system. In 1960 Wide and Gemzell and Swierczynaska and Samochowiec simultaneously introduced haemagglutination inhibition test using sheep cells.

Brody and Carlstrom described complement fixation test almost at the same time. Mckean described a precipitation test by tube technique in the same year. Ouchterlony described precipitation test by agar gel diffusion technique.

Several modifications of these tests are described by later workers.

Fulthrope *et al.* modified Wide and Gemzell test by using tanned red cells. Henry and Little performed a similar test by using latex particles instead of red blood cells.

Review of the results indicates that these immunological tests are superior to biological tests and have the following advantages over them.

- (1) They can be performed with ease in any laboratory.

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- (2) Very large number of samples can be handled in a short time.
- (3) Results are available on the same day.
- (4) They preclude the need for animals — a large number of which are necessary to observe all the pre-requisites of biological tests.

However, the disadvantage of the above mentioned tests is that human chorionic gonadotrophin isolated so far is not absolutely pure, and there is cross reaction with pituitary gonadotrophin, normal human serum and normal urine, though in much lower titre. Hence it is very necessary to avoid these cross reactions and not to increase the sensitivity of the test too much (Hobson).

Recent investigations into the nature of commercial preparations of human chorionic gonadotrophin showed that there are seven demonstrable antigens. Five of these are present in normal urine and two appear to be present only in pregnant urine. Isolation of these two in pure forms will probably make the test more specific and avoid false positive reactions (Hemashig).

Recently Movitskii described a test involving the use of iodine and heat with an accuracy of 96%. Richard E Budd described a new procedure which was a modification of that described by Movitskii. The test is extremely simple and can be carried out in an ordinary laboratory or office. No checking of the pH of urine specimen is required as in Movitskii test.

In the recent paper published in

this journal Patel and Sankari reported 93.7% accuracy in 200 cases, tested by Movitskii test as modified by Budd.

#### *Method*

Add 5% iodine solution, drop by drop, to 5 c.c. of morning specimen of urine, until the specimen acquires a deep yellow tinge, mixing the specimen after each addition of iodine solution; usually 5 to 8 drops are required. Then 1 c.c. of concentrated sulphuric acid is allowed to flow rapidly into the bottom of the tube containing the specimen and iodine. A purple pink wide band denotes a positive result. Stopper the tube and mix gently to disperse and deepen the colour. The stopper should be removed after mixing to release the gas produced. Comparing his test, with Movitskii test and frog test, R. E. Budd found 80% consistency among the 3 tests performed, except that the frog test and the new iodine test showed 100% correlation. This report concerns trial of Budd's Test, the chief advantages of which are simplicity of technique, clarity of end-point and the rapidity with which the test can be performed, the result being obtained within a couple of minutes. We, however, made a slight change in the iodine solution. Instead of 5% tincture of iodine, 5% iodine solution in 10% potassium iodide was used. The end-point, therefore, was not a pink purple wide band, but a very dark brown wide band, denoting positive result. Negative result was indicated by a thin light brown band. Delayed appearance of the ring should be considered as negative.



**Results**

Altogether 200 specimens of urine were tested, out of which 105 were cases of pregnancy, including abor-

tions, 5 were cases of abnormal pregnancies, that is vesicular mole and ectopic, 44 were puerperal cases and 55 were non-pregnant patients, including males (Tables I, II and III).

TABLE I

Diagnosis	Period of pregnancy	No. of cases	Results		
			+ve	-ve	
Pregnancy .. .. .	10 days — 10 weeks	35	35		
	12 weeks — 20 weeks	15	15		
	24 weeks — Full term	43	42	1	
Abortion .. .. .	8 — 12 weeks	3	3		
					threatened .. .. .
					inevitable .. .. .
missed .. .. .	20 — 24 weeks	2	1	1	
	20 — 24 weeks	2	2		
Vesicular mole .. .. .	6 — 8 weeks	3	3		
Ectopic .. .. .					
Total .. .. .		105	103	2	

TABLE II

Diagnosis	Period of puerperium	No. of cases	Results	
			+ve	-ve
Puerperal cases	1 week	10	10	
	2 weeks	10	10	
	3 weeks	10	10	
	4 weeks	10		10
Total .. .. .		40	30	10

TABLE III

Diagnosis	No. of cases	Results	
		+ve	-ve
Primary sterility ..	6		6
Fibroids ..	6		6
Endometriosis ..	2		2
Carcinoma of cervix	2		2
Prolapse ..	1		1
Dysfunctional uterine bleeding ..	8		8
Benign ovarian cysts	10	2	8
Malignant ovarian tumors ..	10	10	
Males .. .. .	10		10
		55	43

**Comments**

The test was positive as early as 10 days after the first missed period. There was 1 false negative among the pregnant patients.

In threatened and in inevitable abortions the test was positive and therefore, it is not of prognostic significance.

During the puerperium and in missed abortions, the test remains positive up to 20 days.

Unfortunately we were unable to correlate our results with other animal tests. However, all the early

cases, were confirmed clinically at a later stage.

As a control, 95 non-pregnant cases including males, were also examined. It was, however noted that the test was positive in all 10 malignant ovarian tumours. Out of these, 1 was a case of granulosa cell tumour and one of adenocarcinoma, the other 8 cases were inoperable and therefore, histological diagnosis was not known. In one case of benign ovarian tumour, pseudomucinous cystadenoma, the test was positive. The second case of benign ovarian cyst was pregnant. No explanation can be offered, as regards the false positive results.

Apart from the false positive results in malignant ovarian tumours where the clinical diagnosis was not very difficult, the test was of value in early diagnosis of pregnancy, in ectopic pregnancy, in the differential diagnosis between fibroids and pregnancy or ovarian cyst and pregnancy prior to operation.

In missed abortions the test remained positive for 3 weeks. It must be mentioned however, that this test is only a measurement of the absence or presence of pregnancy and does not give any qualitative assessment, and, therefore, is of no value to prognosticate the outcome of a particular pregnancy.

The substance, which gives the positive reaction, is not known. According to Budd, it may be the increased glycogen during pregnancy.

In view of the positive results in malignant ovarian tumours, it is possible that the reaction is due to some substance produced by the ovarian tissue. However, the cases

of ovarian tumours were too few to suggest anything definite.

### Summary

A trial of Budd's pregnancy test is given. The new test is extremely sensitive, simple and gives quick results. The exact substance which gives the positive reaction is not known.

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### References

1. Barn, W. A.: *J. Obst. & Gynec. Brit. Comm.* 60: 551, 1963.
2. Brody, S. and Carlstrom, G.: *Lancet.* 2: 99, 1960.
3. Budd, R. E.: *Am. J. Obst. & Gynec.* 86: 909, 1963.
4. Fulthrope, A. J., Parke, J. A. C., Tovey, J. E., Monckton, J. C.: *Brit. M.J.* 1: 1049, 1963.
5. Hamashige, S. and Arquilla, E. R.: *J. Clin. Invest.* 43: 1163, 1964.
6. Henry, J. B. and Little, W. A.: *J.A.M.A.* 182: 230, 1962.
7. Hobson, B. M.: *Brit. M. J.* 2: 1203, 1963.
8. Hobson, B. M.: *J. Obst. & Gynec. Brit. Emp.* 59: 352, 1952.
9. Lynch, P. G. and Schwabacher, H. J.: *Clin. Path.* 16: 585, 1963.
10. McCarthy, C., Pennington, G. W. and Geoghegan, F. J.: *J. Obst. & Gynec. Brit. Comm.* 60: 557, 1963.



11. Mckean, C. M.: *Am. J. Obst. & Gynec.* 80: 596, 1960.
12. Movitskii, D. A.: Quoted by Budd, R. E. (1963).
13. Ouchterlony, O.: Quoted by Mckean, C. M. (1960).
14. Patel, S. C. and Sankari K.: *J. Obst. & Gynec. India.* 14: 864, 1964.
15. Samochowiec.: Quoted by Barn. W. A. (1963).
16. Shea, J. and Werrack, A. J. N.: *J. Clin. Path.* 16: 581, 1963.
17. Swierczynska: Quoted by Barn, W. A. (1963).
18. Wort, A. J., Varde, K. N., Fairweather, D. V. I. and Green, G. A.: *J. Clin. Path.* 16: 590, 1963.