A CLINICAL EVALUATION OF THE ROLL-OVER TEST FOR PREGNANCY INDUCED HYPERTENSION

by

MANJU GITA MISRA,* M.B.B.S., D.G.O., M.S. (Pat)

GEETA VERMA,** M.B.B.S.

and

D. SINGH,*** M.S., F.R.C.O.G. (Lond)

From the standpoint of prevention, pre-eclampsia has remained a constant challenge to the obstetricians. Many inroads have been made in reducing the perinatal impact of pre-eclampsia; however, when overt pre-eclampsia emerges, it carries with it significant maternal and foetal risk. If incipient pre-eclampsia could be diagnosed, intensive obstetric care can be utilized more effectively in that sub-group of 'High-risk' patients and consequently improve the perinatal outcome.

Efforts have been made to achieve a simple test that can be done on a widespread basis for detecting the patients who are prone to develop toxaemia in the third trimester.

Gant and his associates (1974) reported an effective method, predicting the development of pregnancy induced hypertension by observing the response of these patients to an infusion of angiotension II. However, this method although useful needs high degree of sophistication of both equipment and personnel necessary for the conduct.

Registrar, Dept. of Obstetrics & Gynaecology.

***Postgraduate student.*

****Associate Professor of Obstetrics & Gynaecology, Patna Medical College Hospital, Patna, Bihar.*

Accepted for publication on 8-10-1977.

Worley in the process of conducting angiotensin II infusion tests noted that in some patients who are moved from a position in which they are lying on side to their back develop a sudden rise in blood pressure. These women subsequently showed development of pre-eclamptic toxaemia. This observation then led to the study and development of the Roll-over test. Gant *et al* (1971) by this simple test were able to achieve 93 per cent accuracy in determining which patients would develop pregnancy induced hypertension and 91 per cent accuracy in predicting which would not.

The present study was undertaken in an effort to confirm the accuracy of the roll-over test.

Materials and Methods

One hundred seventy-five patients were studied in the antenatal clinic of Patna Medical College Hospital and also at our private clinics. Normal primigravid and mutligravid patients between 28 and 32 weeks of gestation were chosen at random. None of the women included in this study had a past history of renal disease or hypertension. Routine prenatal care included recording of weight, urine testing, foetal heart assessment and measurement of uterine growth at approximate intervals.

At the time of study patients were placed in a left lateral recumbent position and blood pressures were measured. They systolic and diastolic blood pressures were recorded at 5 minutes intervals until a constant baseline diastolic blood pressure had been established. When the diastolic blood pressure became constant and the patient had been in the left lateral recumbent position for at least 15 minutes, she was turned to the supine position and the blood pressure was measured immediately and again 5 minutes later. If the diastolic blood pressure increased to 20 mm.Hg. the test was considered positive and special note was made on her chart.

The patients were followed throughout the course of pregnancy, labour, delivery and postpartum. Those developing pre-eclampsia were classified as mild or severe by standard criteria. The accuracy of the test in predicting subsequent development of pre-eclampsia and eclampsia was examined.

One hundred and seventy-five tests were performed between the 28th and 30th weeks of gestation. Ninety-six patients were primigravidae, and 79 were multigravidae. Out of 96 primigravid patients, 32 had positive test whereas only 14 positive tests were obtained in 79 multigravid patients.

Table II illustrates the range and mean difference of diastolic blood pressure in the lateral and supine position of both negative and positive groups of patients. In positive roll-over test the mean difference of diastolic blood pressure was 23.48, whereas mean difference in negative roll-over test was 12.79.

The clinical outcome of the patients is shown in Table III. Out of 64 primigravid patients with negative test, 58 (90.6%) remained normotensive throughout their prenatal course, labour, delivery and postpartum, whereas 6 patients developed pre-eclamptic toxaemia. Out of 6 patients who developed toxaemia even with negative tests 5 developed

TABLE I

Incidence of Negative and Positive Tests

	No. of cases	Percentage	Negative test		Positive test	
			No. of cases	Percentage	No. of cases	Percentage
Primigravida	96	54.86	64	66.6	32	33.3
Multigravida	79	45.14	65	82.2	14	17.7

TABLE II

Diastolic Blood Pressure in Patients With Negative and Positive Tests

	Diastolic blood pressure in left lateral position		Diastolic blood pressure in supine psition		Mean difference (mm. Hg)
	Range	Mean	Range	Mean	
Negaive roll-over test (129)	50-64	56.17	64-80	63.91	12.79
Positive roll-over test (36)	54-68	60.73	74-96	84.21	23.48

TABLE III
Accuracy of the Roll-over Tests

	Total No. of tests	No. of patients developing pre-eclamptic toxaemia	Accuracy
Primigravid	96		
Positive test	32	24	75.0%
Negative	64	6	90.6%
Multigravid	79		
Positive test	14	10	71.4%
Negative test	65	5	92.3%

mild antepartum pre-eclampsia and 1 developed severe toxaemia. Out of 32 primigravid patients with positive test 24 patients (75.1%) developed pre-eclamptic toxaemia. Among these 24 patients who developed toxaemia, 17 had mild toxaemia, 6 had severe pre-eclamptic toxaemia and 1 came with eclamptic fits during labour. Among 65 multigravid patients with negative test, 60 (92.3%) remained nomotensive and out of 14 multigravid patients with positive test 10 developed toxaemia (71.4%).

TABLE IV
Percentage of False Positive and False Negative Tests

Total number of tests	175
	46
False positive	12%
Negative test	129
False negative	11%

Table IV shows that 12 per cent was false positive and 11 per cent false negative test.

Comments

Although it is too premature to finally conclude about the value of this simple Roll-over test in predicting which patient will develop hypertension in later stage of pregnancy, it certainly proved to be a reasonably good indication for incipient toxaemia. The false positive tests were high but false negative tests were 92.3 per cent correct.

This simple test is based on the observation that significant supine hypertension is present for at least 8-10 weeks prior to the onset of toxaemia. The exact mechanism underlying this is not known but this supine hypertension seems to be one of the early pathophysiological changes preceeding the full blown toxaemia. A decrease in the metabolic clearance rate of dehydroisoandrosterone sulphate and an increase in the vascular sensitivity to infused angiotensin II have been noted in patients prone to develop pre-eclampsia. Because of the immediacy of hypertensive response shown in the roll-over test, a reflex hypertension perhaps mediated by baroreceptors seems a more logical mechanism than activation of the renin-angiotensin system which would require longer time interval (Karbhari *et al*, 1977).

Weinberger *et al* (1973) observed increase in plasma renin activity in normal pregnant women in supine position for more than 30 units. Gant *et al* (1973) ruled out the possibility of increased plasma renin activity since he observed a pressure response within 5 minutes after rolling the patient to the supine position.

Whether the defect is in the prostaglandin E production or loss of response to prostaglandin, renin-angiotensin changes or a combination of events have not yet been proved.

Summary

The present study indicates a highly significant correlation between the positive roll-over test and subsequent development of pre-eclampsia. Conversely a negative test shows a similar high correlation with the absence of subsequent pre-eclampsia. These results are in agreement with the original observation of Gant and associates.

The value of the roll-over test lies in its simplicity. It requires no elaborate equipment of special skills and minimal time. The test is easily reproducible by allied medical personnel allowing easy and reliable screening of large number of patients.

References

1. Gant, N. F., Chand, S. and Worley, R. J.: Am. J. Obst. & Gynec. **120: 1, 1974.**
2. Gant, N. F., Hutchinson, N. T. and Sitteri, P. K.: Am. J. Obst. & Gynec. **111: 555, 1971.**
3. Gant, N. F., Daley, G. F. and Chand, S.: J. Clin. Invest. **52: 2682, 1973.**
4. Karbhari, D., Harrigan, T. John and Lamagra, R.: Am. J. Obst. & Gynec. **127: 620, 1977.**
5. Weinberger, M. N., Peterso, L. P. and Herr, M. J.: J. Clin. Endocrinol. Metab. **36: 991, 1973.**
6. Worley, R. J., Grant, N. F. and Chand. S.: Am. J. Obst. & Gynce. **120: 1, 1974.**