

CRITICAL EVALUATION OF PROVOCATIVE TESTS IN PREDICTING PRE-ECLAMPSIA

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SUMMARY

Pregnancy Induced Hypertension (PIH) is still a major cause of Obstetrical and perinatal morbidity and mortality. From the stand-point of prevention, pre-eclampsia has remained a constant challenge to the obstetrician. Recognition of this need has led to development of number of provocative tests which can be utilized to delineate that segment of the patient population prone to develop pre-eclampsia. In this study the usefulness of Roll over test, Cold pressor test, and Isometric hand grip exercise test, in prediction of PIH was evaluated in a prospective study.

A positive ROT was found to be more effective method for predicting patients who were at risk to develop PIH as compared to CPT and IHG Ex T. The sensitivity of ROT was 82.35%, specificity was 86.66%; positive predictive value 53.84%, specificity and positive predictive value increased to 100% each when criteria for predicting patients for development of PIH was taken as simultaneous positivity of ROT, CPT and IHG Ex T. The combination of provocative tests can be used to achieve high predictive accuracy Kachhawa & Gupta (1991) although, it is cumbersome and time consuming for a busy obstetrician.

INTRODUCTION

PIH is still a major cause of obstetrical perinatal morbidity and mortality. It accounts

for 17.2% of total maternal mortality in India and 22.2% of perinatal mortality.

Janes compared pre-eclampsia to a snowball rolling down hill (Jane 1942) "The earlier one intervenes the easier it is to stop it". Recognition of this need has led

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to development of number of provocative tests which can be utilized to predict pre-eclampsia. These tests are based on the fact that there is increased sensitivity to various vasoactive stimuli in women with pre-eclampsia.

Hines & Brown (1933) first suggested the cold pressor test (CPT) while Gant et al (1974) described the most common test known as Roll over test (ROT). Further, the Isometric Hand Grip Exercise test (IHG Ex Test) is also used as a provocative test to predict pre-eclampsia.

In present study an effort is made to critically evaluate the efficacy of these provocative tests regarding prediction of pre-eclampsia in primigravidae.

AIMS AND OBJECTS

To evaluate the efficacy of "Provocative tests" in predicting pre-eclampsia in primigravida patients, with special reference to sensitivity, specificity and predictive accuracy individually and collectively of :

- (1) Positive tests in predicting pre-eclampsia and
- (2) Negative tests in predicting healthy prognosis in primigravidae.

MATERIAL AND METHODS

One hundred twenty four primigravida women attending the antenatal clinic of Deptt. of Obstetrics & Gynecology, G.R. Medical College & J.A. Group of Hospitals, Gwalior were selected at random for the study from the period July 92 to Nov. 93. Gestational age of patients was between 20 to 30 weeks. In all these patients, besides history taking, general examination and systemic examinations, ROT, CPT,

IHG ExT were done for prediction of PIH.

ROLL OVER TEST - was performed in following manner.

Each patient was placed in left lateral recumbent position and B.P. measurements were made on the right arm. B.P. measurements were repeated until a constant baseline diastolic B.P. was obtained. This procedure usually required 15-20 minutes. Following stabilization of B.P. patient was asked to turn supine position and B.P. was recorded immediately. A rise in diastolic B.P. of more than 20 mm. Hg was considered as a positive test.

COLD PRESSOR TEST- was performed in following manner.

The left hand of the patient was immersed upto the wrist in cold water (4-6°C), the blood pressure was measured on right arm considering the unbearable discomfort as the end point. A positive test was considered as a rise in diastolic B.P. of more than 20 mm Hg over basal level. The test was performed with the subject in the sitting position and her right upper limb extended forward at an angle of 45° to keep the cuff at heart level with the forearm parallel to the ground.

ISOMETRIC HAND GRIP EXERCISE TEST :

The subject was asked to lift a standard weight of 7 Kg with the left hand, B.P. being measured on the right arm and considering unbearable discomfort as end point. A positive test being considered as a rise in diastolic pressure of more than 20 mm Hg of basal level.

All cases were followed up throughout the course of pregnancy, labour, delivery and post partum at regular interval for the

development of pre-eclampsia.

RESULT

The sensitivity, specificity and predictive accuracy of the positive and negative tests were calculated individually and collectively for each provocative test to assess efficacy of the above tests.

In this study 124 primigravida women

were taken for critical evaluation of provocative tests, out of which one had intrauterine death of foetus and sixteen were lost to follow up. Thus 107 primigravidae patients were taken as data base (Table I).

Table No. I shows the incidence of pre-eclampsia in positive provocative tests. Out of 107 cases studied 17 (i.e. 15.88%) patients

TABLE I
PRE-ECLAMPSIA IN NEGATIVE PROVOCATIVE TESTS

Provocative Test	Total No. of Negative cases	No. of Pre-Eclampsia cases	No. of normotensive cases
ROT	81	3	78
CPT	97	10	87
IHGExT	97	11	86

TABLE II
COMPARISON OF PROVOCATIVE TESTS ALONE & IN COMBINATION

Provocative tests	Sensitivity (%)	Specificity (%)	Predictive accuracy (%)
ROT	82.35	86.66	53.84
CPT	41.17	96.66	70.00
IHG ExT	35.29	95.55	60.00
ROT + CPT	29.41	97.77	71.42
ROT + IHG ExT	35.29	98.88	85.71
CPT + IHG ExT	23.52	98.88	80.00
ROT + CPT + IHG ExT	17.64	100.0	100.0

The relative risk of development of PIH was 4.31 ($P = 0.04$ by Fisher's exact test).

developed pre-eclampsia.

ROLL OVER TEST:

The test was positive in 26 patients (24.29%) out of which 14 patients (53.84%) developed pre-eclampsia. 3 patients (3.7%) in which the test was negative also developed pre-eclampsia. The sensitivity, specificity and predictive accuracy of the test came out to be 82.35%, 86.66% and 53.84% respectively. Negative test showed a sensitivity, specificity and predictive accuracy of 17.65%, 13.34%, 96.59% respectively (Table-2).

ISOMETRIC HAND GRIP EXERCISE TEST :

The test was positive in 10 patients 9.34% out of which 6 patients (60%) developed pre-eclampsia. The positive test showed the sensitivity, specificity and predictive accuracy of 35.29%, 95.55% and 60% respectively. 11 patients i.e. 11.34% of negative test also developed pre-eclampsia. The sensitivity, specificity and predictive accuracy of negative test came out to be 64.70%, 4.45% and 88.65% respectively.

COLD PRESSOR TEST :

The test was positive in 10 patients (9.34%), out of which 7 patients (70%) developed pre-eclampsia. 10 patients (10.30%) in which the test was negative also developed pre-eclampsia. The positive test showed the sensitivity, specificity and predictive accuracy of 41.17%, 96.66% and 70% respectively. The negative test showed the sensitivity, specificity and predictive accuracy of 58.83%, 3.34% and 89.69% respectively.

DISCUSSION

In present study we found that two tests, when used in combination of each other had increased specificity and predictive accuracy, whereas the sensitivity was reduced in performance of each individual test when all the three tests were used in combination, the sensitivity further reduced to minimal. Whereas the specificity and predictive accuracy further increased to maximum and became equal. In our study of ROT 13.08% patients developed pre-eclampsia. A highly significant correlation between the positive ROT and subsequent development of pre-eclampsia was found by Karbhari & Harrigan J.T. (1977). The test was positive in 16.3% cases.

The sensitivity, specificity and predictive accuracy of the ROT came out to be 82.35%, 86.66% and 53.84% respectively in positive test. Negative test showed sensitivity, specificity and predictive accuracy of 17.64%, 13.34% and 96.29% respectively when all three tests were considered together the respective values were 17.64% 100% and 100%. These tests are based on the fact that there is increased sensitivity to various vasoactive stimuli in women with pre-eclampsia. This increased sensitivity is a reversal of the vascular hyporesponsiveness that occurs during the course of normal pregnancy.

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