GRIESS NITRITE TEST IN ASYMPTOMATIC BACTERIURIA DURING PREGNANCY

by

SARITA SINHA,* M.S.

The urinary system derives no benefit from pregnancy and occasionally suffers adverse effects. The problem of urinary tract infection in general and during pregnancy in particular though recognised for nearly a century, still requires consideration from the point of view of early detection and prophylaxis. The prophylactic aspect is more important in cases of asymptomatic bacteriuria, particularly during pregnancy. In the present work, bacteriuria has been detected by chemical method (Griess Method). It is quite simple and reliable and can be performed without much laboratory asistance. It can be done on all patients. It compares favourably with the standard culture method.

The author took up the work in order to assess the incidence of bacteriuria during pregnancy and also the incidence of development of pyelonephritis and prematurity in bacteriuric women.

Dodds (1931), Baird (1936), Kass (1960) found that symptoms of pyelonephritis developed during pregnancy in nearly half the women who had bacteriuria in early pregnancy, whereas they were absent in non-bacteriuric patients; consequently they suggested that pyleonephritis of pregnancy could virtually be eliminated by treatment of bacteriuria. Kass (1962) also noted a very high prevalence of prematurity and perinatal mortality in infants of bacteriuric women and found that both these risks were diminished when the bacteriuria was treated.

Material and Methods

The present study was undertaken in Hospital for women P.W. Medical College Hospital, Patna. A total of 400 pregnant women were selected. Both the Griess Method as well as culture method were performed in all the cases to evaluate their respective merits.

Griess Method

The principle of the test is the detection of nitrite in urine. In urine it is present in the form of nitrate which is derived mostly from fruits and vegetables. Nitrate in urine is reduced by bacteria into nitrite. This nitrite in urine is detected by the reagent. The reagent is acid solution of sulfanilic acid and alphanephthylamine which undergoes a diazo-reaction with nitrite forming a red azodye. Positive test requires that urine should remain in bladder long enough for bacteria to reduce a sufficient amount of nitrate.

Reagent

The Griess reagent was prepared by dissolving 1.5 gm. of sulfanilic acid in 450 ml. of 10% of acetic acid. The mixture was added to a solution of 0.6 gm. of alphanephthylamine dissolved in 60 ml. of boiling distilled water. The reagent

*R. S. O. Obst. and Gynaecology, Patna Medical College Hospital, Patna. At present Asst. Professor, Dept. of Obstetrics and Gynaecology, Nalanda Medical College, Patna.

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remains stable for several months if stored in amber coloured bottle in the refrigerator.

The patients were made to drink one full glass of water and not to void urine for a period of 2-3 hours. Mid-stream urine was collected in a sterile test tube. 1 ml. urine was added to 1 ml. of reagent in the test tube. Development of a pink to dark red colour indicates a positive test.

Culture

Culture was done in all these cases to know the accuracy and fallacy of the Griess test.

Results and Observation

Table I shows that the incidence of asymptomatic bacteriuria was present in 13.5% of cases by Griess test. By culture it came to 15.5%.

Dodds (1931) reported 7.6% incidence of persistent coliform bacteriuria in pregnant women. Kass (1960-62) found significant bacteriuria in 6-11% of pregnant women. In the Indian literature Mukherjee and Nawal Kishore reported (1967) 13%, Roy *et al* (1974) 12.4%, Kakoty *et al* (1974) 10%, bacteriuria in pregnant women.

Table II shows reliability of the Griess nitrate test. In the present series Griess test was reliable in 87.09% of cases. No false positive cases were found. Eight (12.9%) false negative cases were recorded.

In published reports the success of the Griess nitrite test in detecting bacteriurics varies between 50% (Smith *et al* 1961) and 80% Turner (1961). Preston (1966) found that the test was reliable in 90.5% of cases and 0.7% of patients had false positive test.

Table III shows that acute pyelonephritis occurred in 25.9% of 54 bacteriurics. Of these 7.4% developed acute pyelonephritis antepartum and 18.5% postpartum. In non-bacteriurics only 7.3% of patients developed acute pyelonephritis. Out of these 0.57% developed acute pyelonephritis antepartum and 6.8% postpartum.

Brumfitt *et al* (1961), Turner (1961), Whalley *et al* (1965), Little (1965), Patrick (1966), Mukherjee *et al* (1967), Roy *et al* (1974) have all noted much higher incidence of symptomatic urinary tract

TABLE I

Incidence of Bacteriuria in 400 Pregnant Women by Griess and Culture Methods

Total number of cases	*Griess test positive*		*Culture*	
	No. of cases	Percentage	No. of cases	Percentage
400	54	13.5	62	15.5

TABLE II

Reliability and Falacies of Griess Test in 400 Cases

Total No. of culture positive cases	Percentage	Total No. of Griess test positive cases	Percentage	Falacies
62	100	54	87.09	12.91%

TABLE III

Occurrence of Acute Pyelonephritis in 400 Follow up Cases

Period when acute pyelonephritis was diagnosed	Bacteriuric (54 cases)		Non-bacteriurics (346) cases	
	No. of cases	Percentage	No. of cases	Percentage
Ante Partum	4	7.4	2	0.57
Post Partum	10	18.5	24	6.8
Total:	14	25.9	26	7.3

infection in bacteriurics as compared to that in non-bacteriurics.

Twelve patients (22.2%) of the bacteriurics and 30 patients (8.6%) of the non-bacteriurics in the present series gave birth to premature infants (birth weight less than 5 pounds). The incidence of prematurity was thus significantly higher in bacteriurics as compared to that in non-bacteriurics.

Kass (1962) found prematurity to be 2½ times more common in infants born of untreated bacteriuric mothers, the incidence being 24% and 10% in bacteriurics and non-bacteriurics. Smith and Bullen (1965), and Roy (1974) have observed a significant difference in the incidence of prematurity between bacteriurics and non-bacteriurics.

The increased incidence of prematurity in bacteriuric group of patients suggests that urinary infection may have a detrimental effect on the foetus even when there is no febrile illness.

It will be clear that Griess method is a simple and reliable method for detecting bacteriuria and can be used even in dispensaries in rural area, where there is not much of a laboratory facility. Thus it is a reliable and relatively inexpensive tool in the hands of doctors for detecting bacteriuria and preventing pyelonephritis and prematurity.

Summary

The reliability of the Griess test for detecting asymptomatic bacteriuria during pregnancy has been observed and stressed. The incidence of pyelonephritis and prematurity was found to be significantly higher in cases of the bacteriuric group. This group needs early detection and management.

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