Communications

Screening for Asymptomatic Bacteriuria in Pregnancy

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Over the past 20 years much time, effort, and money have been spent screening for asymptomatic bacteriuria in pregnant women. It is known that 4 to 12 percent of pregnant women undergoing routine screening will have asymptomatic bacteriuria,[1-12] which places them at increased risk for a urinary tract infection during pregnancy.[1-4,6,9,12] However, only 30 to 60 percent of urinary tract infections in pregnancy are predicted by bacteriuria screening and most pregnant women with asymptomatic bacteriuria will not develop a urinary tract infection.[1-4,9-12]

The association of asymptomatic bacteriuria with complications of pregnancy is not well established.[2-5,8,9,13-15] It is associated with abnormal intravenous pyelogram studies during and after pregnancy[5,9,16,17] and a long-term risk of urinary tract infection, but the importance of these associations to long-term renal function is unclear.[18] Treatment of asymptomatic bacteriuria during pregnancy with antibiotics does decrease the risk of urinary tract infection[5,7,10,12,18]; however, the effect on pregnancy morbidity and long-term urinary tract infection risk and renal function is not resolved.[4,5,8,9,11,12]

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Table 1. Results of Screening for Bacteriuria During Pregnancy

	True Positive	False Positive	True Negative	False Negative
Nitrite	8	9	276	6
History of urinary tract infection	7	49	236	7
Nitrite and/or history of urinary tract infection	10	52	233	4
Nitrite and history of urinary tract infection	7	0	285	7

In spite of these many unknowns, routine screening for bacteriuria during pregnancy continues to be a common practice. This study was conducted in an attempt to find a way more economical than routine urine cultures to screen for bacteriuria.

Methods

All patients presenting for their initial prenatal examination during a four-month period, January through April 1983, at a county-funded, non-hospital-based clinic were studied. The clinic serves a low-income population, 45 percent Hispanic and 13 percent black. Each patient was asked to provide a midstream urine sample at the clinic. Each urine sample was tested for the presence of nitrites using a reagent strip (N-MULTISTIX), and results were recorded as either positive or negative. As part of the prenatal history, each patient was asked whether she had any history of urinary tract infections. All urine samples were sent to the laboratory for culturing on both blood agar and eosin-methylene blue agar using a .001-cc loop.

The laboratory personnel were unaware of the nitrite test and answers to the urinary tract infection history question. The clinic aides testing for nitrites were unaware of answers to the urinary tract infection question. The providers asking the UTI history question could have been aware of the nitrite test results, as the results were recorded in the chart.

Two methods of screening for the presence of asymptomatic bacteriuria, both singly and in combination, were evaluated as follows: (1) the N-MULTISTIX nitrite test, (2) a positive history of urinary tract infection, (3) either a positive nitrite test or positive history of urinary tract infection, and (4) both a positive nitrite test and a positive history of urinary tract infection. Sensitivities, specificities, and predictive values were calculated assuming that culture results were indicative of the presence or absence of bacteriuria. The presence of organisms exceeding 10^5/cc of urine was considered a positive culture. Probability values were calculated using binomial proportions.

Results

A total of 299 patients were studied. Fourteen (4.7 percent) had a positive urine culture. The mean estimated gestational age at presentation for those with bacteriuria was 17.6 weeks and for those without bacteriuria was 17.9 weeks (no statistically significant difference). Of the 8 urine samples positive for bacteriuria by culture and nitrite testing, 6 contained Escherichia coli and 2 contained Proteus species. Of the 6 urine samples positive by culture and negative by nitrite testing, 5 contained E coli, and 1 contained Proteus species.

The true- and false-positive and true- and false-negative results for each screening method are listed in Table 1. The sensitivity, specificity, and predictive values for each method are listed in Table 2.

Table 2. Sensitivity, Specificity, and Predictive Values of Screening for Asymptomatic Bacteriuria in Pregnancy by Nitrite Testing and History

	Sensitivity	Specificity	Predictive Values		
			Positive Test	Negative Test	Overall
Nitrite	.57	.97	.47 (P = .002)	.98 (P < .001)	.95
History of urinary tract infection	.50	.83	.13 (P = .053)	.97 (P < .001)	.81
Nitrite and/or history of urinary tract infection	.71	.82	.16 (P = .037)	.98 (P < .001)	.81
Nitrite and history of urinary tract infection	.50	1.0	1.0 (P = .002)	.98 (P < .001)	.98

Comment

The results of using a history of urinary tract infection as a predictor of asymptomatic bacteriuria are consistent with two other studies[1,4] and show that the predictive value of a positive history is no better than that expected by chance. The results of urine nitrites were also consistent with other studies.[6,19] Czerwinski et al[20] found that nitrite testing (using the Griess test) resulted in fewer false negatives when a first morning specimen was tested. It is possible that by using urine specimens collected in the clinic, some of the false negatives in this study resulted from insufficient time for bacterial reduction of nitrates to nitrites.

Neither of the two methods tested, either singly or in combination, was ideal as a substitute for routine urine cultures. The two procedures with the highest overall predictive value had sensitivities of only 50 and 57 percent. The procedure with the highest sensitivity involved the use of a positive history for urinary tract infection or a positive nitrite test; by culturing urine samples for those positive, 10 out of 14 samples with bacteriuria would have been detected, and 62 out of 299 samples would have required a culture. The results should be compared with other methods of screening for bacteriuria such as dipstick urine cultures, Gram stains, quantitative leukocyte counts, and dipstick leukocyte tests in an ongoing attempt to find a satisfactory, less expensive, substitute for routine urine cultures during pregnancy.

References

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