JOURNAL OF CLINICAL MICROBIOLOGY, May 1979, p. 596-597
0095-1137/79/05-0596/02$02.00/0

Vol. 9, No. 5

Reliability of a Single Urine Culture in Establishing Diagnosis of Asymptomatic Bacteriuria in Adult Males

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Received for publication 5 March 1979

Fifty-nine asymptomatic men without catheters of ileal-loop bladders, who were attending a urology clinic and were incidentally discovered to have 100,000 or more *Enterobacteriaceae* per ml ("significant bacteriuria") in a clean voided urine sample, were prospectively evaluated. To identify these 59 patients, 5,876 urine samples, collected exclusively from men, had been subjected to quantitation and identification. A repeat urine culture performed on these patients invariably confirmed the results of the initial culture. The reproducibility of a single urine culture containing significant bacteriuria occurred independently of the tissue source of infection, as determined by the antibody-coated-bacteria immunofluorescence test. We conclude that a single urine culture obtained from a cooperative man can establish the diagnosis of asymptomatic bacteriuria.

The urine colony count technique has become the preferred method for establishing the diagnosis of a bacterial urinary tract infection (5). Two consecutive clean-voided urine specimens containing 100,000 or more colonies per ml of urine with the same organism have been accepted, with a confidence level that exceeds 90%, as an indication of a urinary tract infection (9). These conclusions, however, were derived from studies of catheterized asymptomatic women and are not necessarily applicable to symptomatic men or women (3, 8).

A number of authorities have suggested that, although a single urine culture containing more than 100,000 organisms per ml is inadequate to establish the diagnosis of asymptomatic urinary tract infection in adult females, results of a single clean-void urine specimen in adult males can be diagnostic (2). This statement, however, has not been confirmed experimentally. The purpose of this investigation was to determine the reproducibility in adult males of a single urine culture that contains more than 100,000 organisms per ml.

MATERIALS AND METHODS

During the last 3 years we have performed a prospective evaluation on clean-voided urine samples from all males attending the urology outpatient clinic in our hospital. We have processed 5,876 urine samples from males.

All subjects were instructed to thoroughly cleanse the penis with soap and water, remove the soap, and void a mid-stream sample of urine into a sterile collection container. The containers were handed to a nurse, who immediately refrigerated the sample. Within 3 h all urine specimens were subsequently inoculated. With a Jorgensen tungsten alloy, 4-mm calibrated wire loop, 0.01 ml of urine was inoculated on Trypticase soy agar with 5% sheep blood (Scott Labs) and Levine eosin methylene blue agar (Scott Labs) and then incubated aerobically at 37°C for 48 h. Organisms were quantitated and then identified by new standards established by the Center for Disease Control (1).

We identified 59 asymptomatic males whose urine contained a pure culture of a member of the *Enterobacteriaceae* family in a count of 100,000 organisms per ml or greater. These men did not practice intermittent catheterization nor did they have a Foley catheter, suprapubic catheter, or ileal-loop bladder. Many of these asymptomatic men had previously been subjected to urological procedures, particularly transurethral resection to relieve obstructive uropathy, and were being followed in the Outpatient Clinic intermittently over a period of 1 year as part of an established postoperative assessment program. These subjects were given no medication and were asked to return to the laboratory within 1 week to have a second urine culture processed. When the patients returned, another specimen was obtained that was processed in a manner identical to the first. In addition, a sample of the second urine was stored and subsequently thawed and tested by an antibody-coated-bacteria (ACB) immunofluorescence determination according to the methods of Thomas et al. (10). This test has been developed as a noninvasive procedure to define the tissue source of a urinary tract infection and has proved to be a reliable technique to evaluate men with asymptomatic bacteriuria (4, 6). We have been performing this test routinely because a number of recent studies have suggested that knowledge of the site of a urinary tract infection can influence therapeutic decisions (7).

RESULTS

Table 1 lists the organisms isolated and the results of the ACB determination. For all patients, except one, the repeat urine culture confirmed the results of the initial culture. One patient with a negative ACB determination and an initial culture with >100,000 *Klebsiella* sp. had sterile urine on a repeat determination performed 5 days after the initial culture.

The reproducibility of a single urine culture containing "significant bacteriuria" occurred independently of the tissue source of the infection, as determined by the ACB immunofluorescence test. Forty-five patients had a positive urinary determination of ACB. Fourteen patients had urine that failed to manifest immunofluorescence.

DISCUSSION

In the present climate of fiscal responsibility, convincing evidence of need should be present before repeating any laboratory test. We feel that our data confirm the statement made by others that, for adult noncatheterized males without an ileal-loop bladder, a single clean-voided urine specimen that contains more than 100,000 *Enterobacteriaceae* per ml in pure culture can be considered diagnostic of an asymptomatic urinary tract infection. We hasten to add the following caveats, however: the patient must be able to cooperate in obtaining the urine, and the specimen should be processed expeditiously.

TABLE 1. *Organisms isolated and ACB results*

Organism	No. of patients	ACB positive	ACB negative
Escherichia coli	38	31	7
Klebsiella sp.	9	4	5
Proteus mirabilis	7	6	1
Proteus morganii (Morganella morganii)	2	2	0
Enterobacter sp.	1	1	0
Citrobacter diversus	1	1	0
Providencia stuartii	1	0	1

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