

Management of acute uncomplicated urinary tract infections in general practice in the south of the Netherlands

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SUMMARY

There is debate about the ideal diagnostic procedure for urinary tract infections (UTIs) in general practice. The aim of this study was to evaluate nitrite and leucocyte esterase strip test procedures in general practice patients, and to relate the results to the decision of the general practitioner to prescribe antibiotic therapy.

A total of 292 female patients from eight general practices in the Maastricht area, who were aged 12 years or over with complaints suggesting UTI, were included in the study. All eight practices tested fresh urine samples using the nitrite strip test, and seven also used the leucocyte esterase strip test. The positive predictive value of the nitrite test was greater than the leucocyte test. Antibiotic therapy was nearly always prescribed when either or both of these tests were positive. Bacterial culture was positive in 159 (59%) cases, although treatment was started in 70 (27%) cases where there was an absence of significant bacteruria. It was found that the choice of agent used to treat the patient was related to the antibiotic susceptibility of the uropathogens that were isolated.

Keywords: urinary tract infection; the Netherlands; nitrite strip test; leucocyte esterase strip test.

Introduction

THERE is still considerable debate about the ideal diagnostic procedure for urinary tract infections (UTIs) in general practice.^{1,2} The aim of this study was to evaluate UTI diagnostic strip procedures — nitrite and leucocyte esterase tests — in general practice patients, using the culture result as the gold standard, and to relate the results to the decision to prescribe antibiotic therapy. Furthermore, the choice of agent prescribed was compared with the antibiotic susceptibility of the uropathogens isolated.

Method

The study was performed prospectively from May to September 1997 in eight general practices in the Maastricht area. All female patients aged 12 years or over with complaints suggesting UTI

were eligible for inclusion. Patients were excluded if they had received antibiotic treatment during the previous month.

Fresh urine samples from all patients, if available, were tested with diagnostic test strips and bacterial culture using a dipslide. All practices used the nitrite test strips, seven also used the leucocyte esterase strip tests. The dipslides were then sent to the microbiology laboratory of the University Hospital Maastricht. The presence of 10.5 colony-forming units (CFUs) or more per millilitre was considered positive. Identification and antibiotic susceptibility of the micro-organisms was performed according to standard microbiological procedures. Data were analysed using SPSS for descriptive statistics and categorical data analysis.

Results

Tests

This prospective study comprised 292 female patients aged 12 years or over. The mean age was 48 years. Fresh urine samples were obtained from 277 patients and growth of 10.5 CFUs or more per millilitre was found in 168 (58%) patients.

A total of 277 nitrite tests and 232 leucotests were performed. Ninety (32%) samples had a positive nitrite test. Of the 187 samples with a negative nitrite test, 76 (41%) were culture positive (Table 1). In 105 samples the nitrite test was negative while the leucotest was positive: 51 (49%) of these samples were culture positive (Table 2). Both tests were negative in 47 cases, of which only nine samples were culture positive, resulting in a negative predictive value of 81% for the combined tests.

Treatment

Antibiotics were prescribed to 175 (79%) patients. Seventy-six (27%) patients were prescribed antibiotic therapy in the absence of significant bacteria (Table 2). In contrast, 14 (8%) cases received no antibiotic treatment, even though there was significant bacteruria. A positive nitrite test, with or without a positive leucotest, resulted in antibiotic therapy in 68 out of 69 (99%) patients (Table 3). In those cases where antibiotics were prescribed, trimethoprim was used in 119 (52%) patients, followed by fluoroquinolones (23%), nitrofurantoin (15%), amoxicillin (4%), and co-trimoxazol (4%).

Only 28 (12%) patients received a three-day course of treatment. Most patients received a five- or seven-day therapy (84 and 98 respectively).

Uropathogens

Escherichia coli accounted for 69% of the micro-organisms isolated; *Proteus mirabilis* for 10%, *Staphylococcus saprophyticus* for 3%, and other Enterobacteriaceae for 17%. The antibiotic susceptibility of *E. coli* ranged from 81% for amoxicillin to 100% for co-amoxiclav and norfloxacin; for trimethoprim and nitrofurantoin, the percentages were 94% and 98% respectively. Also, the susceptibility rates of the other Gram-negative bacteria for the last two compounds were 98% and 83% respectively.

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Table 1. Diagnostic performance of nitrite test and leucocyte esterase test.

Test	No. of samples	No. of positive tests	Sensitivity	Specificity	PPV	NPV
Nitrite test	277	90	53%	95%	93%	59%
Leucotest	232	179	88%	37%	63%	71%

PPV = positive predictive value; NPV = negative predictive value.

Table 2. Antimicrobial treatment in relation to bacterial culture (n = 292).

Antimicrobial treatment	Culture	Number (%)
Yes	Positive	154 (53)
	Negative	76 (26)
No	Positive	14 (5)
	Negative	48 (16)

Table 3. Diagnostic tests in relation to bacterial culture and treatment (n = 221).

		No. of patients	Positive culture n (%)	Antimicrobial treatment n (%)
Nitrite test +	Leucotest +	63	57 (91)	62 (98)
Nitrite test +	Leucotest -	6	6 (100)	6 (100)
Nitrite test -	Leucotest +	105	51 (49)	97 (92)
Nitrite test -	Leucotest -	47	9 (19)	10 (21)

Table 4. Antibiotic susceptibility (%) of *Escherichia coli* compared with earlier studies.

Antibiotic	1998 ⁵ (n = 279)	1992 ⁶ (n = 938)	1997 ^a (n = 183)
Amoxicillin	84	60	81
Co-amoxyclov	96	100	100
Trimethoprim	90	88	94
Co-trimoxazole	90	88	94
Nitrofurantoin	98	93	98
Norfloxacin	100	100	100

^aThis study.

Discussion

The diagnostic performance of the nitrite and leucotest was similar to those described in other studies.^{1,2} The general practitioner should be aware of the poor positive predictive value of the leucotest and hence the risk of overtreatment, as was shown in the culture-negative patients. Of the cases where both tests were negative, only nine showed significant bacteruria. Thus, if both tests were negative, a UTI can probably be excluded. Three-day antimicrobial courses of treatment were only prescribed in 28 patients, even though the guidelines and the literature recommend such short-course treatment.^{3,4} The susceptibility data do not support the frequent choice of fluoroquinolones. The study does not confirm the assumption that the antibiotic resistance of uropathogens has increased significantly over a 10-year period (Table 4).

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