Variation by Specialty in the Treatment of Urinary Tract Infection in Women

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To determine practicing physicians' strategies for diagnosing and managing uncomplicated urinary tract infection, we surveyed physicians in general internal medicine, family practice, obstetrics and gynecology, and emergency medicine in four states. Responses differed significantly by respondents' specialty. For example, nitrofurantoin was the antibiotic of first choice for 46% of obstetricians, while over 80% in the other specialties chose trimethoprim-sulfamethoxazole. Most surveyed said they do not usually order urine culture, but the percentage who do varied by specialty. Most use a colony count of 10^5 colony-forming units or more for diagnosis although evidence favors a lower threshold, and 70% continue antibiotic therapy even if the culture result is negative. This survey found considerable variation by specialty and also among individual physicians regarding diagnosis and treatment of urinary tract infection and also suggests that some of the new information from the literature has not been translated to clinical practice.

KEY WORDS: urinary tract infection; diagnosis; management; medical specialty.

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How physicians diagnose and treat uncomplicated urinary tract infection (UTI) can affect patient care and health care costs. Because UTI is a frequent complaint, even small variations in charges for diagnosis and treatment can account for large differences in expense when aggregated over millions of cases. Surveys have found that physicians vary in their approach to UTI.¹⁻³ Despite its importance, there is little information on what strategies physicians in the United States use in working up suspected UTI in women.

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Research over the past 15 years has introduced new information regarding the diagnosis and management of UTI. Stamm and colleagues, for example, showed that a lower colony count than previously thought predicts bladder bacteriuria in symptomatic women.^{4,5} Investigators have demonstrated the effectiveness and safety of shorter courses of treatment for acute cystitis,⁶ and have developed convenient dipstick tests for pyuria and bacteriuria.⁷ Investigators have increasingly questioned the need for culture and sensitivity of the urine in uncomplicated cases.^{6,8} In addition, there is evidence that diagnostic strategies are changing, driven in part by mandates to reduce unnecessary costs.⁹

To develop a broader understanding of physicians' diagnostic and management strategies and to determine whether these new advances have found their way into practice, we surveyed practicing physicians in several states and compared their strategies by possible sources of variation such as specialty, date of medical training, and practice location.

METHODS

We developed an 88-item survey that was based on a review of the literature and interviews with generalist physicians. The 4-page survey asked about the value of clinical finding, tests, and strategies in the diagnosis and management of a 30-year-old nonpregnant woman with uncomplicated UTI with dysuria of recent onset.

We surveyed physicians in specialties likely to be primary providers for adult women with dysuria: general internal medicine, family practice or general practice, obstetrics and gynecology, and emergency medicine. From the Physician Masterfile, a computer database maintained by the American Medical Association, we obtained lists of active physicians in these specialties in the four home states of the study investigators: Nebraska, Alabama, Pennsylvania, and Minnesota. We surveyed all physicians in these specialties except in Pennsylvania, where we selected a random sample of physicians in each of the four specialties. We sent a second survey to those who did not respond to the first mailing.

Data were analyzed using SAS (SAS Institute Inc., Cary, NC). Analysis of differences by specialty used Mantel-Haenszel χ^2 , controlling for state of practice. Unless otherwise noted, all significant differences reported here are at $p < .001$ to account for multiple comparisons. Because of the length of the questionnaire, this article does not report the results of all questions and subgroup analyses.

(These analyses and the questionnaire are available on request.)

RESULTS

Of 8,942 physicians, 2,172 (24.3%) responded. Of these, 32 responses were excluded because of missing data. Respondents did not differ from nonrespondents in gender (82% male), year of medical school graduation (median, 1979), and practice type (86% community based). The response rate was slightly higher among board-certified physicians (82% vs 78%), as we have found in other surveys of practicing physicians.¹⁰ Respondents saw a median of 5 patients per week with a primary complaint of dysuria (average, 7). They reported a median of 50 hours per week in patient care, 35% practiced with 5 or fewer

physicians, and more than half had less than 1% of their patient care paid for on a capitation basis.

With regard to tests ordered for patients with dysuria, most respondents (79%) said they “usually or always” order a microscopic urinalysis, but only 30% usually order urine culture (Table 1). The two leading reasons given for not ordering culture were that it is too costly for the patient (76%) and that it rarely affects the treatment (74%). When compared with other specialties, obstetricians were more likely to order culture and sensitivity analysis (44%), but less likely to order microscopic urinalysis and leukocyte esterase (41%). Emergency medicine physicians were more likely to obtain leukocyte esterase (71%). When asked what tests they did in the office, most said they do dipstick urinalysis (93%) and microscopic urinalysis (80%), but only 29% said they obtained a urine culture. These

Table 1. Diagnosis and Management Choices in Patients Suspected of Having Uncomplicated Urinary Tract Infection, Analyzed by Specialty*

Choice	Percentage of Respondents				
	Total (n = 2,172)	FP (n = 997)	GIM (n = 547)	OBG (n = 359)	EM (n = 269)
Tests ordered “usually or always”					
Microscopic urinalysis [†]	79	83	78	65	83
Urine culture, any [†]	30	27	29	44	24
Colony count [†]	28	26	25	41	22
Disk sensitivity [†]	27	24	24	41	22
Gram stain of urine	4	4	7	2	4
Leukocyte esterase [†]	57	59	56	41	71
Nitrazine [†]	34	37	33	14	47
Tests done in their office					
Dipstick urinalysis [†]	93	99	91	93	74
Microscopic urinalysis [†]	80	90	82	69	57
Wet prep (KOH) of vaginal secretions [†]	80	88	71	92	56
Colony count, dipstick method	15	16	13	11	18
Colony count, agar plating method [†]	29	33	25	18	40
Antibiotic sensitivity testing [†]	27	28	29	16	36
Duration of treatment of new cystitis [†]					
Single dose	6	4	11	5	4
2–5 days	52	48	64	42	57
6–10 days	41	46	25	51	37
Over 10 days	2	2	2	2	2
“Usually or always” response to these management questions					
Do you acidify the urine? [†]	8	9	3	12	9
Do you prescribe pyridium? [†]	13	11	5	9	40
Do you schedule a follow-up visit? [†]	26	28	17	21	40
Do you get a follow-up urinalysis? [†]	35	47	28	23	24
Do you get a follow-up culture?	7	7	4	10	6
Would prescribe antibiotics over the phone if the patient					
Calls outside of office hours [†]	16	12	23	27	2
Says the symptoms are the same as for a UTI you treated 6 mo ago [†]	23	19	34	4	4
Would “usually or always” start antibiotics based on					
History alone, no urine test [†]	4	3	5	9	3
Positive leukocyte test alone (dipstick)	19	19	20	19	21
Positive microscopic urinalysis but no culture	62	64	59	54	66

*FP indicates family practice/general practice; GIM, general internal medicine; OBG, obstetrics and gynecology; EM, emergency medicine; UTI, urinary tract infection.

[†]p < .001 for specialty comparisons (Mantel Haenszel χ^2).

questions regarding tests done in the office were probably not meaningful for emergency medicine physicians.

We asked what threshold number of colony-forming units (CFU) per milliliter would be diagnostic of acute infection if a urine culture is obtained. The majority (55%) chose 10^5 CFU or greater, and few (6%) chose the 10^2 CFU recommended by Stamm and colleagues.⁴ The number of CFU respondents required for starting antibiotic treatment was lower, although the majority (63%) chose 10^4 CFU or greater. These estimates did not vary by specialty.

Regarding duration of antibiotic therapy, most chose either 2 to 5 days or 6 to 10 days (Table 1). Those in internal medicine and emergency medicine favored the shorter course (2 to 5 days), and those in obstetrics favored the longer course (6 to 10 days). Other differences are shown in Table 1. Although most respondents said they prescribe trimethoprim-sulfamethoxazole as drug of first choice in treating uncomplicated UTI, 13% chose nitrofurantoin. These were mostly obstetricians, 46% of whom selected nitrofurantoin as their first choice (Table 2).

We asked physicians what they do when the urine culture result comes back negative after they have previously prescribed antibiotics. Only 23% said they would contact the patient and stop the antibiotics; most would either continue the antibiotics unchanged (47%) or shorten the course (22%). Eight percent chose "other." In the case of a woman with dysuria whose urine culture is positive for WBC and bacteria, 63% would start antibiotics without further testing. Fewer than 1% would wait for culture results, and 34% would order culture and start antibiotics without waiting for the culture results. Where the results of microscopic urinalysis are "equivocal (5–10 leukocytes, few bacteria)," 39% would start antibiotics and do no further testing, 16% would wait for the culture result, and 39% would start antibiotics and order culture. When asked to estimate what percentage of patients seen for dysuria actually have a UTI, the greatest number of respondents (54%) chose 50% to 75%. Most (81%) thought that more than 75% of UTIs are cured by their treatment.

DISCUSSION

In this survey, we sought to record contemporary practice of community physicians in diagnosing and managing uncomplicated UTI. We hoped to identify sources of variation in strategies and to determine how well new information in the field has been translated into practice. We found that most respondents diagnosed UTI using microscopic urinalysis or dipstick test or both. Most could do these tests in their office, and most did not routinely obtain urine culture.

The reported strategies are consistent with some, but not all, of the more recent developments in the literature. Prescribing a short course of antibiotic was common, more so among internists. Trimethoprim-sulfa is the drug of first choice of the majority. Studies documenting infection in symptomatic women with lower colony counts, however, have not altered the diagnostic standard of 10^5 CFU for the majority of respondents. Most select a lower colony count for initiating treatment than they do for diagnosis, perhaps adjusting for the false negatives that occur with the higher standard. In the past, urine culture was recommended as part of the standard diagnostic workup,¹¹ but most respondents say they usually start treatment based on the results of the microscopic urinalysis, consistent with recent recommendations.⁸

We found considerable variation by specialty. The most striking difference was the increased preference among obstetricians for nitrofurantoin as antibiotic of first choice. This difference, not explained by recommendations in the specialty literature, may carry over from the use of nitrofurantoin in pregnant women and greater familiarity with the drug. Obstetricians in our survey also relied more on culture and less on urinalysis for diagnosis. Other differences in management include a tendency for greater use of follow-up visits by family physicians and emergency medicine physicians and somewhat shorter duration of treatment by internists. The reasons for variation by specialty may include peer or training effects but, for the most part, are unexplained. The lack of controlled studies showing clear superiority of one diagnostic strategy over the other may explain some of the variation. A recent study by Saint and colleagues, for example, questions whether treating all symptomatic patients empirically might be the best strategy.⁹

Because this study had a low response rate, a biased response could affect the generalizability of the results. The rates of test ordering or use, for example, could be overestimated if, for any reason, physicians who were more test oriented were more likely to respond to the questionnaire. The lack of any differences in the major demographic variables between responders and nonresponders, however, makes a large bias highly unlikely. The variability in usual practice for workup and treatment observed among physician groups was so large that these differences are unlikely to be explained by response bias. Also, the variation observed among individual physicians within groups is

Table 2. Antibiotic of First Choice in Treating a 30-Year-Old Woman with Cystitis*

Antibiotic	Percentage of Respondents				
	Total	FP	GIM	OBG	EM
Ampicillin or amoxicillin	7	7	8	6	4
Ciprofloxacin or norfloxacin	2	2	3	1	2
Nitrofurantoin	13	9	3	46	1
Sulfa	4	5	4	7	2
Trimethoprim-sulfa	73	77	81	39	88
Others†	1	1	1	1	0

*FP indicates family practice/general practice; GIM, general internal medicine; OBG, obstetrics and gynecology; EM, emergency medicine.

†An oral cephalosporin, gentamicin, naladixic acid, proxetil, tetracycline, trimethoprim. These antibiotics were listed separately on the questionnaire, but have been combined for reporting purposes.

sufficient in itself. Further analysis by multiple regression confirmed the interspecialty differences while controlling for many possible confounding variables. As with any survey, the responses may not always reflect actual practice.

This survey found that strategies for diagnosis and treatment of UTI vary among physician groups. Some of the variation relates to specialty and practice location, but the remainder is unexplained. Some of the new evidence in the literature has made its way into practice and some has not. Are these examples of random and unwanted variation or can they be explained by more detailed study? Would guidelines or more standardization improve care? These important questions deserve further, careful investigation.

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