SHEA Position Paper

Urinary Tract Infections in Long-Term–Care Facilities

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ABSTRACT

Urinary tract infection (UTI) is the most common bacterial infection occurring in residents of long-term–care facilities. It is a frequent reason for antimicrobial administration, but antimicrobial use for treating UTIs is often inappropriate. Achieving optimal management of UTI in this population is problematic because of the very high prevalence of bacteriuria, evidence that the treatment of asymptomatic bacteriuria is not beneficial, and the clinical and microbiological imprecision in diagnosing symptomatic UTI. This position paper has been developed, using available evidence, to assist facilities and healthcare professionals in managing this common problem (*Infect Control Hosp Epidemiol* 2001;22:167-175).

SCOPE OF THIS POSITION PAPER

Long-term–care facilities (LTCFs) provide non-acute care to a diverse group of individuals. Such facilities may include pediatric patients, young psychiatric patients, and young adults requiring rehabilitation or chronic care. The majority of such facilities, however, provide care for elderly patients, and most of these reside in nursing homes. This position paper, unless otherwise noted, is relevant to elderly populations resident in nursing homes. Urinary tract infections (UTIs) may be a significant problem in other LTCFs, particularly for patients with chronic indwelling catheters, but there is limited information from these other populations describing the extent of the problem or providing a basis for informed recommendations for management. The discussion in this position paper is relevant to populations without chronic indwelling catheters, unless stated otherwise. Wherever possible, recommendations are based on available evidence. The quality of evidence is graded using categories consistent with other Society for Healthcare Epidemiology of America position papers (Table 1).[1]

DEFINITIONS

Urinary tract infection is the presence of bacteria or yeast in the urine, which is normally sterile. The term generally denotes significant bacteriuria or quantitative counts of bacteria isolated from urine specimens that meet accepted standards for infection.[2] UTI may be symptomatic or asymptomatic. Symptomatic UTI is the presence of clinical symptoms attributed to the genitourinary tract in association with significant bacteriuria. In virtually all cases of asymptomatic UTI, there is evidence for a local host response to bacteriuria[3]; so, using the term *colonization* to describe asymptomatic UTI is not appropriate. The term *bacteriuria* in this document is used interchangeably with asymptomatic UTI.

OCCURRENCE OF UTI IN LTCFS

Urinary tract infection is the most common infection experienced by residents of LTCFs.[4] The prevalence of bacteriuria in elderly institutionalized populations without indwelling catheters varies from 25% to 50% for women and 15% to 40% for men (Table 2). Elderly residents with asymptomatic bacteriuria are more functionally impaired, as evidenced by increased dementia, incontinence of urine or bowel, being bedbound, and having a longer duration of residence compared to those without bacteriuria.[2,5-7]

The incidence of asymptomatic UTI, including both new infections in previously bacteriuric residents and new acquisition of infection by nonbacteriuric residents, is also high (Table 3). A US study of women residing in either a nursing home or a geriatric apartment reported an incidence of 0.03 per person per month for initially nonbacteriuric subjects[8] and, in a group of previously bacteriuric female residents of an LTCF in Canada, 1.2 new infections per resident per year were reported.[9] For previously non-

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TABLE 1
CLASSIFICATION OF THE STRENGTH AND QUALITY OF EVIDENCE OF EACH RECOMMENDATION*

Category	Definition
Categories reflecting the strength of the recommendation	
A	Good evidence to support the recommendation.
B	Moderate evidence to support the recommendation.
C	Poor evidence to support the recommendation.
Categories reflecting the quality of evidence for the recommendation	
I	Evidence from at least one properly randomized, controlled trial.
II	Evidence from at least one well-designed clinical trial without randomization, from cohort or case-controlled analytic studies (preferably from more than one center), from multiple time-series studies, or from dramatic results in uncontrolled experiments.
III	Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

* Modified from reference 1 by deleting previously used categories D ("moderate evidence . . . against") and E ("good evidence . . . against") and requiring all recommendations to be phrased so that category A, B, or C is applicable. This modified classification scheme has been used for SHEA position papers since 1994.

TABLE 2
PREVALENCE OF URINARY INFECTION IN LONG-TERM–CARE FACILITY POPULATIONS

Populations	Prevalence	
	Women	Men
USA, mean age 83.3 y, n=160[12]	18%-28%	
USA, six nursing homes, incontinent, mean age 85 y, n=61[49]	57%	25%
Greece, mean age 79 y, n=352[11]	27%	19%
Canada, mean age 80 y, n=88[10]		37%
Canada, mean age 83.4 y, n=50[9]	53%	
USA, VA nursing home, mean age 72 y, condom catheter, n=26[55]		38%

Abbreviation: VA, Veterans Administration.

TABLE 3
INCIDENCE OF URINARY INFECTION IN RESIDENTS OF LONG-TERM–CARE FACILITIES (LTCFS)

Populations	Rate/1,000 Patient-Days		
	Male	Female	Both
Asymptomatic			
Male veterans[10]	1.23		
Women[9]		3.29	
Symptomatic			
*With fever[34]			0.046-0.126
Canada, veterans[10]	0.35		
Canada, veterans[40]	0.19		
*70 y, veterans; 4% women[85]	1.9		
*68.2 y, veterans[86]	1.2		
*81.6 y[87]			1.3
*Canada, 89 y; 70% women[88]			0.32
*USA, 8 rural LTCFs, 83.4 y[89]			1.6
*USA, 70 y; 1% women[90]	1.05		

* Includes patients with indwelling catheters.

bacteriuric male residents on two wards in a Canadian facility, 10% became bacteriuric in every 3-month period.[10]

The occurrence of asymptomatic bacteriuria in these populations also has been described by the "turnover" of bacteriuria documented in repeated prevalence surveys. In an initial study from Greece, 19% of 121 men and 27% of 231 women in an LTCF had bacteriuria, and, at repeat screening 1 year later, an additional 11% of men and 23% of women were bacteriuric. Of those initially bacteriuric, 22% and 27% were nonbacteriuric at 1 year.[11] Similarly, a study from the United States[12] reported prevalences of bacteriuria ranging from 18% to 33% in women residents of a nursing home over a 4-year period. However, 31% of bacteriuric residents converted from positive to negative urine cultures at each 6-month screening interval, and 8% from negative to positive.

Symptomatic UTI is also frequent, although substantially less common than asymptomatic infection. Reported incidence is variable, partially due to differences in definitions used to identify symptomatic infection in different studies. In two studies of elderly women resident in both geriatric apartments and nursing homes, the incidence of symptomatic infection was 0.33 per patient per year in bacteriuric subjects[13] and 0.46 per patient per year for all

women.[8] Studies with restrictive definitions reported a rate of 0.15 per bacteriuric-patient–year for institutionalized women[9] and 0.11 per patient-year for elderly institutionalized men.[10] Symptomatic infection presenting with fever occurred at a rate of 0.06 per patient per year in a group of elderly males in an American nursing home[14] in a study using a broad definition of UTI. Overall, the occurrence of UTI in residents of LTCFs is remarkable.

FACTORS THAT PROMOTE UTI

Multiple factors contribute to the high frequency of UTI in elderly long-term–care residents, and different factors are of relatively greater importance in different individuals. Age-associated physiological changes, comorbid illnesses, and interventions to manage bladder voiding are the most important contributing variables. Prostatic hypertrophy in men promotes infection through urethral obstruction and turbulent urine flow and the additional risk of instrumentation. Bacterial prostatitis, once established, is difficult to eradicate and may be a source for recurrent UTI over many years.[15] There is a twofold increase in the incidence of UTI in men with incontinence managed with external condom-catheter drainage compared to men without condom catheters.[14] Twisting or kinking of the condom or tubing and catheter manipulation are associated with an increased likelihood of infection.[16,17]

Estrogen deficiency may contribute to UTI in postmenopausal women, but the importance of this hormonal effect relative to other factors in the nursing home population is unknown.[18] Postmenopausal women with a history of prior gynecologic surgery, with increased residual urine volume, or with a history of UTI at younger ages have an increased occurrence of symptomatic UTI.[19] These factors also likely contribute to the frequency of UTI in institutionalized populations, but, again, their relative importance is unknown.

For institutionalized women and men, the presence of comorbid illness with an associated neurogenic bladder is likely the most important contributor to UTI.[3] Degenerative neurological diseases, which frequently necessitate institutionalization, such as Alzheimer's disease, Parkinson's disease, and cerebrovascular disease usually are accompanied by a neurogenic bladder. This promotes infection through impaired voiding, increased residual volume, and ureteric reflux. Prior catheterization or instrumentation also contributes to UTI. On the other hand, no specific medications have been associated with an increased prevalence of bacteriuria.[20]

MICROBIOLOGY OF UTI

The most common infecting organisms in UTIs in LTCFs are the *Enterobacteriaceae.*[3] In most reports, *Escherichia coli* is the most common organism isolated from women,[8,9] and *Proteus mirabilis* is the most frequent in men.[10,21] Other organisms frequently isolated include *Klebsiella pneumoniae, Citrobacter* species, *Enterobacter* species, *Serratia* species, *Providencia stuartii, Morganella morganii,* and *Pseudomonas aeruginosa. Enterococcus* species and group B streptococci are the most frequently isolated gram-positive organisms, and *Candida* species also may cause infection. Polymicrobial bacteriuria is identified in 10% to 25% of both men and women.[9,10]

Organisms isolated from UTI tend to have increased antimicrobial resistance relative to those isolated from elderly subjects in the community. This observation reflects repeated exposure to antimicrobials in a given individual with recurring infection, as well as the intense use of antimicrobials in LTCFs, together with opportunities for transmission of organisms among patients.[22] *P stuartii* is one organism that may be highly resistant and appears to have a unique institutional predilection.[23] Where *P stuartii* is identified in UTI in an LTCF, it tends to be isolated from a high prevalence of infections.[10,17,21,24] In other institutions, it is isolated infrequently,[10] and this organism seldom is isolated from UTI in noninstitutionalized subjects.

CLINICAL IMPACT OF UTI

Bacteriuria in residents of LTCFs is not simply "bladder colonization." At least 50% of women with asymptomatic bacteriuria also have bacteria present in the kidneys.[25,26] Pyuria accompanies bacteriuria in over 90% of cases,[27,28] and increased urinary cytokines and the presence of local urinary or systemic antibodies to the infecting organism in many bacteriuric subjects are further evidence for a host response.[29-31] Despite this, UTI occurring in residents of LTCFs is usually clinically asymptomatic.[3] Asymptomatic UTI has not been associated with long-term negative outcomes such as renal failure or hypertension. While there is a high prevalence of infection with urease-producing organisms such as *P mirabilis* and *P stuartii,* renal or bladder stones have not been identified as a significant clinical problem in LTCF residents without chronic indwelling catheters.[10,24] Survival has been reported to be similar in bacteriuric compared to nonbacteriuric long-term–care residents.[5,32] When decreased survival in bacteriuric residents has been observed, bacteriuria was not an independent association with mortality.[33]

Morbidity with symptomatic infection may vary from limited lower tract symptoms and interference with daily activities to substantial clinical decline requiring parenteral therapy or hospitalization. The impact of symptomatic UTI on functional status and daily activities of residents, however, has not been documented adequately. UTI with fever has been reported to occur at rates of 1 to 1.5 per 10,000 resident days, whereas episodes of fever from any cause in bacteriuric residents are 10 times higher.[34] UTI is the most common cause of bacteremia in LTCFs[35,36] and may be a frequent cause of transfer for acute-care hospitalization.[37,38] The strongest association for bacteremia, however, is the presence of an indwelling urinary catheter, which increases the likelihood of developing bacteremia almost 40-fold.[39] Despite this, urosepsis is an infrequent direct cause of death in LTCF residents.[40,41]

Urinary tract infection is the most common reason for antimicrobial prescriptions in LTCFs, being responsible for initiation of 20% to 60% of systemic antimicrobial courses.[42-47] The intensive use of antimicrobials for UTI likely con-

tributes to antimicrobial resistance in organisms isolated from residents of LTCFs, although this is not well studied.[23]

DIAGNOSIS OF UTI

Clinical

Symptomatic UTI may present in residents of LTCFs with clinical signs and symptoms similar to those described for younger populations. Thus, acute cystitis presents as lower tract irritative symptoms of dysuria, frequency, urgency, suprapubic discomfort, or increased incontinence, and acute pyelonephritis presents with fever and costovertebral angle pain or tenderness with or without lower tract symptoms. The clinical diagnosis of symptomatic UTI in the LTCF resident may, however, be problematic[48] and seldom is based on definitive criteria. Diagnostic accuracy is compromised by difficulties in communication, multiple comorbid illnesses with associated chronic symptoms, and clinical presentations that are possibly infectious but without clear localizing findings.

Chronic genitourinary symptoms, including chronic incontinence, frequency, urgency, or nocturia, are frequent in LTCF residents. Many of these residents have positive urine cultures. Chronic symptoms, however, do not occur more often in bacteriuric subjects,[49-57] and a positive urine culture in a patient with chronic genitourinary symptoms is not sufficient for a diagnosis of symptomatic UTI. The very high prevalence of bacteriuria at any time in these populations means a positive urine culture always has a low positive predictive value for a diagnosis of a urinary source in patients with clinical symptoms.[34] An acute deterioration in stable chronic symptoms, such as chronic incontinence, may, however, be an indication of acute infection. A particular diagnostic problem is the presentation of fever with no localizing findings in a bacteriuric resident. Only 10% of such episodes are attributable to a urinary source in subjects without a chronic indwelling catheter.[34] While a diagnosis of symptomatic UTI is unlikely with the presentation of fever in the absence of localizing genitourinary symptoms, it cannot be excluded, as indicators to differentiate the urinary tract from other sites of fever have not been identified. Localizing genitourinary symptoms, including hematuria,[52] acute retention, catheter obstruction, or flank pain, increase the probability of a urinary site of infection. Frequent diagnostic uncertainty with this clinical presentation, however, must be acknowledged.

Nonspecific symptoms such as "clinical deterioration" may be interpreted in the bacteriuric LTCF resident as being due to UTI. One study that addressed this question reported that UTI was a source for only 11% of such episodes and that fever was always present with UTI[53]; thus, this presentation is infrequently attributable to UTI, and a diagnosis of UTI should be made cautiously, especially if the patient is afebrile. Foul-smelling urine and cloudy urine are other symptoms ascribed to UTI and often treated with antibiotics. UTI can be associated with an unpleasant urinary odor, likely due to polyamine production by bacteria in the urine; however, not all individuals with UTI have an unpleasant odor to their urine, and not all urines identified as having an unpleasant odor have bacteriuria.[54] An unpleasant urinary odor should not be interpreted as symptomatic UTI, and alternate interventions, such as improved continence management, should be instituted rather than antimicrobial therapy.

Urine Culture

A microbiological diagnosis of UTI in an LTCF resident requires documentation of significant bacteriuria in a urine specimen, appropriately collected to minimize contamination, and prompt transport to the laboratory.[2] For asymptomatic individuals, at least two sequential specimens with the same organism(s) growing at $\geq 10^5$ CFU (colony-forming units)/mL are diagnostic of bacteriuria. With symptomatic infection, a quantitative count of $\geq 10^5$ CFU/mL of an organism in a single specimen is diagnostic. Lower quantitative counts may be consistent with UTI in selected clinical presentations, including women who have acute cystitis or patients who receive diuretics or who have renal failure, but specific lower quantitative criteria have not been validated in the elderly LTCF resident.

A voided urine specimen may be difficult to obtain in the noncooperative long-term–care resident or the resident who cannot control voiding. A clean-catch specimen usually can be collected from men with voiding. When an external condom is used for continence management, a specimen obtained from a freshly applied condom catheter growing $\geq 10^5$ CFU/mL is consistent with UTI.[55,56] Organisms isolated in lower quantitative counts from specimens collected from condom catheters should be considered contaminants. Collection of urine specimens from women is more problematic. Clean-catch specimens may be obtained from many women and are reliable specimens.[57] Proposed collection methods such as pedibag, bedpan, or diapers are likely to lead to contamination and cannot be recommended.[58,59] In-and-out catheterization should be used where it is essential to obtain a urine specimen for culture and a voided specimen cannot be obtained. For a catheterized specimen, $\geq 10^3$ CFU/mL of a single predominant pathogen is sufficient for the microbiological diagnosis of UTI.

Pyuria

Pyuria is the presence of increased leukocytes in the urine. It is virtually a universal accompaniment of symptomatic UTI. In the elderly long-term–care resident, however, 90% of individuals with asymptomatic infection also will have pyuria, and 30% of residents without bacteriuria also have pyuria, presumably due to other causes of genital, bladder, prostatic, or renal inflammation.[27,28] Thus, pyuria is an expected accompaniment of bacteriuria, whether symptomatic or asymptomatic. The absence of pyuria may be useful in excluding UTI, but the presence of pyuria is not sufficient for a diagnosis of UTI. If bacteriuria is present, pyuria does not differentiate symptomatic from asymptomatic infection. The level of pyuria in subjects with asymptomatic bacteriuria does not predict long-term out-

comes.[31,32] The leukocyte esterase test is a dipstick method for identifying pyuria and, in elderly institutionalized populations, has been shown to have a positive predictive value of 18% to 75% for infection and a negative predictive value of 75% to 100%.[8,28,60]

PREVENTION OF UTI

It seems unlikely that the high frequency of asymptomatic UTI in residents of LTCFs can be substantially prevented. The major determinants of bacteriuria include physiological aging changes and chronic comorbid illnesses. These are not usually modifiable. Ensuring optimal nutrition and management of comorbidities in this population is certainly desirable, but the impact on bacteriuria is not known. The use of cranberry juice as a natural antiseptic for prevention of UTI has been proposed but has not been shown to decrease bacteriuria or episodes of symptomatic infection, and further study is required before endorsing this approach.[61] Long-term antimicrobial therapy for prevention of UTI should be avoided unless efficacy has been documented in appropriate clinical trials, as it will promote antimicrobial resistance.

The use of intravaginal estrogen in institutionalized women with a high frequency of symptomatic infection has been reported to decrease the frequency of both symptomatic and asymptomatic infection.[18] This is associated with a modification in the vaginal flora toward greater colonization with lactobacilli. The generalizability of this observation to the larger LTCF population requires further study. Another report found no decrease in infection when oral estrogen was used.[62] There may be some opportunities for infection prevention with interventions used to manage incontinence. Infections may be decreased in men by avoiding use of condom catheters. Where condom catheters are used, ensuring unobstructed drainage of urine from the catheter to the drainage bag may delay infection. It is not currently known whether different approaches to cleaning for reuse of leg bags alter the frequency of UTI. Incontinence in patients with flaccid bladders and large residual volumes may be managed by intermittent catheterization.[63] This technique is associated with a high frequency of infection, but complications from infection, including bacteremia and acute prostatitis or epididymitis, are less common than with use of a chronic indwelling catheter. Using a clean technique for intermittent catheterization in the nursing home patient results in the same frequency of infection and complications as with sterile technique but is less costly.[64]

Bacteremia and sepsis in elderly bacteriuric subjects who undergo invasive procedures with trauma to the genitourinary mucosa may be prevented by periprocedure antimicrobial prophylaxis.[65] The antimicrobial therapy is given to prevent invasive UTI, rather than to treat asymptomatic bacteriuria. Antimicrobial therapy should be selected based on the preprocedure infecting organism, should be started as short a time as possible prior to the procedure, and should be continued for only a brief period. A single dose given 1 hour prior to the procedure may be adequate.

TREATMENT OF UTI

Asymptomatic UTI

Prospective, randomized clinical trials of treatment of asymptomatic UTI in both male[10] and female[9,33,49] long-term–care residents repeatedly have documented no benefits of antimicrobial treatment. Specifically, antimicrobial therapy does not decrease the frequency of symptomatic infection, alter chronic symptoms such as chronic incontinence, nor alter long-term outcomes, including death. By 6 to 8 weeks after antibiotic treatment, 60% to 80% of treated subjects have recurrent bacteriuria with the same or a new infecting organism.[9,10,66] Subjects who receive antimicrobial therapy for asymptomatic bacteriuria, however, have an increased frequency of adverse effects from antimicrobial therapy, increased reinfection with resistant organisms, and increased cost of therapy. Thus, antibiotics are not indicated for the treatment of asymptomatic UTI in residents of LTCFs.

Symptomatic UTI

Antimicrobial choice for treatment of symptomatic infection must consider efficacy, potential adverse effects, cost, and concerns relevant to emergence of resistance.[67] Selection of the antimicrobial should be based upon the infecting organism and its susceptibilities, tolerance of the individual, and the institutional formulary. Where empirical antimicrobial therapy is given before the infecting organism is known, antimicrobial selection may be directed by anticipated susceptibilities from prior urine cultures in the patient and endemic institutional pathogens. When symptomatic infection occurs, however, it usually is due to reinfection with a new organism.

The appropriate duration of treatment for symptomatic UTI in residents of LTCFs is not well studied. Acute symptomatic episodes in women may respond to 3 days' therapy, but cure rates for elderly women with short-course therapy are not as high as those reported for younger women.[68,69] Thus, a 7-day course generally is recommended for presumed lower tract infection in women, and 10 to 14 days for infections presenting with fever or upper tract symptoms. For men, 10 to 14 days' therapy is recommended. For a man with a symptomatic relapse of UTI within 6 weeks of therapy, prostatic infection is assumed to be present, and a longer course of 6 or 12 weeks is recommended for retreatment.[70,71]

Early recurrent infection is the norm following treatment of asymptomatic or symptomatic UTI. Approximately 50% of men or women will have a positive urine culture within 6 weeks of discontinuing antimicrobial therapy.[9,10,66] Post-therapy urine cultures are not recommended as a test of cure and should not be obtained unless symptoms have persisted or recurred.

UTI IN RESIDENTS WITH CHRONIC INDWELLING URETHRAL CATHETERS

An indwelling urethral catheter is considered a chronic catheter if it remains in situ over 30 days. From 5% to 10% of residents in LTCFs have chronic indwelling catheters.[72,73] Indications for use of an indwelling catheter

are most frequently urinary retention in men and incontinence management in women.[74] A chronic indwelling catheter also may be indicated to assist with wound management of chronic sacral or coccygeal pressure ulcers.

Residents with chronic indwelling catheters are always bacteriuric, usually with two to five organisms present.[75] The indwelling catheter provides a nidus for bacterial biofilm formation, primarily on the interior catheter surface.[76] Large numbers of organisms are present in the biofilm, and urine specimens obtained for culture through a catheter in situ for a prolonged time will grow organisms reflecting the bacteriology of the catheter biofilm rather than the bladder urine.[77,78]

The morbidity of UTI is greater in individuals with chronic indwelling catheters than in elderly LTCF residents with asymptomatic bacteriuria but without an indwelling catheter.[79] The presence of a chronic indwelling catheter is associated with increased episodes of fever from a urinary source[34,79] and local infectious complications including prostatitis, prostatic abscess, epididymitis, and urethritis. An indwelling urethral catheter is the major risk factor for bacteremia in LTCFs.[39] Some individuals have an increased likelihood of catheter obstruction, and obstruction may be associated with recurrent episodes of urosepsis.[80] Bladder stones may develop in individuals with persistent infection with urease-producing organisms such as *P mirabilis, P stuartii,* and *M morganii.* At autopsy, residents with chronic indwelling catheters are more likely to have evidence of acute pyelonephritis or renal abscess formation than bacteriuric subjects without a catheter.[81] Survival is decreased in LTCF residents with a chronic indwelling urethral catheter, but a causative role of catheterization and UTI has not been confirmed.[54]

Diagnosis

Symptomatic infection cannot be differentiated from asymptomatic infection on the basis of urinalysis or urine culture.[82] For microbiological diagnosis, a urine specimen for quantitative culture should be collected aseptically through the catheter port or from a freshly placed catheter. The indwelling catheter should be changed prior to institution of antimicrobial therapy and a urine specimen collected from the newly placed catheter to minimize microbiological confusion from intraluminal biofilm.[77,78]

The most frequent clinical presentation of UTI in the chronic catheterized patient is fever.[79] Lower tract symptoms are identified infrequently, but, occasionally, bypassing of the catheter may occur because of bladder spasms. Catheter obstruction may be a precipitating event for fever and systemic infection.[79] Fever with hematuria or catheter obstruction has a high probability of being from a urinary source.[80] Bacteremia may occur, especially with trauma to the genitourinary mucosa.[39] Patients presenting with fever without any associated localizing findings may have urosepsis, but alternate sources must be considered. UTI is responsible for approximately one third of episodes with this clinical presentation.[34]

Prevention

Bacteriuria may be prevented by limiting the use of chronic indwelling catheters and discontinuing their use as soon as possible. Symptomatic infection in subjects with chronic indwelling catheters likely can be limited by minimizing catheter obstruction or trauma.[74] While a closed drainage system has been shown to be important in decreasing infection for short-term indwelling catheters, the impact on long-term indwelling catheters, where virtually all subjects are bacteriuric, is not known. Routine catheter irrigation has not been shown to decrease catheter obstruction or symptomatic UTI.[83]

Treatment

Asymptomatic bacteriuria is universal in subjects with long-term indwelling catheters. Antimicrobial therapy will not prevent bacteriuria or symptomatic infection, but will lead to emergence of resistant organisms. Thus, asymptomatic bacteriuria should not be treated.

Selection of an antimicrobial for treatment of symptomatic infection is similar to residents without catheters. There may be a more rapid response to treatment and a lower rate of recurrent symptomatic infection if the Foley catheter is changed prior to initiation of antimicrobial therapy,[84] suggesting removal of the biofilm-laden catheter has a beneficial effect on outcome. The optimal duration of treatment is not known. It is generally suggested that antimicrobial treatment should be for as short a period as possible, eg, 5 to 7 days, to decrease the likelihood of emergence of resistant organisms on therapy.

RECOMMENDATIONS

Surveillance

1. Surveillance for endemic asymptomatic bacteriuria in LTCFs should not be undertaken. *Category BII.*

a. Surveillance may be appropriate when an outbreak with a potential uropathogen is suspected. *Category BIII.*

2. Surveillance for symptomatic infection may be undertaken, depending on institutional priorities and infection control resources. *Category BII.*

a. Rates should be reported as per 1,000 patient-days or per 1,000 catheterized-patient–days. *Category BIII.*

3. Standard diagnostic criteria should be used for the identification of symptomatic UTI. Limitations in the ability to make a specific diagnosis of symptomatic UTI should be acknowledged in these criteria. *Category BII.*

Prevention

1. Nutritional status and care of comorbid illnesses should be optimized for patients in LTCFs. *Category CIII.*

a. There is insufficient evidence for a recommendation for routine use of estrogen therapy to prevent UTI in women. *No recommendation.*

2. Routine screening for UTI by urinalysis or urine culture is not recommended for LTCF residents. *Category AI.*

3. Condom catheters should be used to manage incontinence in men only where the benefits to the patient outweigh potential risks. *Category AII.*

a. Condom catheters for external urinary drainage should be applied and managed appropriately to minimize skin breakdown and ensure unobstructed drainage. *Category AIII.*

b. Condom-catheter leg bags should be disinfected and dried prior to reuse. *Category CII.*

4. Where clinically appropriate, intermittent catheterization should be used for urinary drainage rather than a chronic indwelling catheter. *Category BII.*

a. For intermittent catheterization, use a clean technique. *Category AI.*

5. Chronic indwelling urethral catheters should be used only where the benefits outweigh the risks of UTI and its complications. *Category AII.*

a. Indwelling catheters should be discontinued at the earliest opportunity. *Category AII.*

b. There is insufficient evidence to make a recommendation for or against routine chronic indwelling urethral catheter changes. *No recommendation.*

6. Bacteriuric LTCF residents who are to undergo an invasive genitourinary procedure should receive preprocedure antimicrobial prophylaxis. *Category AI.*

Diagnosis

1. A clinical diagnosis of symptomatic UTI should be made only with acute symptoms referable to the genitourinary tract or bacteremia. *Category BII.*

a. A clinical diagnosis of symptomatic UTI should not be made in the presence of stable, chronic genitourinary symptoms. *Category BIII.*

b. In residents with clinical deterioration, including fever, no localizing genitourinary findings, and a positive urine culture, a diagnosis of UTI is possible but not definite. *Category AII.*

2. A urine specimen for culture should be obtained prior to therapy from any resident treated for symptomatic UTI. *Category AII.*

a. A urine specimen with $\geqslant 10^5$ CFU/mL of organisms is consistent with UTI. *Category AI.*

b. In the presence of acute urinary symptoms, lower quantitative counts may be consistent with the diagnosis of acute UTI. *Category BIII.*

c. The diagnosis of asymptomatic bacteriuria requires two consecutive urine specimens with $\geqslant 10^5$ CFU/mL of the same organism and the absence of symptoms referable to the urinary tract. *Category AII.*

d. For men and women, a clean-catch voided urine specimen is the preferred method for collection of urine for culture. *Category AII.*

e. In men using external condom collecting systems, a urine specimen collected from a freshly applied leg bag with $\geqslant 10^5$ CFU/mL is consistent with UTI. *Category AII.*

f. For men or women, where a voided specimen cannot be collected, a urine specimen should be obtained by in-and-out catheterization. A quantitative count $\geqslant 10^3$ CFU/mL of a single predominant pathogen from a specimen obtained with appropriate aseptic technique is consistent with infection. *Category BIII.*

3. In asymptomatic patients with chronic indwelling catheters, urine specimens for culture should be obtained aseptically through the catheter port. *Category AII.*

a. In patients with chronic indwelling catheters and suspected symptomatic UTI, a urine specimen for culture to determine infecting organisms and susceptibilities should be obtained from a freshly inserted chronic indwelling catheter prior to initiating antimicrobial therapy. *Category AI.*

4. The presence or absence of pyuria in a urinalysis specimen should not be used as a criterion to diagnose UTI or to differentiate symptomatic from asymptomatic infection. *Category AII.*

a. The absence of pyuria makes UTI unlikely. *Category AII.*

Treatment

1. Asymptomatic bacteriuria should not be treated with antimicrobial therapy in LTCF residents. *Category A1.*

2. There is insufficient evidence to recommend nonantimicrobial methods to manage UTI in LTCF residents. *No recommendation.*

3. The selection of an antimicrobial for treatment of symptomatic UTI should be based on known or suspected infecting organisms, patient tolerance, local formulary, and documented efficacy. *Category AIII.*

a. The duration of therapy should not exceed 10 to 14 days; shorter courses may be considered for women with minor lower tract symptoms. *Category AII.*

b. For individuals with chronic indwelling catheters, the duration of therapy should be less than 10 days. *Category BIII.*

c. For men with relapsing symptomatic infection, 6 weeks of therapy for retreatment may be considered. *Category BI.*

4. When the diagnosis of symptomatic UTI is uncertain, a decision of whether or not to treat with antimicrobials must be made on the basis of clinical assessment. Where antimicrobials are given, ongoing clinical reassessment of presenting signs and symptoms to assess the impact of antimicrobial therapy should be undertaken. *Category BIII.*

a. Clinical assessment should be undertaken by a physician or appropriately trained designate. *Category AII.*

5. Post-treatment urine cultures to document cure should not be obtained. *Category AII.*

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