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Potential Inappropriate Treatment of Suspected Urinary Tract Infections Among Nursing Home Residents

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Abstract

Objective: To determine if nurse practitioners and physicians followed recommended practice guidelines prior to the initiation of antibiotics among long-term care (LTC) residents with suspected urinary tract infections (UTIs).

Methods: A retrospective review of 1-year reported cases of UTIs in 2 rural southern nursing homes.

Results: There were 175 cases of UTI reported in the 2 homes, but 6 cases were reported in error. Only 4 of the 169 remaining cases met the diagnostic criteria for UTI. The remaining 169 cases received inappropriate antibiotics. Some of these cases may represent asymptomatic bacteria rather than UTI. Problems were identified with the methods used to collect urine sample that were sent to the laboratory for culture.

Conclusion: We found that in 2 nursing homes, almost all of the reported cases of UTI did not meet the accepted diagnostic criteria. Also, there was inappropriate antibiotic therapy for most of these residents. Nurse practitioners and physicians should accurately determine the presence of UTI and document in the medical record prior to initiating antibiotic. Urine specimens should be collected using appropriate methods. Nursing homes should only report to the Centers for Medicare and Medicaid Services (CMS) those cases that meet the diagnostic criteria as a UTI.

Keywords

UTI; bacteriuria; nursing homes; elders

Introduction

Residents of long-term care (LTC) facilities often develop challenging medical problems including problems with the urinary tract. One of the most common urinary tract conditions

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for LTC residents is asymptomatic bacteriuria (ASB; Phillips et al., 2012). Estimates are that 50% of women and 40% of Men develop ASB (Nicolle, 1997, 2009; Wagenlehner, Naber, & Weidner, 2005). ASB can lead to the development of urinary tract infection (UTI; Nicolle, 2002), which is the most commonly reported infection for residents of LTC facilities (Nicolle, 2009). UTIs can progress to urosepsis and death (MacLennan, 2003; Tal et al., 2005).

Over the past decade, there has been an increasing appreciation for the challenge of differentiating between actual infection of the urinary tract and colonization seen in ASB. Several reviews have summarized this complex problem and practice guidelines have been published to promote the goal of improving the management of UTIs in LTC residents (Kamel, 2005; Nicolle, 2002, 2009; Zabarsky, Sethi, & Donskey, 2008). One of the criteria used to distinguish ASB from UTI is the presence of pain (Loeb et al., 2001). This is potentially problematic in that up to 75% of nursing home residents may have some form of cognitive impairment (Monroe, Carter, Feldt, Tolley, & Cowan, 2012) and may not reliably report pain. In addition, pain may be experienced and reported differently by race (Monroe & Carter, 2010).

Concern has grown over the widespread and inappropriate use of antibiotics in general but particularly their use in older adults residing in LTC facilities. Studies have demonstrated that antimicrobials are not beneficial for the treatment of ASB and may actually be harmful (Beveridge, Davey, Phillips, & McMurdo, 2011; Loeb et al., 2001; Phillips et al., 2012; Zabarsky et al., 2008). This information has not decreased the use of antibiotics for ASB, and as many as 75% of LTC residents are prescribed suboptimal antibiotics (Phillips et al., 2012). Unnecessary antibiotics can lead to antibiotic resistance, adverse drug reactions, increased health care costs, and potentially fatal infections such as *Clostridium difficile* (Gorbach, 1999). Antibiotics are not indicated for the treatment of ASB and can lead to antibiotic resistance, adverse drug reactions, increased health care costs, and potentially fatal infections (Genao & Buhr, 2012; Kamel, 2005; Zabarsky et al., 2008).

Despite the known controversies concerning UTI treatment, the Nursing Home Quality Initiative in 2004 began requiring all nursing homes certified by Medicare and Medicaid to provide quarterly reports of the percentage of their residents who had a UTI during the previous 30 days. This information is reported through the Nursing Home Compare website (United States Medicare, n.d.). What is not known is whether nursing homes are reporting actual infections of the urinary tract or ASB.

Objective

We did not know if the nurse practitioners and physicians who were the primary care providers for the residents of these two nursing homes were following appropriate criteria for the diagnosis and treatment of UTIs. The objective of this study was to determine if recommended practice guidelines were being followed prior to the initiation of antibiotic treatment of UTIs in nursing home residents.

Methods

Human Subjects Protection

The University of Tennessee Health Science Center Institutional Review Board approved this study as exempt and did not require individual informed consent. The administrators at both facilities approved the study.

Design

A descriptive cross-sectional retrospective chart audit was used to evaluate whether practice guidelines (Kamel, 2005) were followed prior to the initiation of antibiotics. All LTC residents' records with a reported UTI over the previous 12 months were included. Names were taken from the monthly worksheet created by the nursing staff to prepare their quarterly reports to the Centers for Medicare and Medicaid Services (CMS). Residents receiving rehabilitation services from the facilities were not included.

Setting

Two nursing homes in the Southern region of the United States agreed to participate. The first nursing home was a 122-bed for-profit facility with an average census of 100 located in a city with a population of 7,146. The second nursing home was a 108-bed, county owned, not-for-profit facility with an average census of 95 located in a city with a population of 18,789. Nurse practitioners and physicians were responsible for the diagnosis and treatment of the residents in both facilities.

Protocol and Outcome Measures

Staff at both facilities provided a list of all LTC residents 65 years old or older who had received antibiotics for a UTI during the previous year. The nursing homes recorded the cases each month but did not note if these were repeated cases from month to month. The medical records were reviewed and this included laboratory reports for urinalysis including culture and sensitivity. The laboratory analyses were conducted by outside laboratories that met all state and federal requirements. The data retrieved were those specified by Kamel (2005) for the treatment of UTI (see Figure 1).

ASB was identified as present if there was a single catheterized urine specimen urinalysis result that identified one bacterial species isolated in a quantitative count of at least 10^2 colony forming units/mL, but the patient did not have the other required sign or symptom of UTI (Nicolle et al., 2005).

No identifying information was recorded and the list of names was destroyed after data collection. Two of the authors (AN and MC) conducted the audits and recorded the following: (a) presence of a catheter; (b) fever— temperature of greater than 2.4 °F over usual or greater than 100 °F; (c) presence of burning pain on urination; (d) frequency; (e) urgency; (f) new flank or suprapubic pain or tenderness; (g) worsening of mental or functional status including confusion, decreased appetite, unexplained falls, incontinence of recent onset, lethargy, and decreased activity; and (h) urinalysis with culture with that included white blood cell count, bacteria species and count, and presence of red blood cells.

Results

The records of all reported cases were located and included in this analysis (see Table 1). The first facility listed 85 cases (80 female) of UTI during the previous 12 months. Five cases had no documentation of UTI symptoms, no urinalysis, and no antibiotics ordered. These cases were removed because they were reported in error. Three cases met the criteria for the diagnosis of UTI requiring antibiotic therapy. The remaining 77 cases had a urinalysis with culture report indicating single species bacterial growth of at least 10^2 colony forming units/mL and all of these received antibiotic therapy.

The second facility listed 90 cases (70 female) of UTI during the previous 12 months. One record was reported as a UTI when it was actually an upper respiratory infection. This resulted in 89 cases for review. One case met the criteria for the diagnosis of UTI requiring antibiotic therapy. However, all remaining 88 cases received antibiotic treatment. Sixty of the 88 cases (68%) had urinalysis with culture results in the record of which 45 cases (75%) had single species bacterial growth of at least 10^2 colony forming units/mL and 15 cases had no bacterial growth. All 45 cases received antibiotic therapy.

There were 175 UTI cases reported by the two facilities during the 12-month period. This resulted in incidence of 7.50% that was reported to CMS. However, only 4 (2.30%) of the cases met diagnostic criteria of UTI (Kamel, 2005). This resulted in an actual calculated incidence rate for the year of 0.17% rather than the reported rate of 7.50%. The remaining reported cases were divided between 122 cases that met the criteria for ASB and 43 cases that had no urinary bacterial growth reported. All cases received antibiotics. Of particular concern was one resident who did not meet the criteria for UTI but received antibiotic treatment and subsequently developed an infection with *C. difficile* that proved to be fatal.

Limitations

Several limitations exist. The medical records were intensely reviewed by two of the authors for documentation. Sparse documentation by the nurse practitioners, physicians, or nursing home staff was identified anywhere in the medical record regarding the presence of signs or symptoms of UTI. The possibility exists that residents could have been experiencing these signs and symptoms, which would directly influence the decision to initiate antibiotic therapy but the information not recorded in the record. A second limitation was the inability to determine how the urinalysis samples were obtained from the residents. At the time of the audit, there was no documentation in the charts reflecting the manner in which the samples were obtained. When questioned, staff members reported that they routinely obtained samples from wet diapers, a “hat device” placed in the toilet, or from bedpans. The staff reported seldom obtaining clean catch urine samples because these are difficult to obtain particularly if the resident had dementia. This means that the urinalysis was performed on potentially contaminated urine rendering even the rate of ASB questionable.

Discussion

Findings of this pilot study raise important questions about the treatment of UTIs in LTC facilities. In this sample, most cases were reported as having UTI and were treated with

antibiotic therapy without any documentation that infection actually existed. According to our review criteria, only 4 of 174 cases over the entire year met the diagnostic criteria for UTI. Instead, most of the cases met the diagnostic criteria for ASB. Antibiotic therapy is not warranted for ASB and is potentially harmful including potentially fatal complications. These findings are similar to those reported by Phillips et al. (2012) even with the limitations of our study. Both found that antibiotics are being frequently used for ASB and for residents without any documented signs or symptoms of UTI.

Of most concern is that the methods for collection of the urinalysis was so varied as to render the findings of the urine culture to be meaningless. We do not know if the organisms identified by the culture were from the bladder, skin, diaper, or other contamination. Clearly, initiation of antibiotics for these results is inappropriate.

Recommendations

We recommend that signs and symptoms of a UTI should be documented when initiating antibiotic therapy in nursing home residents. We believe the criteria identified by Kamel (2005) are appropriate and can be a guide for the standard for care. We recommend that residents with ASB not be treated with antibiotics to avoid potential adverse outcomes from inappropriate antibiotic use.

Second, nursing homes should initiate and enforce policies concerning the appropriate methods for collecting urinalyses from residents prior to the initiation of antibiotics. Every effort should be made to assure that the urine specimen is obtained from the bladder in an uncontaminated manner and the sample transported to the laboratory in a timely manner.

The third recommendation is that nursing homes should not report UTIs that do not meet the diagnostic criteria. Our findings indicated that the actual incidence of UTI in nursing home residents in our sample is much lower than was reported.

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Treatment with antibiotics is indicated for residents without catheter if at least three of the following were recorded as present:

1. Fever ($>37.9^{\circ}\text{C}$ [100.0°F] or (1.5°C [2.4°F])
2. Burning on urination, frequency, or urgency
3. New flank or suprapubic pain or tenderness
4. Change in urine—pyuria or microscopic hematuria
5. Worsening mental or functional status

Treatment with antibiotics is indicated for residents with catheter if at least two of the following were present:

1. Fever ($>37.9^{\circ}\text{C}$ [100.0°F] or (1.5°C [2.4°F])
2. New flank or suprapubic pain or tenderness
3. Change in urine—pyuria or microscopic hematuria
4. Worsening mental or functional status

Figure 1.

Kamel's (2005) specifications for the treatment of UTI.

TABLE 1.

Reported Urinary Tract Infections

Measure	Total Sample <i>N</i> (%)	Nursing Home 1 <i>n</i> (%)	Nursing Home 2 <i>n</i> (%)
Reported UTI	175	85	90
Reported UTI in error ^a	6 (3.5)	5 (5.8)	1 (1.1)
Actual UTI ^b	4 (2.2)	3 (3.5)	1 (1.1)
Single species bacterial growth	122 (69.7)	77 (90.5)	45 (50.0)
No bacterial growth	43 (35.0)	0	43 (48.3)

Note. UTI 5 urinary tract infection.

^aNo information in chart in Nursing Home 1; URI was coded as UTI in Nursing Home 2.

^bPresence of 3 of 5 criteria for those without catheter and 2 of 4 for those with catheter.