Urinary Tract Infections in LTC

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Introduction

- My goal is to provide you with a summary of related research evidence
- This is only one source of evidence
- I ask you to also reflect on your own craft knowledge, local data and resident experience

What we know

- **Based on your submitted clinical questions and a review of the relevant literature we know that there are many challenges in the**
  - Diagnosis
  - Treatment &
  - Prevention

  of UTI in the LTC population (Buhr et al. 2011)
- Challenges include the non-specificity and frequently misleading symptoms and signs (Gopal Rao & Patel 2008)

What we know

- UTI is common in LTC residents
- A large proportion of UTIs in the LTC population are asymptomatic (Buhr et al. 2011)
- Institutionalized elderly are at risk for a delayed or missed diagnosis of UTI (Midthun 2004)
- The prevalence of asymptomatic bacteriuria increases with age in both sexes, up to 40% of elderly men and 50% of elderly women who are institutionalized (Nicolle et al. 2005)

What we know

- Based on well-designed clinical trials, there is no benefit to treating asymptomatic UTI/bacteriuria in this population
- Prospective, randomized clinical trials of antimicrobial therapy for elderly residents of long-term care facilities have reported no benefits of screening for or treatment of asymptomatic bacteriuria (Nicolle et al. 2005)
- There are compelling reasons to avoid unnecessary antimicrobial use

  Buhr et al. 2011

What we know

- Treatment of asymptomatic bacteriuria is associated with significantly increased adverse antimicrobial effects and reinfection with organisms of increasing resistance (Nicolle et al. 2005)
- The use of antibiotics in the absence of symptoms and signs should be avoided

What we know

- Two consensus guidelines have been published that help clinicians to differentiate symptomatic from asymptomatic UTI (revised Loeb et al. 2005; Loeb et al. 2001; McGeer et al.1991)
- Treatment of symptomatic UTI in LTC residents is similar to the community-dwelling and younger populations (Buhr et al. 2011)

What we know: Screening

- Screening for and treatment of asymptomatic bacteriuria in elderly institutionalized residents of long-term care facilities in not recommended by the Infectious Diseases Society of America (IDSA) Guidelines for Asymptomatic Bacteriuria (Nicolle et al. 2005)

What is not known

- **Differentiating asymptomatic from symptomatic UTI is a challenge**
  - LTC residents have chronic urinary symptoms
  - Multiple comorbidities
  - Communication barriers
- **Improvements in diagnosis is needed**

Buhr et al. 2011

What is not known

- There is limited evidence for risk factors and prevention strategies for men
- There is some evidence for the efficacy of cranberry products and vaginal estrogen to prevent recurrent UTI in women – further research is recommended

Buhr et al. 2011

Clinical dilemma

- Nursing home clinicians are faced with the clinical dilemma of accurately identifying residents with UTI that warrant antibiotic treatment (Juthani-Mehta et al. 2007)
- However, based on existing criteria, residents without classical UTI symptoms may be designated as having asymptomatic bacteriuria

Clinical dilemma

- Juthani-Mehta and colleagues (2007) advocate that many of these residents may not have asymptomatic bacteriuria, but exhibit geriatric manifestations of acute disease (e.g., change in mental status or behavior)
- A combination of urinary tract-specific symptoms along with geriatric manifestations of acute disease may be associated with laboratory evidence of UTI (Juthani-Mehta et al. 2007)

What we know: Screening

- It is important to use your clinical judgment
- Screening of asymptomatic residents for bacteriuria is appropriate if bacteriuria has adverse outcomes (e.g. sepsis) that can be prevented by antimicrobial therapy (Nicolle et al. 2005)
- The nurse has a crucial role in identifying the subtle or atypical symptoms of a UTI (Midthun 2004)

Confusing “messes”

- “In the varied topography of professional practice there is a high ground where practitioners can make effective use of research based theory and technique, and there is a messy lowland where situations are confusing “messes” incapable of technical solution” (Schön 1983, p. 42)

Revised Loeb consensus-based criteria (2005)

Loeb et al. (2005) recommends a more targeted approach to screening urine

- A urine culture would be indicated if the resident had one or more of the following symptoms in the presence of fever (defined as >37.9^{o}C or 1.5^{o}C increase above baseline on at least two occasions over the last 12 hours):

Criteria for a urine culture

- Dysuria
- Urinary catheter
- Urgency
- Flank pain
- Shaking chills
- Urinary incontinence
- Frequency
- Gross hematuria
- Suprapubic pain

Loeb et al. 2005

McGeer criteria for a urine culture

3 of the following signs of symptoms:

- Fever or chills
- New or increased dysuria, frequency, or urgency
- New flank or suprapubic pain
- Change in character of the urine
- Worsening of mental or functional status

McGeer et al. 1991 as cited by Buhr et al. 2011

Criteria for residents with an indwelling urinary catheter

- 1 or more of the following
- Fever
- New costovertebral angle tenderness
- Rigors
- New onset of delirium

Loeb et al. 2005

Symptoms

- Symptoms must be recognizable
- Symptoms may be absent, masked or difficult to assess, especially among residents who are cognitively impaired
- Complaints of urgency, frequency & dysuria can be common & chronic in the elderly without bacteriuria
- Symptoms may not improve with antibiotic treatment

Midthun 2004

Other Possible Symptoms

- Older persons may require more time to demonstrate a fever and may show no increase in temperature or $\leq 2.4^{o}$ F above an individual's baseline temperature (Midthun 2004)

Other Possible Symptoms

- A decline in mental or functional status, as a symptom of a UTI, may be seen in the elderly (Midthun 2004)
- Increased blood sugar levels in diabetics (Lohfeld et al. 2007)
- Signs of urosepsis other than fever or decline in mental status
  - **Hypotension**
  - **Tachycardia**

Midthun 2004

Other Possible Symptoms

- Respiratory symptoms
  - **Tachypnea**
  - **Rales**
  - **Respiratory distress**
- Gastrointestinal symptoms
  - **Anorexia**
  - **Nausea**
  - **Vomiting**
  - **Abdominal tenderness**

Midthun 2004

Absent or muted symptoms

- **Residents in danger of absent or muted symptoms include**
  - Those with catheters
  - Those who are incontinent
  - Those receiving antipyretics or analgesics
  - The immunocompromized
  - The cognitively impaired

Midthun 2004

Obtaining a urine sample

- Urine specimen collection should be done in a manner that minimizes contamination
- There are difficulties in obtaining a clean catch specimen (Gopal et al. 2009)
- Gopal et al. (2009) advocate an ‘in-out’ catheterization to obtain the specimen
- For a resident with an IUC, the catheter should be changed before specimen collection

Diligent detection of specific symptoms

- Baglioni (2009) advocates for the diligent detection of specific symptoms and signs in order to correctly interpret microbiological results and inform decisions to treat
- Midthun (2004) advocates for the cautious interpretation of culture results

Diagnostic accuracy of criteria for UTI

- Juthani-Mehta et al. (2007) studied the diagnostic criteria for UTI in a cohort of nursing home residents
- Participants were identified who met the criteria of McGeer, Loeb, revised Loeb and laboratory evidence of UTI

Diagnostic accuracy of criteria for UTI

- Juthani-Mehta et al. (2007) report that using laboratory evidence of UTI as the outcome:

Note that all of the consensus-based criteria have similar test characteristics.

McGeer	Loeb	Revised Loeb
Sensitivity 30%	19%	30%
Specificity 82%	89%	79%
PPV 57%	57%	52%
NPV 61%	59%	60%

Sensitivity: measures the proportion of actual positives which are correctly identified. Specificity: measures the proportion of negatives which are correctly identified. Positive Predictive Value (PPV): the proportion of subjects with positive test results who are correctly diagnosed. Negative Predictive Value (NPV): the proportion of subjects with a negative test result who are correctly diagnosed.

Diagnostic accuracy of criteria for UTI

- Juthani-Mehta et al. (2007) conclude that the diagnostic accuracy of UTI criteria in nursing home residents could be improved
- Their data suggest that evidence-based clinical criteria associated with laboratory evidence of UTI need to be identified & validated

Evidence-Based Clinical Pathways

- Lohfeld, Loeb & Brazil (2007) conducted a qualitative study to examine the views of nursing staff and administrators in long-term care facilities (LTCFs) (Ontario and Iowa) regarding a clinical pathway for managing UTIs in LTCF residents

Evidence-Based Clinical Pathways

- To optimize antimicrobial use for suspected UTI in LTCF residents, Lohfeld et al. (2007) developed diagnostic and treatment algorithms for UTIs
- These authors advocate that antimicrobials should not be prescribed without a positive urine culture, and in the absence of a minimum set of symptoms or signs of UTI, urine should not be cultured

Evidence-Based Clinical Pathways

- The diagnostic & treatment algorithms for UTIs were introduced to facility staff and management with a multifaceted campaign using
  - **Written material**
  - **Videotaped case scenarios**
  - **Pocket cards**

(Lohfeld et al. 2007)

Accuracy of urine dipstick

- A urine dipstick can be used to test for the presence of nitrites and leukcocyte esterase
- Reliability of the absence of both nitrites and leucocyte esterase may reach over 90% in ruling out UTI
- The detection of nitrites in the urine of symptomatic non-catheterized patients may prompt initiation of treatment
- The presence of leucocyte esterase is less reliable as an indication of UTI (positive predictive value <50%)

  Gopal Rao & Patel (2008)

Accuracy of urine dipstick

- Ouslander et al. (1995) collected 684 urine specimens and each underwent dipstick testing for nitrite and leucocyte esterase and a quantitative urine culture
- No one screening test or combination of tests had adequate sensitivity and specificity for clinical purposes

Accuracy of urine dipstick

Ouslander et al. (1995) report that using all three tests,

- **the sensitivity increases to 97% in females and 92% in males when any one of the tests is positive**
- **The specificity increases to 95% in females and 97% in males when all three tests are negative**

- Ouslander et al. (1995) report that among nursing home residents suspected of having a symptomatic UTI, the prevalence of bacteriuria is probably higher that in their study population (e.g., 60%—70%), compared with 32%)

Accuracy of urine dipstick

- At the prevalence rate of 60-70%, the positive predictive value of all three tests being positive is 93% and higher
- The negative predictive value of all three tests being negative is 80-90%

  Ouslander et al. (1995)
- This study suggests that the urine dipstick test has an acceptable rate of detection/exclusion only when used in combination with other tests (Baglioni 2009)

Accuracy of urine dipstick

- Urine dipstick quality control is required
  - Quality control product
  - Quality control policy & procedure
  - Quality control documentation

Urine dipstick vs. diagnostic algorithm

- Lohfeld, Loeb & Brazil (2007) advocate not to use urine dipstick screening

- These authors advocate the use of the diagnostic algorithm for ordering urine cultures

Asymptomatic bacteriuria

- For asymptomatic women, bacteriuria is defined as 2 consecutive voided urine specimens with isolation of the same bacterial strain in quantitative counts $\geq 10^5$ CFU/mL
- A single, clean-catch voided urine specimen with 1 bacterial species isolated in a quantitative count $\geq 10^5$ CFU/mL in men
- A single catheterized urine specimen with 1 bacterial species isolated in a quantitative count $\geq 10^2$ CFU/mL identifies bacteriuria in women or men

Infectious Diseases Society of America (IDSA) Guidelines for Asymptomatic Bacteriuria (Nicolle et al. 2005)

Symptomatic UTI

- Bacteria in the urine is equal to or greater than 10^5 CFU/mL in a clean catch specimen
- Bacteria in the urine is equal to or greater than 10^2 CFU/mL in a catheterized specimen
- Plus symptoms and signs attributable to the GU tract

(Nicolle et al. 2005)

Risk factors for asymptomatic & symptomatic UTI in LTC residents

- Age
- Postmenopausal changes
- Prostatic hypertrophy
- History of UTI earlier in adult life (women)
- Dementia
- Mobility limitations
- Cormorbidities that result in bladder dysfunction (e.g., diabetes, Parkinson's Disease, CVA)

Buhr et al. 2011

Management of bacteriuria

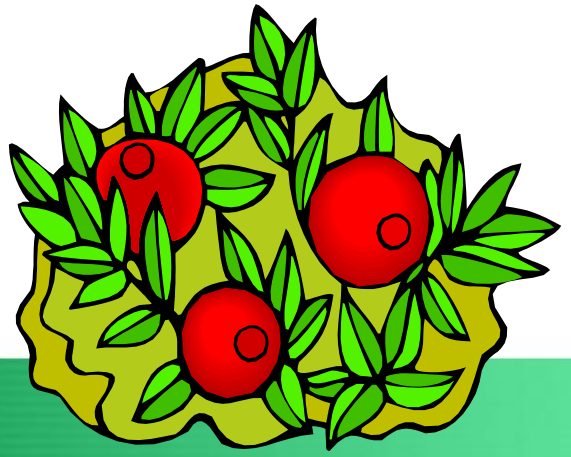
- **Conservative nursing interventions may decrease the incidence of UTIs in LTCF**
  - Adequate hydration
  - Cranberry juice
  - Prevention of constipation
  - Perineal hygiene
  - Advocating for low dose vaginal estrogen when appropriate
  - Functional status
  - Catheter care
  - Minimizing long-term indwelling urinary catheters

Prevention: adequate hydration

- Hydration is an important aspect
- Ensure an adequate level of fluid intake (1500-2000 ml per day), and minimize the use of caffeinated and alcoholic beverages where possible (RNAO 2011)
- Strong urine or a change in urine odour may be related to dehydration

Cranberries for preventing & treating UTIs

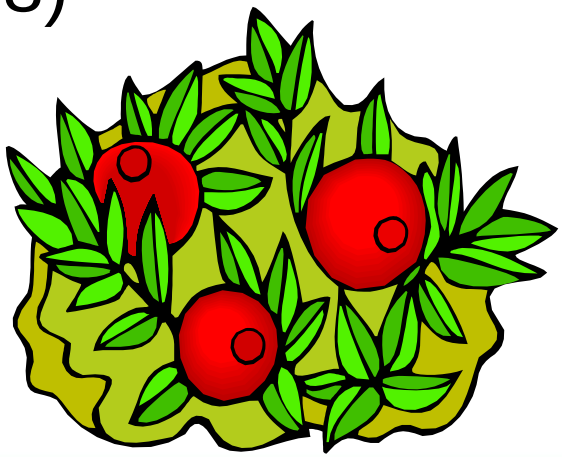
- Cranberries (particularly in the form of cranberry juice) have been used widely for several decades for the prevention and treatment of urinary tract infections (UTIs) (Jepson, Mihaljevic & Craig 2010)
- Cranberries contain a substance that can prevent bacteria from sticking on the walls of the bladder



Cranberries for preventing UTI

- There is evidence that cranberry juice is effective for the prevention of recurrent UTI in women in a recent Cochrane review

  Jepson & Mihaljevic (2008)



Cranberries for treating UTIs

- A recent Cochrane review (Jepson, Mihaljevic & Craig 2010) confirms that at the present time, there is no good quality evidence to suggest that cranberry juice or cranberry products are effective for the treatment of UTIs
  - There is no evidence regarding the dosage (amount and concentration) and duration of therapy (Jepson & Mihaljevic, 2010)
  - Be mindful of potassium restrictions in residents with renal disease

Prevention: Constipation

- Ensure that constipation and fecal impaction are addressed
- New supplement to the RNAO Prevention of Constipation in the Older Adult Population (2011) will be available this fall

Prevention: Perineal hygiene

- Wash and wipe from the front to the back
- Wash with warm water and pat dry
- Use white cotton crotch underwear
- Avoid
  - feminine hygiene sprays
  - bubble bath
  - baby wipes

Prevention: Vaginal estrogen

- Tablet, patch, ring or cream (low dose)
- Works by improving the tissues of the vagina and urethra in post-menopausal women
- Lowers vaginal pH
- Provides symptomatic relief of atrophic vaginitis & decreases the number of UTIs
- Risk considerations
  - breast cancer
  - uterine cancer

Prevention: functional status

- Therapy to improve functional status
- Improvement in ambulation, transfers and bed mobility

Buhr 2011

Elimination of long-term IUC

- **Only IUC that are clinically indicated based on criteria:**
  - **Appropriate Indications for Use of a Chronic Indwelling Catheter in the Long-Term Care Setting AMDA's Clinical Practice Guideline: Urinary Incontinence. © 2005**

    American Medical Directors Association. Columbia, MD.
    http://www.amda.com/tools/clinical/urinaryincontinence.cfm
- **Nurse-initiated catheter discontinuation protocol** (Saint et al. 2009)
- **Catheter care**
  - Sterile insertion & use of a closed drainage system
  - Smaller catheter and balloon sizes
  - Avoid irrigation of long-term IUC
  - Catheter securement device to prevent urethral trauma
  - Do not change catheters routinely (Lo et al. 2008)

Elimination of long-term IUC

- **Alternatives to IUC**
  - Intermittent catheterization
  - Condom catheter
- **Bladder scan to avoid use of catheterization** (Chenoweth & Saint 2011; Palese et al. 2010)
  - The bladder scan is used to evaluate and monitor bladder urinary volume and therefore, residents are catheterized only when necessary
  - May improve the rate of discontinuation of unnecessary urinary catheter utilization (Saint et al. 2009)

Conclusion

- My goal was to provide you with a summary of related research evidence
- This is only one source of evidence
- I ask you to also reflect on your own craft knowledge, local data and resident experience
  - **You work with older persons on a daily basis and you are an excellent resource for insight & anecdotal data regarding UTIs in the elderly (Midthun 2004)**

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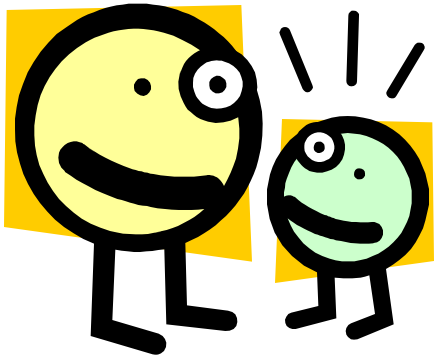
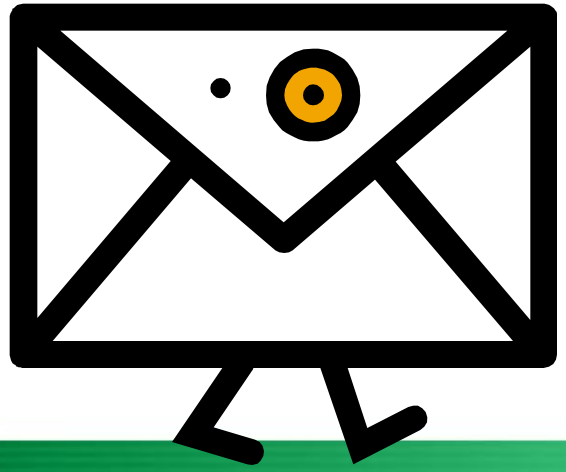
Comments?





Feedback?