

Differentiating Asymptomatic Bacteruria from UTI in Nursing Home Residents

Kelly Kruse Nelles MS, APNP
Clinical Associate Professor
UW-Madison School of Nursing
Continence Consultant & Owner
UroGyn Consultations LLC
kkruise@mhtc.net or klkrusen@wisc.edu

Learning Objectives

- 1. Differentiate between ASB and UTI.
- 2. Describe the impact of ASB and UTI on overall health for elders.
- 3. Identify prevention and management strategies specific to each.
- 4. Recognize potential health consequences of unnecessary antibiotic use.

Why This Discussion?

- **Urinary tract infection (UTI)**
 - Most common infection among elderly nursing home (NH) residents
 - Second most common infection among non-institutionalized elderly populations
 - Represents 25% of all infections

- Currently clinicians are not doing a good job of distinguishing between ASB (which does not require treatment) and UTI (which does)
- Thus many elders are being treated unnecessarily for UTI resulting in serious adverse events

What is Asymptomatic Bacteruria?

- **Defined as:**
 - Bacteria in the urine but not a true UTI
 - *Positive urine culture does not prove that a patient has a UTI – Must have specific symptoms!*
 - Very common among the nursing home elderly
 - Also see in pregnancy, diabetics and indwelling catheter use
 - Properly collected U/C shows >100,000 cfu/mL of a single organism in a resident who does not have any specific GU symptoms has ASB
 - There is no benefit to antibiotic treatment

How Does ASB Compare to UTI?

- **Defined as:**
 - A clinically detectable condition associated w/ invasion by disease causing microorganisms of some part of the urinary tract,
 - Lower Tract
 - urethra (urethritis)
 - bladder (cystitis)
 - Upper Tract
 - ureters (ureteritis) and/or
 - kidney (pyelonephritis)
 - Bacteria in the urine results in specific GU tract symptoms
 - Properly collected U/C shows >100,000 cfu/mL of a single organism in a resident who does have specific GU symptoms has UTI
 - There is benefit to antibiotic treatment

Why Be Concerned?

- Distinguishing ASB from true UTI important
- Presence of ASB does *not* increase morbidity and mortality
- Results in unnecessary antibiotic use which contributes to:
 - Increasing drug resistance
 - Increased risk of adverse drug reactions
 - Greater likelihood of drug-drug interactions

(Annals of LTC: Clinical Care and Aging, 2006; 14(7):17-22.)

Prevalence of ASB

- Elderly living in LTC have more than general population
 - 25-50% women and 15-40% men living in LTC have ASB
 - Elderly women and men living outside the NH are 11-16% and 4-19% respectively

Pathophysiology of ASB

- Bacteria gain access to the urinary tract by the ascending route from the perineum
- Most people are able to eliminate these bacteria with the first line of defense – flow of urine
- This defense is weakened in those with ASB

ASB Risk Factors

- Aging
- Physical impairment
- Mental decline
- Prostate enlargement
- Bladder prolapse
- Alkaline urine

- **Place of residency is also a risk factor**

- Analysis of 3 groups of ambulatory elderly women living in the same retirement community
 - independent living site
 - apartment-type assisted living building
 - nursing home
- Demonstrated that bacteruria was related to where they lived
- With increasing level of care, a successive increase in ASB prevalence was noted
- Living in a NH more than doubles the chance of developing ASB

Understanding Why Treatment is Unnecessary

- **Morbidity and mortality are unchanged in LTC residents with ASB**
 - with or without treatment
- **Antibiotics do not alter the course of ASB**
 - Bacteria is only temporarily eliminated with a high recurrence rate after treatment
- **Some clinicians believe that NH residents are sicker in general and should be treated**
 - *There is no difference in mortality rates of people with ASB living in NH as compared to those living outside of NH!*

Experts Agree

- Centers for Disease Control (CDC)
- Infectious Diseases Society of America (IDSA)
- Association for Professionals in Infection Control (APIC)
- American Medical Directors Association (AMDA)
- Agree that:
 - Treating ASB in NH residents will do more harm than good
 - ASB does NOT cause further functional decline, renal failure or increased symptomatic infections
 - instead consider dehydration!
 - ASB is NOT a risk factor for persons w/Diabetes to develop UTIs more frequently
 - instead consider hyperglycemia and altered immune response!

Is Treatment of ASB Ever Indicated in NH Residents?

- Yes
 - Treatment of ASB to temporarily eliminate bacteria will reduce complications associated w/ procedures involving manipulation of the urinary tract
 - Cystoscopy
 - TURP
 - Other GU procedures associated w/ mucosal disruption and bleeding

Distinguishing ASB from UTI

- The challenge is not deciding whether to treat NH residents w/ASB but to *distinguish* ASB from UTI

- Most reliable indicators of true UTI in LTC are symptoms specifically arising from the urinary tract:
 - Flank pain
 - Dysuria
 - Urinary frequency
 - Or any combination
 - Abnormal U/A, +U/C or non-specific clinical changes alone are not enough!

- No one lab test alone proves a UTI
 - E.g. bacteriuria on U/C
- Nonspecific symptoms such as a change in function or mental status, bacteriuria alone does not warrant antibiotic treatment
- Several test results in combination with clinical findings can better identify UTI
 - i.e. pyuria on microscopic U/A or + urine dipstick for leukocyte esterase (indicating significant pyuria) or + nitrates indicating presence of Enterobacteriaceae accompanied by GU specific symptoms

UTI Risk Factors

- Aging
- Physical impairment
- Mental decline
- Conditions that alter immune response
- Diabetes/hyperglycemia
- Kidney/bladder stones
- Inability to acidify urine
- Constipation
- Indwelling urinary catheter
- Gender

UTI in Women

- In general population account for >7 million office visits & 1 million ER visits/year
- 50-60% women report UTI at some time during their life
- 10% perimenopausal women report UTI in past year
- UTI prevalence increases about 1% per each decade of life

UTI in MEN

- Rare in young men
- Incidence increases after age 50
- By age 65 equals that of women
- All are considered complicated

Gender related Risk Factors

- **Women**
 - Estrogen deficiency
 - Menopause
 - Radiation therapy
 - Chemotherapy
 - Ovariectomy
 - Ovarian Failure of any cause
 - Anti-estrogen medications (i.e. medroxyprogesterone, tamoxifen, danazol)
 - Post-partum/lactation
 - Cigarette smoking

- **Estrogen key in maintaining:**
 - **Vaginal pH**
 - maintains acidic environment which prevents overgrowth and colonization of organisms that usually only proliferate when the vaginal pH rises above 4.5
 - **Structural integrity**
 - Maintains collagen rich connective tissues of the vulva, vagina, urethra and pelvic floor
 - **Urologic function**
 - Maintains intraurethral pressure needed for continence, enhances strength and contractility of the detrusor muscle, contributes to more complete bladder emptying

- **Atrophic vaginitis**
- **Pelvic Organ Prolapse**
 - Cystocele
 - Rectocele
 - Uterine prolapse

- **Men**
 - Functional anomaly or instrumentation of the GU tract
 - Chronic bacterial prostatitis – most common cause of relapsing UTI
 - Prostate enlargement
 - Bladder tumor
 - Condom or urethral catheter use

Clinical Features

- Bacteria causes inflammation of bladder and urethra that disturbs normal voiding sensation and function

- **In Women:**

- Acute onset
 - Dysuria, frequency, urgency, suprapubic heaviness or discomfort, possible hematuria
- Vital signs
 - Normal or may have low grade fever
- Abdominal Exam:
 - Normal except may have mild suprapubic tenderness or discomfort with palpation
 - No costovertebral angle (CVA) tenderness

- Urine Dipstick:

- +/- RBC
- +/- nitrates
- +/- leukocytes

- Microscopic U/A:

- RBCs may be present
- WBCs ≥ 10 per hpf
- Bacteria present
- >2 epithelial cells may indicate contamination

◦ **Urine Culture:**

- 80% E. Coli
- 5-15% Staphylococcus saprophyticus
- More commonly seen in LTC population
 - Klebsiella species
 - Proteus mirabilis
 - Enterococci

• **In Men**

- **Most common:**
 - Acute onset dysuria, frequency, urgency
- **May also note:**
 - New onset hesitancy, nocturia, slow stream, dribbling
- **Occasional hematuria**
- **Normal vital signs**
- **Normal abdominal exam:**
 - May have suprapubic distension from urinary retention

◦ **DRE**

- Prostate may be enlarged, indurate and/or tender - r/o prostatitis

◦ **Urine Dipstick**

- +/- nitrates, +leukocytes, +/- RBCs

◦ **Consider sequential urine testing if suspect chronic prostatitis**

◦ Urine culture

- 50% E. Coli
- 40% other Gram Negative Rods
 - Proteus, Psuedomonas, Providencia, Enterobactor
- 20% Gram Positive Cocci
 - Enterococcus faecalis, Staphylococcus epidermis, Staphylococcus aureas

◦ Clean specimens easier to collect in men so lower levels of bacteria are more significant (10⁴ cfu)

Distinguishing ASB from UTI in NH Residents

- CMS 2006 F-315 TAG: *Urinary Incontinence, UTIs and Catheter Use*
- American Medical Directors Association (AMDA) 2006 clinical practice guideline: *Urinary Incontinence*
- Both provide clear evidence-based criteria

Clinical Features

- Consider presence or absence of urinary symptoms
- Consider U/A results
- Consider U/C results
- Consider whether or not they have a urinary catheter

- Urinary symptoms are
 - Clinically detectable
 - Associated w/ invasion by disease causing microorganisms of some part of the urinary tract,
 - Lower Tract
 - urethra (urethritis)
 - bladder (cystitis)
 - Upper Tract
 - ureters (ureteritis) and/or
 - kidney (pyelonephritis)

Distinguishing ASB from UTI - In Residents w/o Indwelling Catheter

- **Criteria:** *at least 3 of the following signs and symptoms should be present:*
 - Fever
 - (increase in temperature of >2 degrees F (1.1 C) or rectal temperature of >99 degrees F (37.5 C) or single measurement of temperature >100 degrees F (37.8 C);
 - New or increased burning pain on urination, frequency or urgency;
 - New flank pain or suprapubic pain or tenderness;
 - Change in the character of the urine
 - (e.g. new bloody urine, foul smell, or amount of sediment) or as reported by the lab (new pyuria or microscopic hematuria);
 - Worsening of mental or functional status
 - (e.g. confusion, decreased appetite, unexplained falls, incontinence of recent onset, lethargy, decreased activity).

Distinguishing ASB from UTI - In Residents with Indwelling Catheter

- **Criteria:** *at least two of the following signs and symptoms:*
 - Fever or chills;
 - New flank pain or suprapubic pain or tenderness;
 - Change in character of urine
 - (e.g. new bloody urine, foul smell, or amount of sediment) or as reported by the laboratory (new pyuria or microscopic hematuria); and/or
 - Worsening of mental or functional status.
 - Local findings such as obstruction, leakage, or mucosal trauma may also be present.

- Always document patient status/symptoms you have identified to support obtaining a U/A
- Obtain most accurate U/A possible
 - Without IFC
 - Clean catch
 - Sterile straight cath
 - With IFC
 - Never take specimen from existing catheter
 - Instead change catheter and take specimen

- U/A results
 - Specific Gravity
 - Range = 1.000-1.030
 - Normal fluid balance 1.005-1.020
 - pH
 - Range = 5 – 9
 - 5-6 = acidified urine
 - Blood
 - Range = Negative to 3+ /large
 - Leukocytes
 - Negative to 3+
 - Nitrite
 - Negative or Positive
 - Epithelial cells
 - >2 indicates probable contamination of specimen

- Urine Culture results
 - >100,000 cfu/mL and resident is symptomatic consistent with evidence based criteria
 - U/A alone does not provide enough information to treat
 - Need to know what you are treating
 - U/C also important in determining recurrent UTI

Treatment of UTI

- Goal: To *alleviate* systemic or local symptoms *not* to eradicate all bacteria
- Routine post-treatment culture not routinely necessary but may be useful in select situations
- Continued bacteria without residual symptoms does not warrant repeat or continued antibiotic treatment

- In both women and men
 - Urine Culture w/ Sensitivity important in determining effective antibiotic therapy
 - Increase fluids to manage symptoms, dilute bacteria concentration and facilitate bladder emptying

- In Women
 - Warm water irrigation to vulva w/voiding
 - Gentle, consistent peri-care
 - Avoidance of irritants
 - External: perfumed soaps, lotions, etc.
 - Internal: caffeine, nutrasweet, alcohol

Relapse vs Recurrent UTI in Women

- **Relapse:**
 - Same bacteria is present within 2 weeks of initial therapy and resident is still symptomatic
 - Consider:
 - Longer course of a different antibiotic
 - Evaluation for anatomic/functional anomaly
- **Re-infection:**
 - Occurs >2 weeks after treatment
 - Often a different bacteria but not always
 - Should be evaluated for anatomic/functional problems

- **Anatomic/Functional Factors to Consider:**
 - Hormonal status including tissue integrity and hypoestrogenic state
 - Bladder emptying
 - Blood sugar control
 - Altered immune system
 - Perineal hygiene
 - Constipation
 - Fluid intake
 - Uterine prolapse, cystocele

- **In Men:**
 - If UTI: 7-14 day treatment is adequate
 - If related to prostatitis: minimum of 3-4 weeks
 - Maintain adequate fluid intake
 - Relapse can be common
 - Requires close follow up
 - Diagnostic evaluation including cystoscopy, urodynamic studies may be indicated

Also Consider w/ Recurrent UTI

- Evaluate critically – was this really a UTI?
- Also consider:
 - STI
 - Atrophic vaginitis
 - Urethral Syndrome
 - Interstitial Cystitis
 - Chronic Prostatitis
 - Bacterial
 - Inflammatory
 - Non-inflammatory

Differentiating UTI from Upper UTI/Pyelonephritis

- Infection of renal parenchyma (collecting system)
- Estimated 250,000 hospitalizations per year
- Etiology:
 - Most often results from an ascending infection with similar organisms as found with UTI

Clinical Features:

- Appear Ill
- Acute onset low back pain often associated with systemic symptoms
 - Fever and chills
 - Dysuria
 - Urgency
 - Frequency
 - Hematuria
 - +CVA tenderness

- +U/A dipstick
- Consider obtaining a CBC
- Treatment:
 - Hospitalization if severe w/nausea and vomiting, pregnant, elderly
 - Longer course of treatment (10-14 days)
 - Follow up U/C 1 week after completion of antibiotic therapy if complicated (i.e. pregnancy, men, elderly)

UTI Prevention Strategies

- **Hygiene**
 - Wash hands before and after toileting – resident and CNA
 - Daily cleansing and/or cleansing after each void or bowel movement with mild soap or wipes
 - Front to back wiping for women
 - Urinating before and after sexual intercourse – may also benefit from washing before and after intercourse
 - Keep bowels regular – constipation or diarrhea increase risk of UTI

- **Drink Adequate Fluids Daily**
 - Daily intake of 48-64 oz = 6 eight oz glasses unless otherwise directed
 - Liquids include any beverage you ingest during the day – milk, juice as well as water
 - Cranberry, prune or plum juices will help acidify urine

• **Cranberry Capsules**

- Concentrated powder
- Usual dosage is two 100mg capsules daily w/glass of water
- Beneficial in acidifying the urine and keeping bacteria from “sticking” to the bladder wall

• **Empty Bladder Regularly**

- Regular toileting – do not put off voiding for long periods of time
- Elders should empty the bladder every 2-3 hours or shortly after they feel the urge
- Urinate before and after sexual intercourse
- Practice double voiding techniques:
 - Place your hand over your bladder and apply pressure on your bladder by leaning forward
 - Stand up after urinating and then sit back down – wait a few minutes and likely will void again

• **Avoid:**

- Tight pants
- Underwear without a cotton crotch
- Perfumed soaps and powders, bubble bath
- Routine vaginal cleansers and douches
- Rough, perfumed or colored toilet paper
- Wearing feminine hygiene and menstrual pads when you do not have a period
- Make sure absorbent products used are appropriately fitted, changed when wet or soiled and are made specifically for urine

• Vaginal Estrogen Replacement Therapy

- Shown to be a safe and effective option in treating:
 - Recurrent UTI
 - Relieving symptom of genito-urinary atrophy (i.e. dryness, burning on urination, urgency, frequency)
- **Low-dose intravaginal therapy is indicated for women experiencing:**
 - Hypoestrogen state
 - Who suffer from GU complaints

• Available Intravaginal Estrogen Options in the U.S.

- Creams
- 2 mg estradiol ring
- 25 mcg estradiol tablets

• Safety of Vaginal Estrogen

- Carries the same contraindications as oral estrogens although not systemically absorbed to the same degree
 - Unexplained vaginal/uterine bleeding
 - Estrogen dependent cancers

• **Efficacy of Vaginal Estrogen in Treatment of UTI**

- Eriksen (May 1999)
 - Primary objective:
 - to detect a difference in time until the first recurrence of UTI during treatment with an Estring as compared to no treatment.
 - Secondary aim:
 - to detect any differences in improvement of urethral and vaginal mucosa atrophy and in the subjective assessment of urogenital symptoms.
 - The study also sought to detect a difference in decrease of vaginal pH to <5.5 and report adverse events.

• **Method**

- Multicenter, randomized, open, parallel-group study with an untreated control group.
- Estrings were worn vaginally for 12 weeks and duration of treatment was 36 weeks for the Estring group and for either 36 weeks or until first UTI recurrence for the control group.

• **Results**

- Cumulative proportion of women remaining free of UTI was significantly higher in the Estring group than the control group.
- After 36 weeks of the cumulative likelihood of remaining free of UTI was approximately 45% in women using the Estring vs. 20% in the control group
- Estring lowered vaginal pH and time to first UTI was effectively prolonged
- Vaginal and urethral mucosal cells were significantly more mature in the Estring group
- No unexpected adverse events were found

- **Educate Residents and CNAs to Report:**
 - Increased urinary urgency and frequency
 - Urinating in small amounts
 - Sudden unwanted urine leakage
 - Feeling that their bladder is not emptying completely after urinating
 - Any discomfort or unusual sensation when you urinate
 - Foul smelling urine
 - Fever or chills
 - Blood in the urine

- **Monitor chronic conditions that can affect bladder emptying:**
 - Diabetes
 - Neurologic conditions (i.e. MS, CVA, SCI, Parkinson's Disease)
 - Alzheimer's dementia
 - Prostate enlargement (i.e. BPH, cancer)

- **In Men**
 - **Prostate Monitoring**
 - Annual DRE
 - Avoid routine use of PSA
 - False-positive results
 - Lack of definite evidence of treatment efficacy in screened vs. non-screened men

- Consider these sites for current evidence-based recommendations regarding prostate screening:
 - American Urological Association Recommendations
 - www.guideline.gov
 - American Cancer Society Recommendations
 - www.cancer.org
 - Revised USPSTF Recommendations

- Elder men may be candidates for medical therapy to treat benign prostatic hypertrophy (BPH)
- Alpha blockers act on the smooth muscle of the bladder neck to relax and promote emptying
 - Terazosin (Hytrin)
 - Doxazosin (Cardura)
 - Tamsulosin (Flomax)
 - Alfuzosin (Uroxatral)
 - Silodosin (Rapaflo)

- Monitor for side effects with initiation:
 - First-dose syncope
 - Postural hypotension
 - Fatigue
 - Dizziness
 - Headache
 - Nasal stuffiness
 - Erectile dysfunction
 - Urinary incontinence

• 5-alpha-Reductase inhibitors act in a complicated way on testosterone to reduce prostate size

- Finasteride (Proscar)
- Dutasteride (Avodart)
 - May take 6 months to reach peak efficacy
 - Demonstrated enhanced effect when taken in conjunction with alpha-1-blocker therapy

• Phytotherapy

- Saw palmetto

• Actions not completely understood

• Believed to act as a mild 5-alpha-reductase inhibitor

• Not to be used with other medical therapy for obstructed voiding

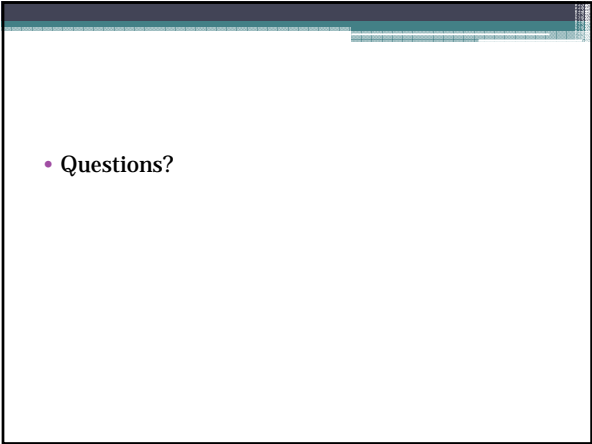
Improving Practice

- Educate and encourage nurses to:
 - more thoughtfully perform UTI assessments applying current evidence based criteria
 - Support them in encouraging fluids and monitoring resident status
 - Educate residents and their families re: UTI prevention and appropriate intervention

- **Educate providers**
 - Provide leadership as to best practices in regard to UTI and NH elders
 - Communicate F-315 guidance expectations
 - Inform them of nursing's more active role in assessing and monitoring
 - Involve your medical director

- **Provide evaluation of residents w/UTI to rule out structural and functional factors and improve plan of care**
 - Continence consultants
 - Urology
 - Primary provider
 - Medical Director

- **Enhance QA specific to UTI**
 - Implement UTI protocol
 - Utilize QI to identify UTI in resident population
 - Monitor closely for patterns and recurrence
 - Chart review to determine symptoms, u/a and u/c results
 - Based on findings take action
 - +reinforcement for appropriate management
 - Reeducation on what could have been done differently



- Questions?
