Do Criteria-Based Urine Cultures Contribute to Unnecessary Antibiotic Use at a Community Teaching Hospital?

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Background
- Asymptomatic bacteriuria (Asx) bacteria is commonly treated with antibiotics despite evidence demonstrating no benefit. Reliance on urinalysis (UA) or urine culture (UCx) without consideration of patient (pts) symptoms may contribute to overtreatment.
- A criteria-based urine culture (CB-UC) process relies on UA triggers to determine need for UCx. The purpose of this study was to assess the impact of CB-UC on inpatient antibiotic prescribing and development of antimicrobial resistance at a community teaching hospital.

Methods
- A retrospective cohort study was conducted of adults admitted between January 1 and September 30, 2013 who had a UA performed meeting criteria for UCx. Pts were excluded if discharged before results of UCx were available, neutropenic, or history of renal transplant within a year. UCx was prompted by ≥ 10 WBC/hpf, ≥ 1 bacteriuria, ≥ 3 white blood cells (WBC) per high power field (hpf) for men or ≥ 10 WBC/hpf for women. Data collected included characteristics, UA and microbiologic data, antibiotic regimens, and clinical outcomes. Pts were compared on presence of urinary tract infection (UTI) symptoms and further stratified based on result of UTI treatment (tx).

Results
- 305 pts were included, 241 in the Asymptomatc and 64 in the Symptomatic group. Demographics were similar between groups. Approximately 58% of UCx were positive. E. coli was the most frequently isolated organism (43%). The most common empiric treatments were fluoroquinolones (48%) and cephalosporins (44%). In the Symptomatic group 80% of pts received tx, while 44% of Asx pts received tx. No statistical difference in new antimicrobial resistance at 6 months was found between groups. A subgroup analysis of Asx pts found that those who received tx had more new antimicrobial resistance (11.3% vs. 4.4%, p < 0.044). Risk factors associated with tx in Asx pts included UA with bacteria present (OR 9.6, 5.0 – 143), ≥10 WBC (OR 2.5, 2.0 – 3.4), or a positive UCx (OR 2.8, 2.0 – 3.5).

Conclusions: Over half of CB-UCs were negative and approximately 44% of Asx pts received UTI tx; this was significantly associated with development of antimicrobial resistance. These results support the need for revision of the CB-UC process and antimicrobial stewardship interventions to reduce tx of Asx bacteriuria.

Background
- Urinary tract infections (UTIs) are labor intensive, costly, and may contribute to overtreatment. A criteria-based urine culture (CB-UC) process relies on UA triggers to determine need for UCx. The CB-UC process resulted in a large number of unnecessary antibiotic treatments despite evidence demonstrating no benefit. Reliance on urinalysis (UA) or urine culture (UCx) without consideration of patient (pts) symptoms may contribute to overtreatment. A criteria-based urine culture (CB-UC) process relies on UA triggers to determine need for UCx. The purpose of this study was to assess the impact of CB-UC on inpatient antibiotic prescribing and development of antimicrobial resistance at a community teaching hospital.

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Background
- Asymptomatic bacteriuria (Asx) bacteria is isolated from a bacteria in a urine sample from a patient who is not experiencing any symptoms common to urinary tract infections (UTIs).
- Treatment of Asx does not reduce the frequency of symptomatic infections and can increase bacterial resistance; it is discouraged by the Infectious Diseases Society of America for the majority of the population.
- Currently at Mercy Health Saint Mary’s (MHSM) the preferred urinalysis (UA) order in the Emergency Department (ED) is labeled “Urinary Macroscopic culture if (+) rule” ordered, meaning that if certain criteria are met the urine sample will automatically be sent for bacterial culture. A antimicrobial stewardship program started within the past year.

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Abstract
Primary objective
- Compare clinical outcomes of patients who appropriately received antibiotics versus those who inappropriately received antibiotics based on urinary symptoms

Study Setting
- 350-bed community teaching hospital in Grand Rapids, Michigan
- 52-bed ED with 83,000 visits per year

Study Design
- Retrospective cohort comparing patients who were symptomatic (Sx) vs those who were asymptomatic (Asx) for UTI

Inclusion Criteria
- Inpatients admitted through the ED between January 1 and September 30, 2013
- Urine Macroscopic culture if (+) rule ordered
- Urinalysis met criteria to prompt a culture
- ≥ 18 years of age

Exclusion Criteria
- Patients discharged before results of the culture were available
- Different urinalysis/culture
- Neutropenic patients (ANC < 1000)
- History of renal transplant within a year of culture

Population
- Convenience sample size (n = 300)

Data Collected
- Characteristics
- Demographics, diagnosis, indwelling device, urinary symptoms
- Microbiology
- Collection method, urinalysis, culture results
- Antimicrobial therapy
- Empiric antibiotics, definitive antibiotics
- Clinical outcomes
- Readmit to ED within 72 hours, n (%) Readmission to hospital within 30 days, n (%) Revisit to ED within 72 hours, n (%) Asymptomatic Patients
- No Tx, n (%) Tx, n (%) P-value

Symptoms and Treatment Characteristics
- Positive urine culture
- Urinary tract infection

Conclusions
- The CB-UC process resulted in a large number of unnecessary cultures at MHSM.
- Approximately 44% of asymptomatic patients received antibiotics.
- Asymptomatic patients who received antibiotics developed more new antibiotic resistance within 6 months, particularly to fluoroquinolones.
- These results support the need for targeted education to prescribers regarding the use of Asx, as well as multidisciplinary discussion regarding the use of the CB-UC process.

References