



ANTIMICROBIAL STEWARDSHIP INITIATIVE TO REDUCE ANTIBIOTIC USE FOR ASYMPTOMATIC BACTERIURIA (ASB)

A. PIRASTEH^{1,2} PHARM D, S. WANG^{1,2} PHARM D, A. HANSON² PHARM D, G. PEKSA² PHARM D, S. WON² MD, J. SEGRETI² MD, C. VARUGHESE² PHARM D, P. MORENCY-POTVIN^{2,3} MD, H. HARRISON^{1,*}, J. LEE^{1,*}

¹MIDWESTERN UNIV., DOWNERS GROVE, IL, USA; ²RUSH UNIV. MED. CTR., CHICAGO IL, USA; ³UNIV DE MONTRÉAL, QC, CANADA; * PHARM D CANDIDATE

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MODIFIED ABSTRACT

BACKGROUND: The use of antibiotics for asymptomatic bacteriuria (ASB) is inappropriate with the exception of cases involving pregnancy or traumatic urologic procedures. Otherwise, untreated ASB has not been shown to cause harm. Treating ASB is a risk factor in developing symptomatic urinary tract infections (UTI), *Clostridium difficile* infection and selection of multi-drug resistant pathogens. This study aimed to assess the impact of an antimicrobial stewardship educational intervention directed to reduce inappropriate antibiotic use associated with ASB in a large academic medical center.

METHODS: A controlled quasi-experimental antimicrobial stewardship education and quality improvement study consisted of a historical control group (pre-intervention), 10/2015 – 12/2015, and an interventional education group (post-intervention), 1/2016 – 3/2016. Study patients were identified from daily urinalysis reports and were included if they were admitted to the hospital, ≥ 18 years of age with a reported urinalysis and urine culture. Patients were excluded if they had documented signs/symptoms of a UTI, cultures from a nephrostomy bag, altered mental status, candiduria, neutropenia, were pregnant, underwent a urologic procedure, or received antibiotics for a co-infection. For the post-intervention, physicians were contacted by an ID pharmacist to discuss proper management of ASB and the need for antimicrobial therapy. To meet a power of 80%, 26 patients in each group were needed.

RESULTS: Twenty-six unique patients met inclusion criteria for each group and baseline demographics were similar. Levofloxacin was the most common antibiotic used in the pre-intervention group (50%), followed by cephalosporins. Duration of antibiotics reduced from an average of 5.6 days in the pre-intervention group to 0.80 days in the post-intervention, p<0.0001. The initiation of antibiotics decreased from 77% in the pre-intervention group to 23% in the post-intervention group, p<0.0001. Majority of inappropriate antibiotic use for ASB were on floors without a rounding pharmacist. A 8-fold decrease in antibiotic cost was observed as a result of active intervention and education, p<0.01.

CONCLUSION: An interventional approach with a focus on education was found to be effective in reducing the duration and initiation of antibiotics for ASB with significant cost savings. Our study underscores the value of clinical rounding pharmacists who can actively educate on and advocate for appropriate use of antibiotics.

BACKGROUND

Urinary tract infections (UTIs) drive the use of antibiotics. Up to 40% of patients admitted with a diagnosis of a UTI have found to be inappropriately treated; either not meeting criteria for a UTI or resulting in a negative urine culture.^{1,2,3}

The use of antibiotics for asymptomatic bacteriuria (ASB) is inappropriate with the exception of cases involving pregnancy or traumatic urologic procedures.⁴ Treating ASB is a risk factor in developing symptomatic UTI, *Clostridium difficile* infection and selection of multi-drug resistant pathogens.^{3,5}

Untreated ASB has not been shown to cause harm.⁶

Data suggests education and awareness made the most difference amongst the hospitalist medicine services and that addressing the prescribing behaviors rather than implementing interventional feedback as a more successful approach in reducing antibiotic use for ASB.^{6,7}

Antimicrobial stewardship teams, driven by an infectious diseases clinical pharmacist, are influential in promoting appropriate antimicrobial use for UTIs and diverting unwarranted treatment for ASB.

BACKGROUND – INITIAL ASSESSMENT

- A preliminary assessment of ASB cases and its management at RUSH University Medical Center was conducted.
- Urine cultures generated from the microbiology department between July 2014 and June 2015 were reviewed to identify cases of ASB (N=1524).
 - ASB was defined as inpatient cases with a positive (index) urine culture (≥ 10⁵ CFU/mL) and undocumented signs or symptoms of a UTI.
 - Reasons for exclusion: yeast infection, urologic abnormality or procedure, cultures from a catheter or nephrostomy tube, repeated urine culture ≤ 7 days of index collection, neutropenia, pregnancy, < 18 years of age, received antibiotics for concomitant infection(s), or had > 2 species of organisms in urine.
- Based on our initial assessment, antimicrobial stewardship efforts to reduce inappropriate antibiotic treatment for ASB are warranted with early attention placed in the ED.

ASB cases – July 2014 to June 2015 (N = 93)	
Mean Age, years (range)	70 (18-96)
Female Gender, n (%)	61 (66)
Common Uropathogens ^a , n (%)	
E. coli	47 (51)
Klebsiella species	16 (17)
Enterococcus species	9 (10)
Alpha hemolytic Streptococci	8 (9)
Proteus species	7 (8)
Antibiotic initiated ^b , n (%)	83 (89)
Location: Emergency Department, n (%)	73 (88)
Antibiotic(s) Used, n	
Levofloxacin	47
IV Cephalosporin ^c	39
Piperacillin/tazobactam	18
TMP/SMX	8
Carbapenem ^d	3
Mean duration of antibiotic therapy, days (range)	4.5 (1-14)
Infectious Diseases Consult, n (%)	8 (8.6%)

a Up to two pathogens may be isolated from a urine culture; b At least one dose of antibiotic received; c Ceftriaxone, cefepime or cefazolin; d Ertapenem or meropenem

METHODS

- A controlled quasi-experimental antimicrobial stewardship education and quality improvement study comparing a pre-intervention group to a post-intervention group.
- Primary outcome:** Assess the impact of an antimicrobial stewardship intervention directed to reduce the *duration* of inappropriate antibiotic use for ASB.
- Secondary outcomes:** 1) Assess the impact of an antimicrobial stewardship intervention directed to reduce the *initiation* of inappropriate antibiotic use for ASB. 2) Determining the overall antibiotic-related cost-savings associated with reducing inappropriate antibiotic use for ASB.

Pre-Intervention (10/2015 to 12/2015)	Post-intervention (1/2016 to 3/2016)
Study patients were identified from daily urinalysis reports.	
Inclusion criteria: hospital admission, ≥ 18 years of age, reported urinalysis and urine culture.	
Exclusion criteria: documented signs or symptoms of a UTI, cultures from a nephrostomy bag, baseline altered mental status, candiduria, neutropenia, pregnancy, urologic abnormality or procedure, or received antibiotics for a co-infection, repeat urine culture ≤ 7 days of index collection.	
No intervention	Physicians were contacted by an ID pharmacist to discuss proper management of ASB and the need for antimicrobial therapy.

- Categorical variables analyzed using chi-square analysis and continuous variables analyzed using student's t-test. To meet a power of 80%, 26 patients in each group were needed.

RESULTS

	Pre-intervention (n = 26)	Post-intervention (n = 26)	P value
Mean Age, years (range)	63 (23-90)	58 (21-96)	0.39
Female Gender, n (%)	13 (50)	14 (54)	0.70
Mean Duration of Antibiotic Therapy, days (range)	5.6 (1-11)	0.8 (1-7)	< 0.01
Antibiotic Initiated, n (%)	20 (77)	6 (23)	0.0001
Location Antibiotic Initiated, n	GenMed: 6, Rehab: 6, ED: 3, Surgery: 2, ICU: 2, Psych: 1	GenMed: 2, Surgery: 2, ICU: 1, ED: 1	
Infectious Diseases Consult, n (%)	3 (12)	1 (3.8)	0.04
Total Antibiotic Cost	\$560	\$71	< 0.01

CONCLUSIONS

- An interventional approach with a focus on education was found to be effective in significantly reducing the duration and initiation of antibiotics for ASB with antibiotic cost savings.
- Majority of inappropriate antibiotic use for ASB were on floors without a rounding pharmacist.
- Our study underscores the value of clinical rounding pharmacists who can actively educate on and advocate for appropriate use of antibiotics.

REFERENCES



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