

ANTIMICROBIAL THERAPY FOR UNCOMPLICATED CYSTITIS IN THE EMERGENCY DEPARTMENT

Jamie L. Voigtmann PharmD
Christian Hospital – PGY1 Pharmacy Resident
Residency Director - Jackie Harris PharmD, BCPS
Project Mentor - Jessica Kolkmeyer PharmD, BCPS

Your Best Medicine™

Disclosures

No conflicts of interest to disclose

Your Best Medicine™

Background

- Uncomplicated cystitis is one of the most common bacterial infections in women
- In 2015, it was responsible for 2-3 million emergency department visits annually
– \$3.5 billion
- Antimicrobial resistance is increasing

Your Best Medicine™

Background

- IDSA Guidelines were last updated in 2011

First Line

- Sulfamethoxazole-trimethoprim
- Nitrofurantoin
- Fosfomycin

Second Line

- Fluoroquinolones
- Beta-lactams

Your Best Medicine™

Regional Antibioqram - 2018

- Susceptibilities for E. coli from the urine based on the 2018 regional antibioqram (%)

98

Nitrofurantoin

91

Cefazolin

77

Ciprofloxacin

71

Sulfamethoxazole-
trimethoprim

Hospitals Included: Christian Hospital, Alton Memorial Hospital, Barnes- Jewish Hospital, St. Louis Children's Hospital, Parkland Health Center

Your Best Medicine™

Background

- In 2015, Percival et al evaluated adherence to pharmacy recommendations before & after physicians were educated on local resistance rates
 - Appropriate antimicrobials **increased** 44% → 80%
 - Nitrofurantoin use **increased** 12% → 80%
 - Empiric therapy corresponding to cultured susceptibilities **increased** 74% → 89%

Your Best Medicine™

Background

- **Purpose:** Evaluate the regimens of antibiotics prescribed for the treatment of uncomplicated cystitis based on the regional antibiogram
- **Clinical Impact:**
 - Develop & implement order set
 - Add to current literature

Research Question

Do emergency department providers at Christian Hospital provide appropriate outpatient antibiotics for uncomplicated cystitis in accordance to the BJC Medical Group outpatient protocol?

Your Best Medicine™

Review Antibiotic Allergies And Last Creatinine Then Sent Prescription Through Epic:

- First choice – no allergy to nitrofurantoin and last creatinine < 1.5 mg/dL (within 3 years)
 - **Nitrofurantoin** 100 mg PO BID for 5 days
 - “Take 1 pill by mouth twice a day for 5 days”
- Second choice – no allergy to cephalexin and creatinine < 1.5 mg/dL (within 3 years)
 - **Cephalexin** 500 mg PO BID for 5 days
 - “Take 1 pill by mouth twice a day for 5 days”
- Third choice – no allergy to Fosfomycin and no creatinine on file
 - **Fosfomycin** 3 grams PO for 1 dose
 - “Take entire packet of granules with water as directed on the package”

Patient Instructions:

- Drink plenty of fluids (2-3 liter per day)
- Call back if:
 - Pain does not improve by day 3 on antibiotics
 - Urine symptoms (frequency, urgency, pain) do not improve by day 3 of antibiotics
 - You become worse – develop fever, flank pain, etc.

Methods

- Assess appropriateness of prescribed antibiotics for uncomplicated cystitis according to the outpatient BJC Medical Group protocol through chart review
 - 1) Nitrofurantoin 100 mg PO BID x 5 days
 - 2) Cephalexin 500 mg PO BID x 5 days
 - 3) Fosfomycin 3 grams PO x 1 dose

Methods

Primary Outcome

- Adherence to outpatient BJC protocol

Secondary Outcomes

- Comparison of prescribed antibiotics to available urine cultures
- Incidence of prolonged duration of therapy
- Incidence of fluoroquinolone use

Your Best Medicine™

Data Collection

- **Prescription**
 - Dose, Frequency, Route, Duration
- **Objective**
 - Dysuria, Polyuria, Suprapubic Pain
- **Demographics**
 - Age, Height, Weight, Race, Allergies
- **Vitals/Labs**
 - Temperature, Blood Pressure, Heart Rate, Serum Creatinine, Glucose, White Blood Cells, Creatinine Clearance
- **Diagnostics**
 - Urinalysis (WBC), Urine Culture

Your Best Medicine™

Inclusion Criteria

Women

Age \geq 18 years old and $<$ 65 years old

Diagnosis of cystitis or UTI without systemic symptoms

Outpatient Therapy

Your Best Medicine™

Exclusion Criteria

Pregnancy

Recurrent UTI

Uncontrolled DM

Antibiotics within
previous 30 days

Immunocompromised

Indwelling catheter

CrCl < 30 mL/min

Pyelonephritis

Resident of LTCF or
nursing home

Concomitant STI

Antibiotic prophylaxis

Inpatient Therapy

Statistical Analyses

- Descriptive statistics (percentages)
- Sample size – 100 patient
- 738 patients identified between January 2019-June 2019
- Included Northeast and Northwest Campus

Baseline Characteristics

Characteristic	Patients (n=100)
Age	34 years old
Race	
African American	89%
Caucasian	11%
Weight	80.5 kg
Height	64 inches
Antibiotic Allergies (26%)	
Penicillin	54%
Sulfa	35%

Your Best Medicine™

Baseline Characteristics

Characteristic	Patients (n=100)
Chief Complaint	
Dysuria	51%
Frequency	46%
Suprapubic/back pain	25%
Urgency	21%
Abdominal pain	21%
Diagnosis	
Acute cystitis with hematuria	63%
Acute cystitis without hematuria	23%
Cystitis	8%

Your Best Medicine™

Baseline Characteristics

Characteristic	Patients (n=100)
Seen by NP or PA	76%
Seen by MD	24%
Temperature	36.8°C
Blood Pressure	131/78 mmHg
Heart Rate	86 bpm
Labs (24%)	
White blood cells	8.2 cell/mm ³
Serum Creatinine	0.79 mg/dL
Creatinine Clearance	111 mL/min
Glucose	103 mg/dL

Your Best Medicine™

Baseline Characteristics

Characteristic	Patients (n=100)
Urinalysis (WBC)	
> 50 cells	76%
21-50 cells	14%
11-21 cells	10%
Bacteria	
Escherichia coli	81% (ESBL-3%)
Citrobacter koseri	7%
Enterobacter aerogenes	7%
Klebsiella pneumoniae	3%
Proteus mirabilis	2%

Your Best Medicine™

Results

	Patients (n=100)
Primary Outcome	
Adherence to outpatient BJC protocol	9%
Secondary Outcomes	
Comparison of prescribed antibiotics to available urine cultures	16% resistant
Incidence of prolonged duration of therapy	81%
Incidence of fluoroquinolone use	23%

Your Best Medicine™

Results

	Patients (n=100)
Antibiotic	
Nitrofurantoin	36%
Sulfamethoxazole-trimethoprim	36%
Ciprofloxacin	24%
Duration of Therapy	
5 Days	16%
7 Days	57%
10 Days	23%

Your Best Medicine™

Results

	Patients (n=16)
Resistant Empiric Antibiotics	
Sulfamethoxazole-trimethoprim	56% (9)
Ciprofloxacin	31% (5)
Nitrofurantoin	13% (2)
Resistant Bacteria	
Escherichia coli (ESBL-3)	94% (15)
Sulfamethoxazole-trimethoprim	60% (9)
Ciprofloxacin	33% (5)
Nitrofurantoin	7% (1)

Your Best Medicine™

Strengths

Large patient population

Comparison of actual practice vs protocol

Clinical findings that could change practice

Included ESBLs

All patients included had a positive urine culture

Dose, route, and frequency were analyzed

Your Best Medicine™

Limitations

Retrospective,
single-center study

Only evaluated
uncomplicated
cystitis

Physicians were not
informed of the BJC
outpatient protocol

Limited outpatient
follow-up/data

Descriptive statistics

Only 23% of
patients had labs
obtained

Your Best Medicine™

Discussion

- Patients who were prescribed sulfamethoxazole-trimethoprim or ciprofloxacin for uncomplicated cystitis were 86% more likely to be resistant to therapy when compared to nitrofurantoin.
- 81% of patients received a prolonged duration of therapy by 2-5 days.

Discussion

- Increasing the use of nitrofurantoin and cephalexin would decrease the rates of resistant empiric antibiotics.
- Is education for ED providers enough or does there need to be an order set built for current & future use?
- An antibiogram based on the 100 positive cultures will be made for ED use.

Your Best Medicine™

Conclusion

Christian Hospital could benefit from adopting the BJC outpatient protocol for uncomplicated cystitis. This would decrease prescribing resistant antibiotics, ensure the appropriate duration of therapy, and decrease the use of fluoroquinolones.

ANTIMICROBIAL THERAPY FOR UNCOMPLICATED CYSTITIS IN THE EMERGENCY DEPARTMENT

Jamie L. Voigtman PharmD
Christian Hospital – PGY1 Pharmacy Resident
Residency Director - Jackie Harris PharmD, BCPS
Project Mentor - Jessica Kolkmeyer PharmD, BCPS

Your Best Medicine™