An Outpatient Antimicrobial Stewardship Initiative for Urinary Tract Infections in Primary Care Pediatrics

Mary Kathryn Mannix, DO[1], Shamim Islam, MD, DTM&H[1]

University at Buffalo, Oishei Children's Hospital, contact: mmannix@upa.chob.edu

Background

Expanding antimicrobial stewardship efforts into the outpatient setting is critical. Recent studies have shown that 30% of antibiotics prescribed in the outpatient setting are unnecessary[1]. Acute UTI is a significant health burden in outpatient pediatrics affecting ~3% of children annually[2]. Given the nature of UTI diagnosis, antibiotics are often empirically started. High prescribing variability exists amongst providers with an increasing use of broad-spectrum antibiotics, especially higher-generation cephalosporins[3-4]. Pediatric UTIs are an ideal target for outpatient stewardship to promote the use of narrow empiric antibiotics and the discontinuation of therapy in culture-negative samples. The purpose of this educational intervention was to recommend the use of cephalexin as narrow empiric antibiotic therapy and the assessment of its utilization.

Methods

We conducted a retrospective review of electronic medical records of two pediatric practices of patients aged 2 months to 18 years diagnosed with uncomplicated UTI using ICD-10 codes N39, R30 and R35. The definition of a positive urine culture was >50,000 CFU/ml if catheterized and >100,000 CFU/ml if clean-catch specimen[5]. Pre-intervention period began in January 2018 for ~2 years. A brief UTI educational intervention took place with all providers. The post-intervention period began at each site after the educational intervention with monthly review of cases; a sub-analysis for COVID-19 is referred to as post-intervention phase 2.

Results

Pre-intervention

- **515 encounters (443 patients) seen for UTIs**
- **most commonly prescribed antibiotics were cefprozil and TMP-SMX**
- **cephalexin was prescribed in 39/383 (10%) of encounters**

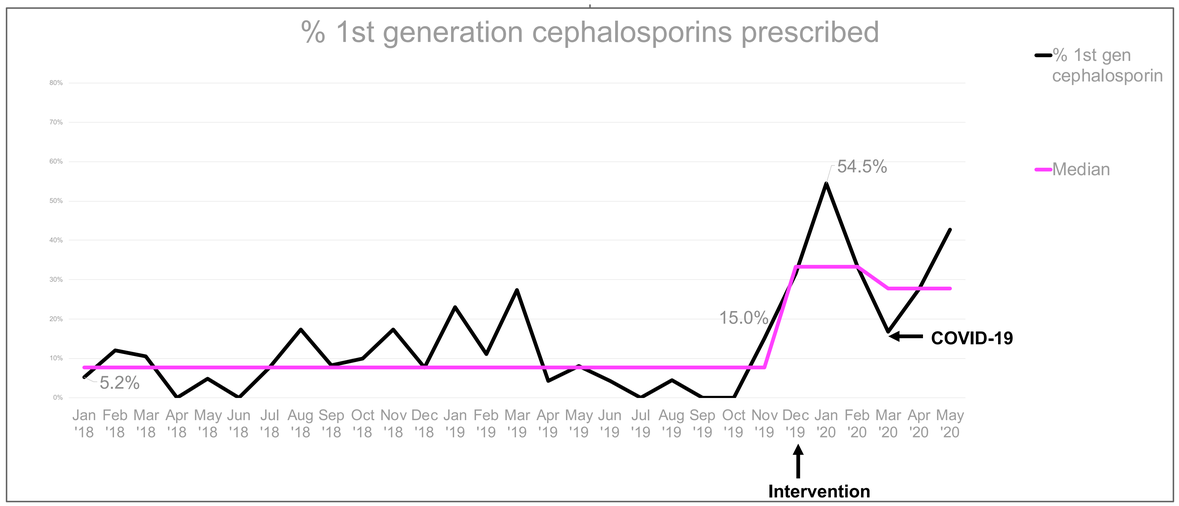
Post-intervention

- **113 UTI encounters (105 patients) seen for UTIs**
- **cephalexin most commonly prescribed in 32/86 (36.8%) of encounters (p<0.01); second most-common was higher-generation cephalosporins (22/86)**
- **Discontinuation of antibiotics most frequently occurred in cultures with no growth or 1-10k CFU/mL**

Table 1

Combined Sites	Pre-Intervention	Post-Intervention Phase 1	Post-Intervention Phase 2
Demographics			
# Encounters	515	68	45
# patients	443	63	42
Gender	95.9% (425/443) female	95.9% (425/443) female	83.3% (35/42) female
Average age [Range]	9.81 [0.20 – 17.99 y]	9.05 [0.36 – 17.9 5y]	8.39 [0.42 – 17.60y]
% Patients w/reported Antibiotic Allergy	12.4% (55/443)	6.3% (4/63)	14.3% (6/42)
Encounters			
% Visits with Empirically Prescribed Antibiotic	74.4% (383/515)	75% (51/68)	75.6% (34/45)
% Visit with Antibiotic Prescribed	93.4% (481/515)	92.6% (63/68)	93.3% (42/45)
% Visits with Urine Culture Sent	98.3% (506/515)	97.1% (66/68)	96% (43/45)
Average Urine Culture Turn-Around Time (days)	2.5	2.75	2.9
% Antibiotic Courses Discontinued			
Culture: No Growth	71.4% (65/91)	61.5% (8/13)	83.3% (5/6)
Culture: 1 – 10K CFU/mL	54.3% (19/35)	100% (7/7)	75% (3/4)
Culture 10-50K CFU/mL	3.7% (2/54)	25% (1/4)	0% (0/8)
Total	47.8% (86/180)	66.7% (16/24)	44.4% (8/18)

Figure 1: 1st generation cephalosporin prescribing from January 2018 – May 2020



Conclusion

- Implementation of a simple outpatient antimicrobial stewardship educational intervention was effective in changing antimicrobial prescribing practices.
- This resulted in a significant increase in the use of narrow spectrum empiric antibiotics (cephalexin).
- Missed opportunities for antibiotic discontinuation in culture-negative cases still exists, specifically for patients not reaching UTI guidelines threshold for positive cultures (i.e. cultures with 10-50k CFU/mL)
- Sustained outreach efforts are needed to:

1) understand and increase the rates of antibiotic discontinuation in culture-negative samples, and

2) continue to promote narrow spectrum empiric antibiotic use.

References

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University at Buffalo The State University of New York

1. Division of Pediatric Infectious Diseases, Department of Pediatrics, University at Buffalo Jacobs School of Medicine and Biomedical Sciences
buffalo.edu