Impact of a Duration Bundle on Antimicrobial Use in a Pediatric Hospital

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Treat the Source · Cut the Course · Limit Durations

INTRODUCTION

- Limiting antibiotic durations to the shortest effective duration is a strong recommendation with moderate-quality evidence in the 2016 IDSA Antimicrobial Stewardship Program (ASP) guidelines.
- Shortening the duration of antimicrobial therapy is being increasingly studied with similar clinical outcomes and decreased antibiotic exposure when compared to longer durations.
- An ASP bundle including a decrease in antimicrobial automatic stop dates from 14 days to 10 days along with a guideline for standard durations for 48 specific indications was implemented at a tertiary pediatric hospital in November 2019.

OBJECTIVES

- Assess the impact of this ASP initiative on patient outcomes by comparison of pre-intervention and post-intervention data.

METHODS

- A set of antimicrobial duration recommendations for pediatric patients was created by CHP ASP team.
- Automatic stop dates in the Electronic Medical Record (EMR) were updated from 14 days to 10 days for all antimicrobials.
- Advertising campaigns of shortening antibiotics durations were shown on all hospital screensavers.
- **Design**: The CHP quality improvement committee approved retrospective review and prospective tracking of all patients received antimicrobial treatment for 23 indications in Nov.15 - Dec.15, 2018 and Nov.15 - Dec.15, 2019.
- **Inclusion & Exclusion:**

397 patients were assessed for inclusion based on ICD-10 Infection Codes

106 patients did not meet the inclusion criteria and were excluded
- 5 atypical pathogen
- 2 continued to be septic
- 12 infection not improving
- 7 prosthetic or foreign material
- 58 ruled out and d/c all therapy
- 21 other

152 patients qualified 11/15/2018-12/15/2018 were included in pre-intervention data screening

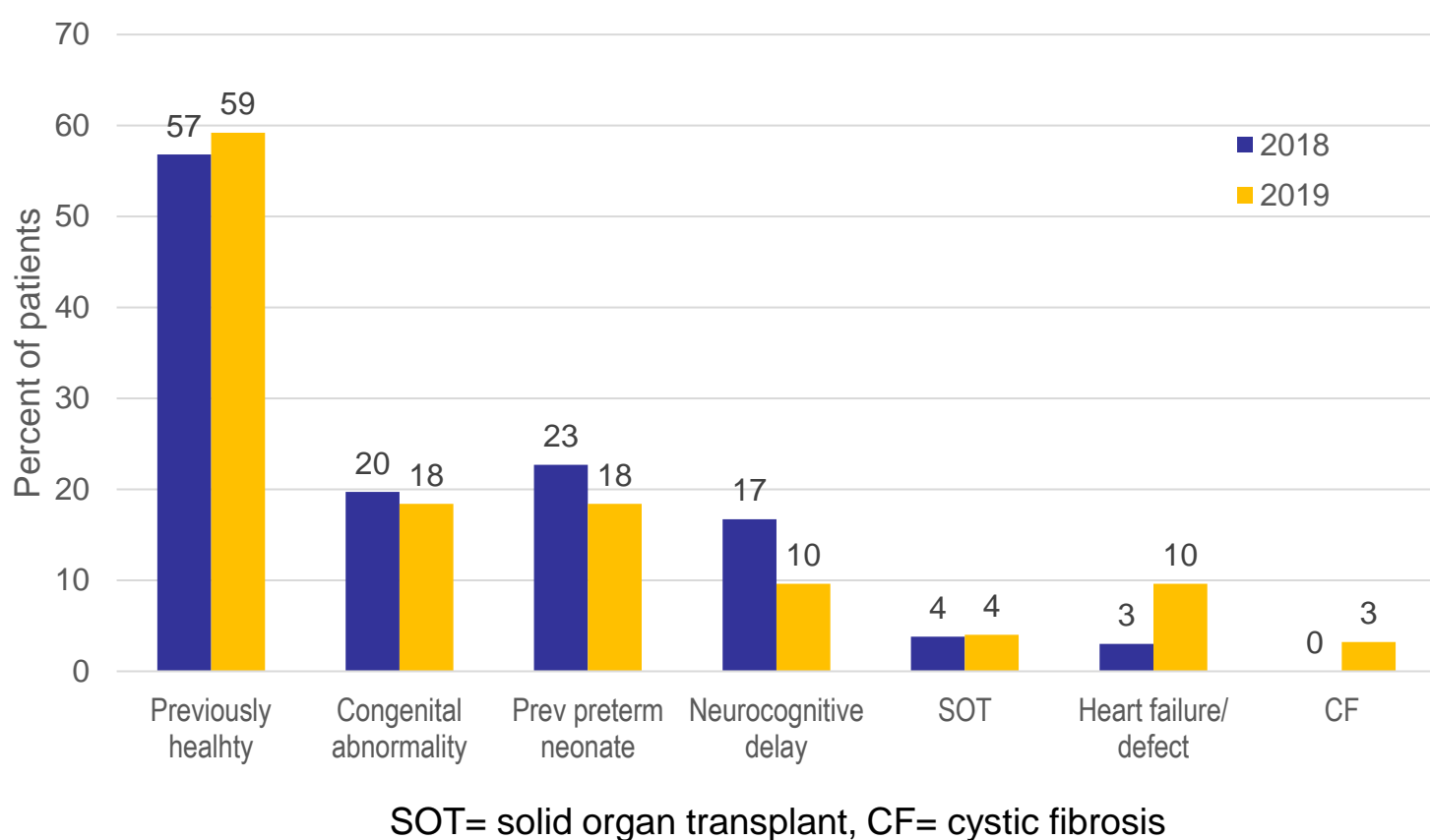135 patients qualified 11/15/2019-12/15/2019 were included in post-intervention data screening

Post Hoc 20 were excluded
- 15 BMT/Heme/Onc
- 5 iCare

Post Hoc 10 were excluded
- 9 BMT/Heme/Onc
- 1 iCare

132 were included in pre-intervention data analysis

125 were included in post-intervention data analysis

RESULTS

Demographics

Characteristic	Pre-intervention (n=132)	Post-intervention (n=125)
Age – yr	8.0 years	7.4 years
Male sex – no. (%)	80 (58%)	68 (54%)

Patient type

(Percent of patients — 2018 vs 2019)

Patient type	2018	2019
Previously healthy	57	59
Congenital abnormality	20	18
Prev preterm neonate	23	18
Neurocognitive delay	17	10
SOT	4	4
Heart failure/defect	3	10
CF	0	3

SOT= solid organ transplant, CF= cystic fibrosis

Indication

(Percent of patients — 2018 vs 2019)

Infection	2018	2019
PNA	51	51
GU	13	8
SSTI	11	9
BSI	9	7
ENT	4	14
IAI	5	6
Bone/Joint	5	4
CNS	3	1

PNA= pneumonia, GU= genitourinary, SSTI= skin and soft tissue infection, BSI= blood stream infection, ENT= ear, nose, and throat, IAI= intra-abdominal infection, CNS= central nervous system

Statistics

- Outcomes analyses using R software
- Nominal data: chi-squared
- Continuous data: Wilcoxon Rank Sum Test
- All tests were 2-sided and $p < 0.05$ is considered significant

Outcomes
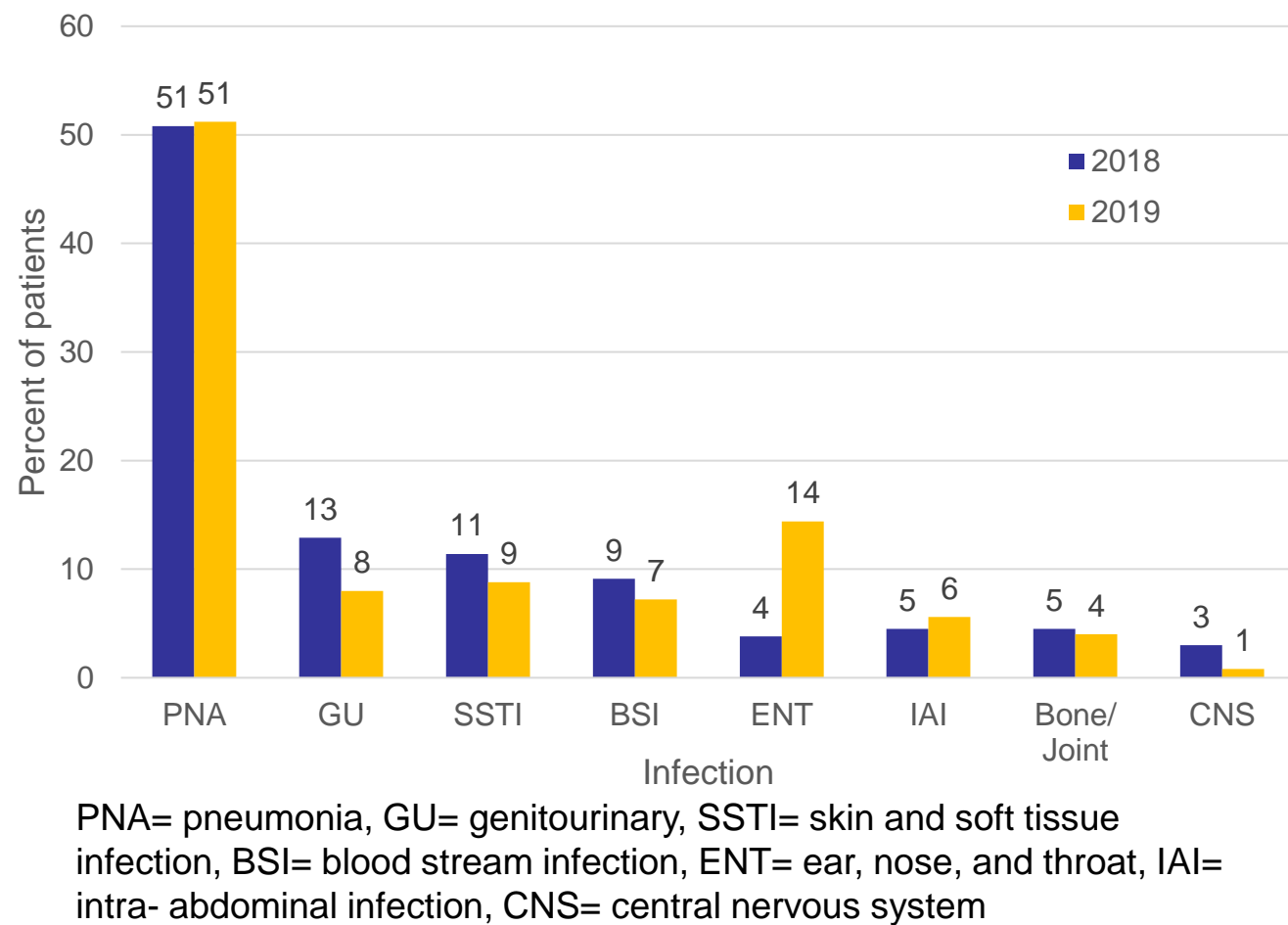
Primary Outcomes	Pre-intervention (n=132)	Post-intervention (n=125)	Post - Pre	P- value
Average Length of Stay	8.3 days	6.7 days	1.6 days	0.043
Percent of patients with duration 10 days or more inpatient	14% (19/132)	6.4% (8/125)	7.6%	0.054
Secondary Outcomes				
Average ratio- Actual: Recommended Duration	1.56 : 1	1.30 : 1		<0.001
Average Total Duration	11.8 days	10.9 days	0.9 days	<0.001

Balancing Measures and Inpatient Sub Analysis

Measure	Pre-intervention (n=132)	Post-intervention (n=125)
Restarted treatment within 48 hours	3.8% (5/132)	0% (0/125)
Readmitted within 30 days for same infection	6.8% (9/132)	6.4% (8/125)
Avg Days Above Recommended Inpatient	2.3 days	0.5 days
Sum of extra days inpatient	65.3 days	13.4 days (normalized)

CONCLUSIONS

- This intervention lead to a significant reduction in average length of stay per admission. The percent of patients with a duration more than 10 days inpatient did not meet statistical significance after the intervention.
- The rate of restarting antibiotics for the same indication within 48 hours and readmission rate within 30 days for the same infection were unchanged with this protocol.
- The intervention significantly reduced the secondary outcomes of the total duration of antimicrobial therapy and the ratio of actual duration compared to recommended duration.

FUTURE DIRECTIONS

- Continue education of health care providers about the antimicrobial duration recommendations.
- Implement indication-specific antimicrobial automatic stop dates in EMR.
- Assess cost savings of the ASP bundle to shorten durations.

REFERENCES

1. Barlam TF, Cosgrove SE, Abbo LM, et al. Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clin Infect Dis.* 2016;62(10):e51-e77.

DISCLOSURE

The authors do not have any disclosure to report