Address correspondence to:
cmedler1@hfhs.org

Identifying Empiric Antimicrobial Trends and Frequency of Bacterial Co-Infections at the Time of COVID-19 Diagnosis

Corey Medler, PharmD[1,2], Lejla Jakupovic, PharmD[1], Allison Weinmann, MBBS, FRAP[1], Rachel Kenney, PharmD, BCIDP[1], Susan Davis, PharmD[1,2]
[1]Henry Ford Health System, [2]Wayne State University

Introduction

- SARS-COV-2 is a current pandemic sweeping across the globe causing a respiratory infection called COVID-19
- Ideal management currently unknown
- Microbial co-infections remain infrequent
- Untreated or delayed antibiotic treatment may result in increased risk of mortality in patients with co-infections
- Empiric antibiotic indication and timing remains in question.
- Increased difficulty for antibiotics stewardship

Methods

Study Design and Objectives

This was a cross-sectional study conducted through all five hospitals within the Henry Ford Health System in southeast Michigan. The study was approved by the Henry Ford Hospital Institutional Review Board. The study objectives were to:

1. Describe selection and timing of empiric antibiotic therapy
2. Identify trends of antibiotic therapy and opportunities for antibiotic stewardship interventions
3. Assess clinical outcomes of COVID-19 positive patients receiving antibiotic therapy

Subjects

The study population included patients admitted to Henry Ford Hospital between March 1, 2020 through October 31, 2020 meeting the following criteria:

Inclusion Criteria	Exclusion Criteria
• COVID-19 Positive test	• Less than 18 years old • Mortality or transitioned to hospice/ comfort care within 24 hours of admission

Data Collection and Endpoints

Data was collected from electronic medical records using a standardized case report form. Data collected included patient demographics, COVID-19 pertinent laboratory values, antibiotic indication, antibiotic selection, microbiology history and susceptibilities. The rest of this paragraph should be used to provide definitions for your primary endpoints and how they were adjudicated.

Analysis

Descriptive measures (incidence, proportions, measures of central tendency and dispersion) were used to evaluate the frequency of bacterial co-infections at diagnosis of COVID-19. To compare antibiotic therapy, bivariate comparative tests were used. Categorical data was compared using Chi-square tests, continuous data was compared with Mann-Whitney U. All tests were two-sided; a P value of <0.05 was considered significant. Statistical analysis was completed with SPSS version 26.

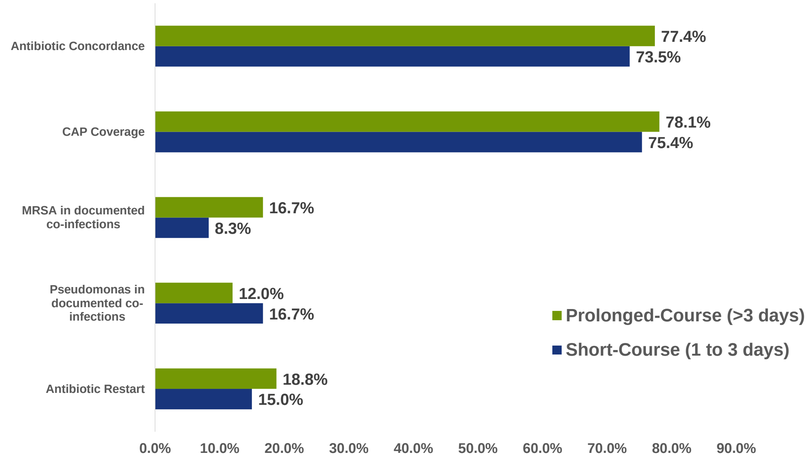
Disclosures: Nothing to disclose

Results

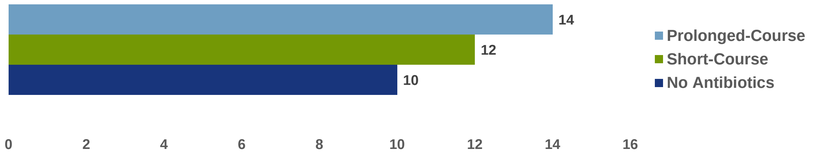
Baseline Patient Characteristics

Demographics	No Antibiotics (n=181)	Antibiotics (n=819)
Age (Median, IQR)	64 (50-75)	64 (53-75)
Gender (Male)	92 (50.8%)	419 (51.2%)
Charlson Score (Median, IQR)	1 (0-3)	1 (1-3)
ICU	10 (10.5%)	263 (32.1%)
Oxygen Required	88 (48.6%)	595 (72.6%)
Severity of Illness:		
Mild	79 (43.6%)	159 (19.4%)
Moderate	80 (44.2%)	392 (47.9%)
Severe	20 (11%)	179 (21.9%)
Critical	2 (1.1%)	89 (10.9%)
Bacterial Co-Infection	0 (0%)	54 (6.6%)

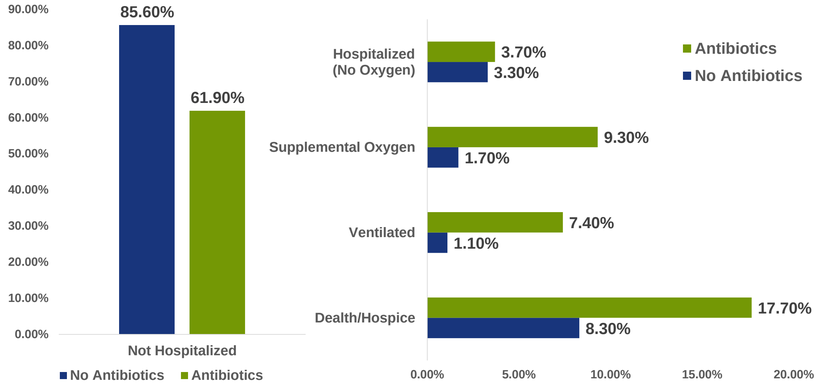
Empiric Antibiotic Therapy



Median Days to Recovery



Patients at Day 15



Adverse Events

Adverse Events	Short-Course (n=426)	Prolonged-Course (n=393)
Any Adverse Event	72 (16.9%)	122 (31%)
Renal	18 (4.3%)	32 (8.1%)
Gastrointestinal	43 (10.1%)	60 (15.3%)
Hepatic	5 (1.2%)	16 (4.1%)
Multidrug Resistant Organism (within 30 Days)	10 (2.3%)	19 (4.8%)
Antibiotics Restarted + Adverse Event	29 (6.8%)	43 (10.9%)
Readmission (within 2 weeks)	40 (11.2%)	30 (10.7%)

Summary

- Frequency of bacterial co-infections was only 5.4% in the total population
- There are increased opportunities for antibiotic stewardship to optimize empiric antibiotic selection and de-escalation
- Unnecessary antibiotic exposure increases risk for antibiotic induced adverse events and antibiotic resistance