Impact of a Procalcitonin-Based Treatment Guideline on Antibiotic Prescribing in Cardiology Patients with Suspected Respiratory Tract Infection

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Abstract

Background

The utility of procalcitonin (PCT) in guiding antibiotic (ABX) decisions for respiratory tract infections (RTIs) is established. Cardiology (CARD) patients may benefit from PCT as ABX are often prescribed in response to respiratory symptoms and nonspecific chest roentgenogram (CXR) findings (e.g., possible pulmonary edema). The objective of this study was to determine the impact of a PCT guideline on antibiotic prescribing among CARD patients with suspected RTI.

Objective

To determine the impact of a PCT-based treatment guideline on ABX prescribing among cardiology patients with suspected RTI.

Methods

STUDY DESIGN

Retrospective, observational, single-center, before-and-after study

Approved by WFBH Institutional Review Board

METHODS

STUDY POPULATION

Before Group (n=37): Jan 2014 – Dec 2013

After Group (n=37): Jan 2014 – Dec 2014

Inclusion Criteria

≥18 years old
Cardiology service patient
Suspected RTI documented in medical record
Prescribed systemic ABX at time of suspected RTI

Exclusion Criteria

≥18 years old
Cardiology service patient
Suspected RTI documented in medical record
Prescribed systemic ABX at time of suspected RTI

RESULTS

Thirty-seven patients were included in each group. There was no difference in patient characteristics. Median length of stay (LOS) was 5 days for both groups. Twenty-four patients in the after group were PCT guideline eligible based on LOS ≥4 days; a PCT was ordered for 17 (71%) of these (PCT subgroup). One patient developed C. difficile enterocolitis before group, and none died during hospitalization.

DEFINITIONS

Days of therapy (DOTs) = aggregate sum of total days of each ABX at any dose charted in the eMAR or prescribed for outpatient use
ABX free days (AFDs) = number of days when no ABX was charted or prescribed for outpatient use
Defined daily doses (DDDs) = average maintenance dose per day for a medication prescribed for its main indication

RESULTS CONTINUED

Before
After
PCT

In-hospital mortality, n (%) 0 (0%) 0 (0%) NS
Sepsis, surgical, cardiac arrest, or cardiogenic shock 8 (21.6) 7 (18.9) 0.2 (0.6) p=0.538
Ventricular assist device 12 (32.4) 12 (32.4) 0.2 (0.6) p=0.538
Immunocompromised 13 (35.1) 12 (32.4) 0.2 (0.6) p=0.538
Concurrent infection 11 (29.7) 13 (35.1) 0.2 (0.6) p=0.538
Outside hospital stay or ABX administration prior to admission for ≥1 day 8 (21.6) 6 (16.2) 4 (10.8) p=0.391

Secondary Outcomes

Mean AFDs/patient

Means ± SD

ABX Exposure Outcomes

Before Group
After Group
PCT Subgroup

Mean AFDs/patient

Baseline Characteristics

Characteristic

Before (n=37)
After (n=37)
PCT (n=17)

Age, mean (SD) 69 (14) 70 (13) 69 (14) NS
Male, n (%) 18 (51.4) 17 (45.9) 12 (70.6) p=0.147
Suspected cardiac event, n (%) 13 (35.1) 13 (35.1) 7 (41.2) p=0.107
CHF exacerbation, n (%) 12 (32.4) 13 (35.1) 12 (70.6) p=0.268
Atrial fibrillation, n (%) 7 (18.9) 5 (13.5) 3 (17.6) p=0.391
Abnormal radiograph, n (%) 29 (78.4) 26 (70.3) 13 (76.5) NS
Charson Comorbidity, mean (SD) 5.4 (2.0) 4.4 (1.3) 5.8 (1.9) p=0.538
Suspected RTI type, n (%) 29 (78.4) 26 (70.3) 13 (76.5) NS
CAP 17 (45.9) 13 (35.2) 6 (35.3) NS
COPD exacerbation 9 (24.3) 8 (21.6) 4 (23.5) NS
HCAP 6 (16.2) 2 (5.1) 2 (11.8) NS

STATISTICAL ANALYSES

Descriptive statistics
Chi-square or Fisher’s exact test for comparisons of categorical data and Student’s t-test for comparisons of continuous data

Conclusions

A PCT-guideline is a useful tool to decrease ABX among CARD patients who often receive ABX due to respiratory symptoms and non-specific CXR findings.

ABX Duration (Days)

Before Group
After Group
PCT Subgroup

Mean ± SD

ABX Free Days

Before
After
PCT

Suspected cardiac event, n (%) 0/0 (0) 0/0 (0) 0/0 (0)
CHF exacerbation, n (%) 0/0 (0) 0/0 (0) 0/0 (0)
Atrial fibrillation, n (%) 0/0 (0) 0/0 (0) 0/0 (0)
Abnormal radiograph, n (%) 0/0 (0) 0/0 (0) 0/0 (0)
Charson Comorbidity, mean (SD) 0/0 (0) 0/0 (0) 0/0 (0)
Suspected RTI type, n (%) 0/0 (0) 0/0 (0) 0/0 (0)
CAP 0/0 (0) 0/0 (0) 0/0 (0)
COPD exacerbation 0/0 (0) 0/0 (0) 0/0 (0)
HCAP 0/0 (0) 0/0 (0) 0/0 (0)

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