Evaluating the Impact of Procalcitonin on Chronic Obstructive Pulmonary Disease Exacerbations

Kevin Lin, Casey Dempsey, Shivani Patel, Nga Vo, Chase Waxler, Michael Wollner, Santosh Yatam Ganesh, Jaime Clavijo, John Butler, Matthew Kleininsky, Edward Septimus

Memorial Hermann Southwest Hospital, Houston, Texas

#1479

Abstract

- Elevations in procalcitonin can be seen in the presence of bacterial infection
- Procalcitonin may be beneficial in decreasing unnecessary antibiotic utilization in patients with COPD exacerbations, as this biomarker can be utilized to differentiate between viral and bacterial infections
- A pre- and post-analysis was performed assessing antibiotic days of therapy, length of stay, respiratory-related 30-day readmission, and treatment failure defined as ICU admission, invasive mechanical ventilation, and death in COPD exacerbation patients

Methods: We conducted a retrospective, pre- and post-intervention study evaluating the impact of a PCT-guided protocol on antibiotic utilization in COPD exacerbations. Patients with a primary diagnosis of COPD exacerbation, at least 18 years of age, who had a PCT level drawn within 24 hours of admission were included. Exclusion criteria included patients presenting with severe trauma, sepsis, bacterial pneumonia, patients who required invasive mechanical ventilation, and patients with an initial admission to the ICU. Data collection variables included baseline characteristics, laboratory values, vital signs, microbiology cultures and sensitivities, and antibiotic use data. The primary outcome of this study was antimicrobial duration of therapy. Secondary outcomes include hospital length of stay (LOS), respiratory-related 30-day readmission rates, and treatment failure defined as ICU admission, requirement of invasive mechanical ventilation, or death.

Results

- Antimicrobial days of therapy were significantly reduced by 67%
- Initial antibiotic prescribing decreased significantly from 97% to 69%
- Implementation of a procalcitonin guided protocol for antibiotic use in COPD exacerbations as associated with:
  - Improved antibiotic stewardship
  - A significant decrease in antibiotic utilization
  - No significant differences in length of stay, respiratory-related readmissions, or treatment failure

Conclusions

- Authors of this poster have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have indirect interest in the subject matter of this presentation.

Background: Antibiotic prescription rates for treating acute exacerbations of chronic obstructive pulmonary disease (COPD) have been reported as high as 85% in the United States. Research has shown that over 50% of COPD exacerbations are due to viral etiologies. Elevations in procalcitonin (PCT) levels can be seen in bacterial infections and can help guide the need for antimicrobial therapy in this patient population. The goal of this study is to evaluate the significance of PCT on antibiotic use in patients with COPD exacerbations.

Methods: We conducted a retrospective, pre- and post-intervention study evaluating the impact of a PCT-guided protocol on antibiotic utilization in COPD exacerbations. Patients with a primary diagnosis of COPD exacerbation, at least 18 years of age, who had a PCT level drawn within 24 hours of admission were included. Exclusion criteria included patients presenting with severe trauma, sepsis, bacterial pneumonia, patients who required invasive mechanical ventilation, and patients with an initial admission to the ICU. Data collection variables included baseline characteristics, laboratory values, vital signs, microbiology cultures and sensitivities, and antibiotic use data. The primary outcome of this study was antimicrobial duration of therapy. Secondary outcomes include hospital length of stay (LOS), respiratory-related 30-day readmission rates, and treatment failure defined as ICU admission, requirement of invasive mechanical ventilation, or death.

Results: A total of 620 patients were reviewed with 150 fitting the inclusion criteria. There were a total of 64 and 86 patients in the pre- and post-intervention cohorts, respectively. Baseline characteristics were similar between groups. PCT guidance was associated with a significant reduction in number of antibiotic days of therapy (7.1 days vs. 2.6 days; P<0.001). No differences were found in inpatient LOS (5.3 days vs. 4.3 days; P>0.14) nor respiratory-related 30-day readmissions (9.4% vs. 11.6%; P=0.66). In addition, treatment failure defined as ICU admission (3.1% vs. 12.5%; P=0.68), requirement for invasive mechanical ventilation (3.1% vs. 0%; P=0.21), and death (1.8% vs 1.2%; P=0.40) did not differ significantly between groups.

Conclusion: Implementation of a PCT-guided protocol for the treatment of COPD exacerbations was associated with a significant reduction in antimicrobial days of therapy. No differences were noted in inpatient LOS, respiratory-related 30-day readmissions, and treatment failure defined as ICU admission, requirement of invasive mechanical ventilation, or death. Our PCT-guided protocol has been demonstrated to safely reduce antibiotic utilization in patients with COPD exacerbations.

Disclosures

Authors of this poster have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have indirect interest in the subject matter of this presentation.