Use of a Novel Clinical Decision Support Tool for Pharmacist-Led Antimicrobial Stewardship in Patients with Normal Procalcitonin

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Background

- Procalcitonin (PCT) is a biomarker that can be used to assist in the decision to discontinue or de-escalate antibiotics in patients being evaluated for pneumonia or suspected sepsis.
- Our Antimicrobial Stewardship Program (ASP) instituted review of patients on antibiotics with PCT <0.25 mcg/L in 2012.
  - PCT guidance available from: https://www.unmc.edu/intmed/divisions/id/asp/procalcitonin-pct-guidance/index.html
- In 2018, a clinical decision support (CDS) tool was implemented as a "daily checklist" alert in the electronic medical record for frontline pharmacists to assist in this patient review.

Objectives

Primary objective:

- Assess antibiotic de-escalation after PCT alert in patients on antibiotics for lower respiratory tract infections (LRTI)

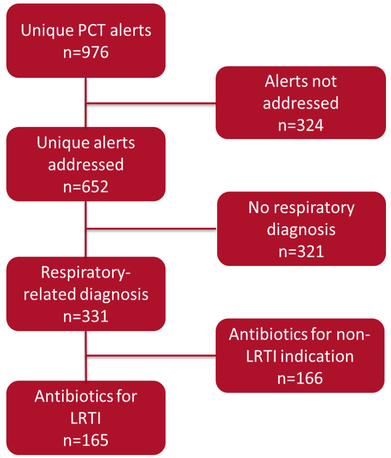
Secondary objectives:

- Compare changes in antibiotic use and length of stay (LOS) in patients with PCT interventions vs. those with an alert but no intervention documented
- Characterize antibiotic days of therapy (DOT) both in patients with interventions and in patients without

Methods

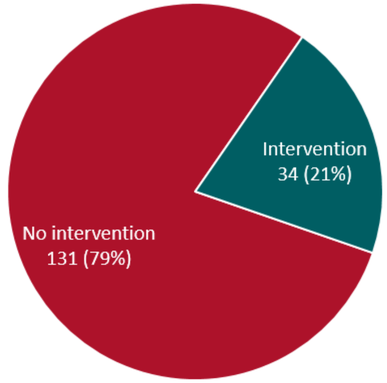
- Design:
  - Retrospective cohort study
- Population:
  - Patients on antibiotics for presumed or confirmed LRTI with PCT <0.25 mcg/L and a Daily Checklist alert
- Time frame:
  - January 2019 – November 2019
- Criteria for PCT alert:
  - PCT result <0.25 mcg/L in the last 3 days PLUS
  - Active order for antibiotic PLUS
  - No positive culture results
- PCT alert workflow:
  - Patients who trigger this alert should be assessed daily by team-based clinical pharmacists, who then contact providers to discuss antibiotic de-escalation or discontinuation.

Results



Demographics and Background Information	
Alerts included	165
Unique patients	116
Unique admissions	119
Mean age, years	62.9
Female, n (%)	57 (50.4)
Median LOS, days	6.84
Intensive care, n (%)	56 (48.3)

Primary Outcome



Type of Intervention	n (%)
Narrow therapy	18 (34)
IV-PO	10 (18.9)
Drug/dose optimization	8 (15.1)
Shorten duration	7 (13.2)
D/c all antibiotics	4 (7.5)
Prolong therapy	4 (7.5)
Broaden therapy	2 (3.8)
Total	**53**

- There were a total of 53 interventions made after 34 PCT alerts, with narrowing spectrum or converting to oral therapy being the most common interventions.
- Two cases (5.9%) had therapy escalated within 48 hours of intervention.

Secondary Outcomes

	Intervention	No Intervention	p-value
Median LOS, days	6.37	7.05	0.81
Vancomycin use reduction, %	85.3%	27.4%	**0.016**

Results

	Days of Therapy
DOT Prevented (intervention)	125
DOT Optimized (intervention)	56
DOT Not Prevented (no intervention)	140

- DOT prevented – difference in DOT between antibiotic orders after intervention to what would have been continued with no intervention
- DOT optimized – narrow therapy, oral conversion, dose optimization
- DOT not prevented – DOT after an alert was marked as "no change" (i.e., no intervention was made on an eligible alert); not counted if there was an ID consult, positive respiratory culture, or upward trend in PCT

Discussion

- Utilizing a pharmacist-directed CDS tool for PCT-based stewardship was associated with 125 fewer DOT and 56 optimized DOT with a 21% intervention rate.
- Pharmacist interventions were also associated with a significant reduction in vancomycin use.
- These interventions appear to have been made safely, with only 2 cases having therapy escalated within 48 hours of intervention.
- Additional interventions could have potentially prevented 140 DOT.
- Many alerts occurred in patients on antibiotics for indications other than LRTI, one of the two indications in which most PCT data exist, highlighting a potential area for improvement in this tool.

Conclusions

- Interventions driven by a CDS tool for pharmacist-driven antimicrobial stewardship in patients with normal PCT resulted in fewer DOT and significantly higher rates of vancomycin discontinuation without a change in LOS.
- Additional interventions could have potentially prevented many more DOT.
- Refinement of this tool is ongoing with goals to create more meaningful CDS, reduce alert fatigue, and increase intervention rates.

Disclosures

- The authors have no conflicts of interest to disclose related to the subject matter of this presentation.