A Pharmacist-Driven Implementation of Carbapenem Antibiotic Timeouts

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Background

In 2013, the CDC emphasized the need for antibiotic use improvement strategies[1]

- 20%-50% of all antibiotics utilized are inappropriately or unnecessarily prescribed[1]
- Antibiotic timeout[1-6] – a period of evaluation where the medical team reassesses the continuing need and choice of antibiotics when more clinical information is available through four key clinical questions:
  - *Does this patient have an infection that will respond to antibiotics?*
  - *If so, is the patient on the right antibiotic(s), dose, and route of administration?*
  - *Can a more targeted antibiotic be used to treat the infection (de-escalate)?*
  - *How long should the patient receive the antibiotic(s)?*

At Regions Hospital in Saint Paul, MN, the overuse of carbapenems has led to a 9% decrease in antimicrobial sensitivities, specifically for *Pseudomonas aeruginosa*[7]

- The antimicrobial stewardship team was implemented in October 2016
- ID service weekday rounding (Monday through Friday) began June 2018 for patients on broad-spectrum antibiotics or with infectious disease consult

Objectives

The objective of this study was to evaluate the impact of the implementation of a pharmacist-driven antibiotic timeout at 72-hours following initiation of carbapenem-based antibiotic therapy

Primary Aims

Duration of carbapenem therapy pre- and post-timeout implementation

Secondary Aims

Development of *Clostridioides difficile* infection

Re-escalation of antibiotic therapy due to worsening condition

Pharmacist time spent during the antibiotic timeout process

Methods

Inclusion

- Adults ≥18 years
- Treatment with carbapenem therapy (i.e. Meropenem, ertapenem, imipenem, doripenem)

Exclusion

- Hypersensitivity to carbapenems
- Pregnant women

Pre-Intervention Methodology

- Retrospective data extracted from 03/05/2018 to 04/05/2018 via the McKesson Performance Analytics Platform
- Patients excluded based on consent for research participation

Post-Intervention Methodology

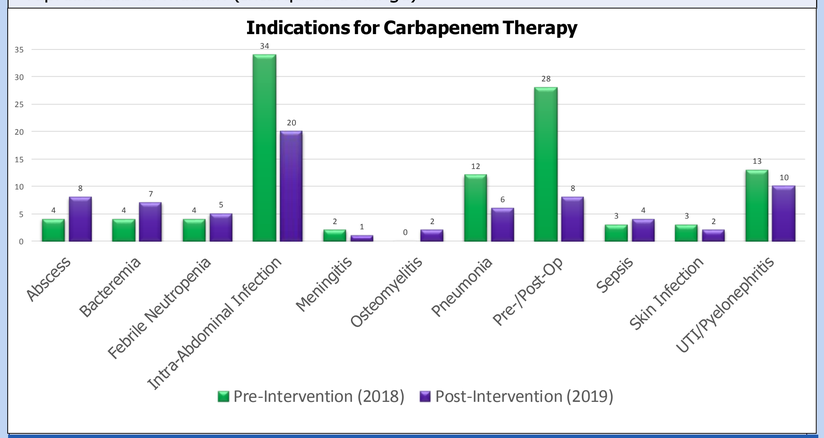
- Data collected prospectively from 03/05/2019 to 04/05/2019
- Patient enrolled into Antibiotic Timeout following running of a daily report indicating initiation of any carbapenem therapy
- Antibiotic Timeout
  - Assessment of patient clinical condition at 72-hours
  - Contacting primary team or attending physician
- Continued use or de-escalation of therapy documented in chart
- Follow-up continued for total duration of carbapenem therapy

Results

Table 1. Baseline Comparison

	Pre-Intervention N=107	Post-Intervention N=72
Age, years*	59 (41.5, 68)	56.5 (46.25, 64)
Sex, female (%)	52 (48.6)	44 (61.1)
Hospital LOS, days*	4 (2, 9)	6 (3, 14)
Level of Care	General Care: 94 Intensive Care: 8	General Care: 41 Intensive Care: 23
Carbapenem Therapy	Ertapenem: 80 Meropenem: 27	Ertapenem: 47 Meropenem: 25
Exclusion	Pregnancy: 1	Pregnancy: 1

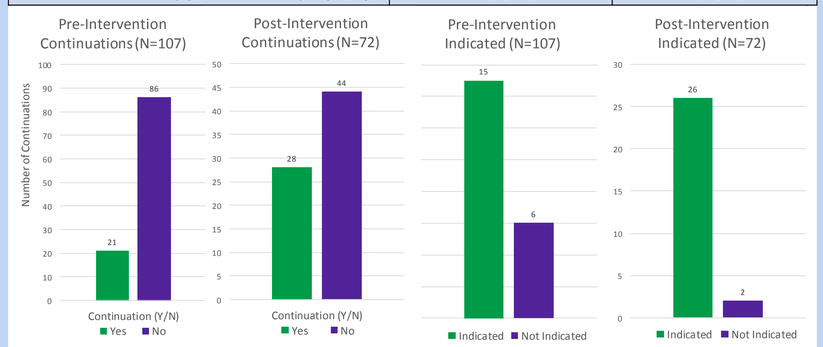
*represented as median (Interquartile Range)



Primary Outcomes

Table 2. Primary Outcome – Continuation of Carbapenem Therapy

	Pre-Intervention N=107	Post-Intervention N=72
Continuation of Therapy, yes (%)	21 (19.6)	28 (38.9)
Duration of Therapy, median days (IQR)	1 (1, 3)	3 (2, 6)



Secondary Outcomes

Table 3. Secondary Outcomes – *C. difficile* infection, Re-escalation of therapy

	Pre-Intervention N=107	Post-Intervention N=72
Clostridioides difficile infection tests, (% negative)	19 (73.7)	26 (84.6)
Re-escalation of therapy, (%)	0 (0)	2 (2.8)

Table 4. Secondary Outcomes – Pharmacist Time Spent

	Median (Interquartile Range)
Time for Chart Review, minutes	9.5 (7, 14)
Discussion with Team, minutes	3 (2, 5)
Documentation, minutes	2 (1, 2)
Total Time Spent, minutes	11 (9, 17)

Conclusions

Limitations

- Unmatched patient groups at baseline (i.e. sex, age, carbapenem therapy)
- Difference in number of patients per cohort
- Implementation of antimicrobial stewardship services may have reduced number of opportunities for interventions due to carbapenem therapies being used for specific disease states as indicated

Conclusion

- Duration of therapy almost 3-fold greater in 2019 compared to 2018 due to indicated disease states requiring carbapenem therapy
- Risk for *Clostridioides difficile* infection ranges from 15.4-26.3%
- Risk for re-escalation in antibiotic therapy seen in 2.8% of patients in post-intervention compared to pre-intervention
- Use of this implementation process may require ~10 minutes of pharmacist time per patient encounter

Future Directions

- Implementation strategy that is achievable and potentially could be expanded to other broad-spectrum antibiotics
- Assists in the facilitation of achievement of Joint Commission action requirements for our institution

References

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