Impact of Antimicrobial Stewardship Protocol Mandating Infectious Diseases Consultation Post 72 Hours of Meropenem Usage

Nhi Nguyen, PharmD[1], Rachel S. Britt, PharmD, BCIDP[1], David Reynoso, MD, PhD[2], Ryan S. Ferren, PharmD, BCIDP[1]
[1]Department of Pharmacy, [2]Department of Internal Medicine & Infectious Diseases
The University of Texas Medical Branch, Galveston, TX

BACKGROUND

- Carbapenems are broad-spectrum antimicrobial agents with in-vitro activity against a wide range of bacteria and ideally are considered last-resort treatment options
- Carbapenem consumption has significantly increased over the past decade
- Studies have demonstrated a correlation between carbapenem use and the development of carbapenem-resistant organisms (CROs)
- The increasing use of meropenem at our institution prompted the development of a stewardship policy mandating infectious diseases (ID) consultation after 72 hours of meropenem use

OBJECTIVE

- To evaluate the impact of the antimicrobial stewardship program (ASP) policy on meropenem utilization and associated clinical outcomes

METHODS

Pre-intervention 11/2020-4/2021 → **Policy implementation 5/2021** → **Post-intervention 6/2021-11/2021**

- Quasi-experimental, observational study evaluating the impact of the policy in adult patients across four campuses
- Administered meropenem orders were retrieved retrospectively six months before and after policy implementation

Primary Outcome	Secondary Outcomes
Meropenem days of therapy per 1000 patient-days (DOTs)	▪ DOTs of other antimicrobials (vancomycin, ertapenem, ceftriaxone, cefepime, piperacillin/tazobactam) ▪ 30-day all-cause mortality ▪ Hospital length of stay (LOS) ▪ *Clostridioides difficile* (*C. difficile*) infection incidence

RESULTS

Pre-intervention: 1493 meropenem orders

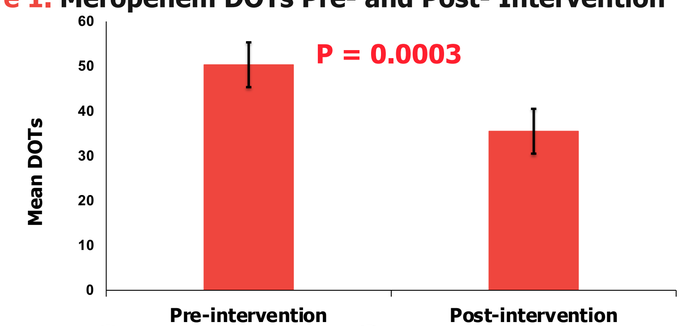
Post-intervention: 1404 meropenem orders

Table 1. Baseline Characteristics of Included Patients

Characteristic	Pre-intervention	Post-intervention	P value
Age, mean (SD)	60.6 (15.8)	59.4 (16.7)	0.05
Antibiotic Allergies, %	PCN – 17.1 Sulfa – 7.6	PCN – 13.5 Sulfa – 9.8	0.007 0.03
Meropenem Indication, %	Blood – 22.7 Respiratory – 20.7 Abdominal – 17.8 Urine – 11.6	Blood – 25.4 Respiratory – 24.1 Abdominal – 13.5 Urine – 14.5	0.1 0.03 0.001 0.02
mCCI, mean (SD)	2.1 (1.5)	1.9 (1.6)	0.02
ID consult, %	44.1	51.7	0.001
ESBL-producing Enterobacterales, %	11.7	12.5	0.7
Cefepime-resistant *Pseudomonas*, %	2.1	3.1	0.1

Red: statistically significant; ESBL: extended-spectrum beta-lactamase; mCCI: modified Charlson Comorbidity Index; PCN: penicillin; SD: standard deviation

Figure 1. Meropenem DOTs Pre- and Post- Intervention



RESULTS (cont.)

Table 2. Secondary Outcomes

Outcome	Pre-intervention	Post-intervention	P value
Other DOTs, mean (SD)			
Vancomycin	108.3 (5.1)	108.7 (5)	0.9
Ertapenem	9.8 (2.5)	11 (3.1)	0.5
Ceftriaxone	94 (4.9)	103.8 (4.9)	0.006
Cefepime	39 (5.2)	58.5 (7.9)	0.0005
Piperacillin/ tazobactam	74.5 (6.8)	76.8 (8.4)	0.6
30-day all-cause mortality, %	29.9	36.5	0.003
Hospital LOS, mean days (SD)	18.5 (18.7)	18.5 (17.9)	0.9
***C. difficile* incidence, #**	95	121	N/A

Red: statistically significant

- After ASP policy implementation, 24/450 (5.3%) ID consults were placed by members of the ASP team

CONCLUSION

- The ASP policy mandating ID consultation after 72 hours of meropenem use helped decrease meropenem DOTs, encouraged use of antimicrobial agents with narrower spectrums, and increased ID consultation

DISCUSSION

- Increased mortality observed in the post-intervention period could be due to multiple reasons, one of which was the surge of the SARS-CoV2 Delta variant during the post-intervention period
- Future directions:
  - Subsequent studies are needed to determine if there were differences in LOS among different subgroups
  - ASP policy expansion to other broad-spectrum antimicrobials

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