Department of Pathology and Laboratory Medicine
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

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Evaluating Carbapenem Restriction Practices at a Large, Urban Hospital in Manila, Philippines

Corresponding Author:
Dr. Cybele Abad
cybelemd@yahoo.com

Kaitlin F Mitchell PhD[1*], Nasia Safdar MD, PhD[1,2], and Cybele L Abad MD[3]

[1]Division of Infectious Diseases, Department of Medicine, University of Wisconsin-Madison; [*]Current: Department of Pathology and Immunology, Washington University School of Medicine in St. Louis;
[2]William S. Middleton Memorial Veterans Hospital, Madison, WI; [3]Department of Medicine, Division of Infectious Diseases, The Medical City, Pasig, Philippines

Abstract

Background Hospital antimicrobial stewardship programs are critical in countries such as the Philippines, where antibiotic resistant infections are highly prevalent. At the study institution, a Prior Antimicrobial Restriction Approval (PARA) is required for non-infectious disease specialists to prescribe carbapenems. PARA request forms include specification of empiric or definitive therapy based on diagnostic tests. Recommended duration of therapy is typically 3 days for empiric use and 7 days for definitive, with possible extension upon specialist approval.

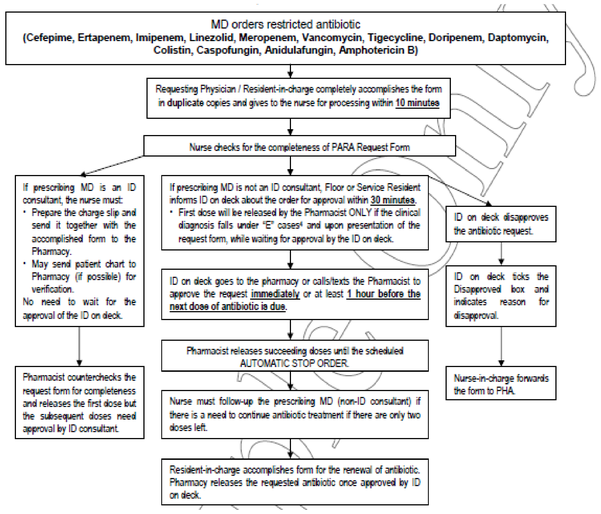
Methods The study took place at an 800-bed tertiary hospital in Manila, Philippines. We performed a retrospective review of patient medical records and laboratory reports from 2016. Information related to patient demographics, carbapenem prescription, laboratory diagnosis, and therapy were compiled. Carbapenem prescriptions were classified as 'adherent' or 'non-adherent' according to clinical guidelines related to infection diagnosis, treatment duration, and de-escalation.

Results Of the 185 patients on carbapenem therapy, Prescriptions of carbapenems were either definitive (n=56), empiric (n=127), or prophylactic (n=2) as defined by the ordering provider. 69 out of 185 (37%) prescriptions were deemed non-adherent to guidelines, despite receiving approvals for their respective requests. Of these, 72% were non-adherent due to failure to de-escalate the carbapenem and 28% were non-adherent due to an incomplete course of therapy.

Conclusion Prior approval of restricted antimicrobials (PARA) is a component of antimicrobial stewardship in this institution. Despite initial approval for carbapenem therapy, 37% of prescriptions were non-guideline-adherent, highlighting the challenges in implementing such a strategy. In order to increase the effectiveness of PARA, additional approaches including the application of strict policies which reinforce follow-up of available culture results, justification of therapy extension, or referral from an infectious disease specialist may be warranted.

Background

Copy of flowchart for PARA process and approval of restricted antibiotics at the study site



- Prior Antimicrobial Restriction Approval (PARA) requires approval from an infectious disease (ID) specialist prior to prescription of restricted antibiotics
- Definitive prescriptions (7 days) recommended for infections with laboratory-confirmed diagnosis
- Empiric prescriptions (3 days) recommended for infections prior to diagnosis
- Empiric prescriptions should be de-escalated once laboratory data is available
- Longer durations of therapy must be approved

Results

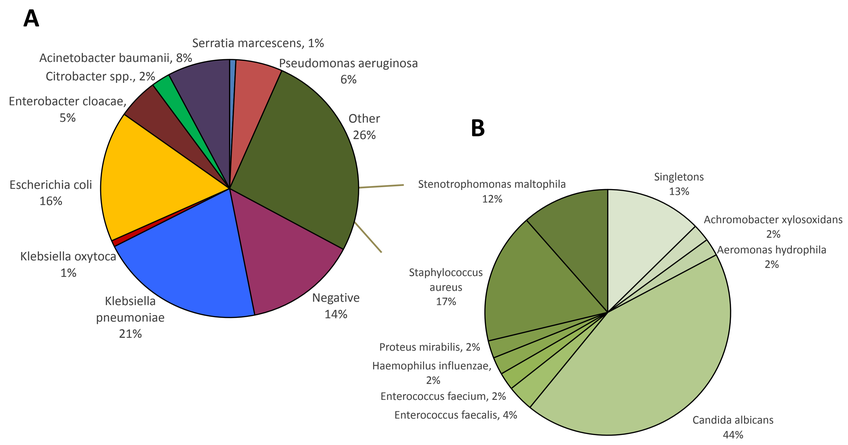


Figure 1. A) Microorganisms identified by the microbiology laboratory from cases with PARA approvals (n=256). **B)** Organisms not typically treated with carbapenems, and classified as "Other" (n=87).

	Total n (%)	Definitive n (%)	Empiric n (%)	Prophylactic n (%)
Group size (N)	185	56	127	2
Age (median years)	75.5	78.4	72.7	75.0
Gender (male)	83 (45%)	30 (54%)	52 (41%)	1 (50%)
Total # comorbidities of interest	268	83	183	2
Average # comorbidities per patient	1.45	1.48	1.44	1.00
COPD	25	8	16	1
Hypertension	102	36	66	0
Diabetes Mellitus	66	23	43	0
Malignancy (any, active)	51	9	41	1
Hemodialysis	25	6	19	0
None	28	7	20	1
Outcome				
Length of hospital days (median days)	14.0	14.5	14.0	15.0
Mortality	42 (23%)	10 (18%)	32 (25%)	0 (0%)
Cases with same recurrent infection within 30 days of discharge	14 (8%)	2 (4%)	12 (9%)	0 (0%)
Duration of therapy (median days)	6.5	7.0	5.0	11.0
Site of infection for PARA request				
Respiratory	143	30	113	2
Blood	18	8	10	0
Gastrointestinal	1	1	0	0
Genitourinary	39	24	15	0
Wound/surgical site	2	1	1	0

Table 1. Characteristics of patients with a PARA request during 2016. When presented, percentages are derived from the respective group size (total, definitive, and empiric).

	Total n (%)	Definitive n (%)	Empiric n (%)	Prophylactic n (%)
Total cases	185	56	127	2
Guideline-adherent	116 (63%)	43 (77%)	71 (56%)	2 (100%)
Non-guideline-adherent	69 (37%)	13 (23%)	56 (44%)	0 (0%)
Total non-adherent cases	69	13	56	-
No de-escalation	50 (72%)	5 (38%)	45 (80%)	-
Incomplete course	19 (28%)	8 (62%)	11 (20%)	-

Table 2. Number of carbapenem prescriptions following PARA requests that were deemed adherent or non-adherent to clinical guidelines using criteria defined in the text. The lower portion of the table presents the number of cases that were deemed non-adherent for different violations of these criteria.

Summary

- 37% of carbapenem prescriptions deviated from clinical guidelines
- 26% of microorganisms identified in patients with PARA approvals were species not typically treated with carbapenems, and 14% of cultures were negative
- Carbapenems were not always discontinued or de-escalated to a narrow-spectrum antibiotic, even when laboratory results indicated a negative culture or an irrelevant organism
- Both the definitive and empiric prescription groups included patients given incomplete courses of carbapenems. Patients' financial concerns were noted as the reason for incomplete therapy in several cases

Recommendations

- Antimicrobial stewardship programs should incorporate checkpoints at the end of empiric and definitive prescription durations
- Adjustment/de-escalation of therapy based on test results should be mandated
- Patients who need ongoing carbapenem therapy at discharge should enter a formal outpatient antibiotic treatment program