Retrospective Study on Personal Protective Equipment During Pandemic Link to Outbreak of Carbpenem-Resistant Enterobacteriaceae

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INTRODUCTION

Antimicrobial Resistance has been a global health problem. According to CDC in 2019, antibiotic -resistant infections had cost the lives of over 35,000 patients.

Public Health Concerns of CRE

- Economic Healthcare cost
- Deadly disease burden, increase length Hospital stay
- strategies of antimicrobial constructs
- Lingering affect on Hospital surfaces & horizontal transmission

Studies have shown that the Rapid emergence of Novel SAR-CoV-2 led to a shortage of personal protective equipment (PPE) and medical supplies resulted in a shift in resources compromising routine infection control practices & subsequent rising horizontal transmission

Goal

Determine the impact of Personal Protective Equipment (PPE) shortage during the COVID-19 Pandemic on New Delhi metallo-beta-lactamase (NDM)

DEFINITIONS

Pre- PPE Shortage
January- June 2020
During PPE Shortage
July – October 2020
Post PPE Shortage
October – Dec 2020

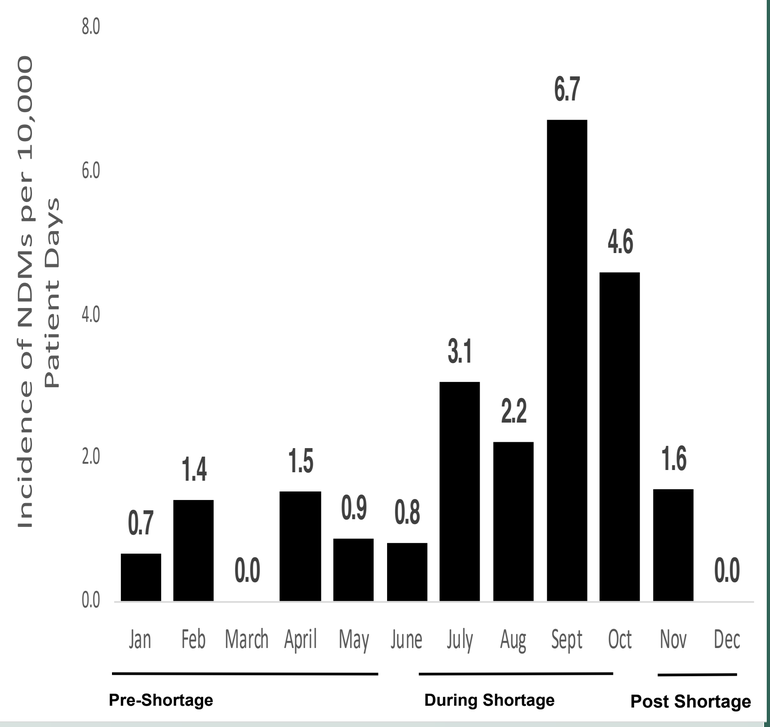
METHODS

- Retrospective Review of ~50 hospitalized CRE Patients Clinical Presentation Base on time periods defined by PPE availability

METHODS

- Isolates confirmed for resistant by NDM via Molecular typing by Michigan State Health Department
- Rates of NDM per 10,000 patient days were compared between time periods by Wilcoxon Signed Rank Sum Test

RESULTS



- Rates during the PPE shortage were significantly higher, averaging 4.4 ± 2.2 cases per 10,000 patient days ($p = 0.02$)

RESULTS

The NPAR1WAY Procedure

Wilcoxon Scores (Rank Sums) for Variable Rate Classified by Variable Period

Period	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
Pre-Shortage	6	26.50	39.0	6.234071	4.416667
During Shortage	4	42.00	26.0	5.877538	10.500000
Post Shortage	2	9.50	13.0	4.646602	4.750000

Average scores were used for ties.

Kruskal-Wallis Test

Chi-Square	DF	Pr > ChiSq
7.4234	2	0.0244

- **Clusters of NDM infections** occurred on the same unit & Patients with same treating teams
- Replenishment and isolated practices were reinstated decrease NDM 0.77 ± 1.1 per 10,000 patient days

CONCLUSIONS

Health Crisis Requires

1.Prompt Plan for Controlling Crisis
2.Prevention of Unintended lapses in patient safety measures

This study just as recent article in E*merging Infectious Disease* summarized, to accommodate health crisis as COVID-19 surge measures of health system policy and protocols can indirect affect hospital control measures. Nevertheless swift recognition at a state and local level can migrate adverse outcomes.

References

1. CDC 2019 Antibiotic Resistance Threat Roports. www.cdc.gov/drugresistnace/biggest-Threats.html
2. Patel. A et al. Rapid Spread & Control of Multidrug-Resistant Gram-Negative Bacteria in COVID 19 Patient Care Units, Emerging Infectious Disease. www.cdc.gov 4, April 2021