



# Clinical spectrum and outcomes of Colistin-Resistant Carbapenem Resistant Enterobacteriaceae (CoR-CRE)

Sara Ahmed<sup>1</sup>, Syed Faisal Mahmood<sup>2</sup>, Fatima Sharif<sup>3</sup>, Mariam Aijaz<sup>4</sup>, Safia Awan<sup>5</sup>, Bushra Jamil<sup>6</sup>

The Aga Khan University Hospital, Karachi, Pakistan

Questions?

Dr Syed Faisal Mahmood  
Associate Professor & Section Head, ID  
faisal.mahmood@aku.edu

Dr Sara Ahmed  
Second Year fellow, ID  
drsaraahmed@hotmail.com

## ABSTRACT

**BACKGROUND:** Colistin is considered as one of the last resort of antibiotics against carbapenem resistant enterobacteriaceae. Due to the increasing prevalence of carbapenem resistant gram-negative bacteria increased use of the polymyxins has led to the emergence of colistin resistant strains. There are no defined antibiotic regimens for colistin resistant strains making treatment of these organisms extremely challenging. We therefore conducted a study assessing the clinical spectrum and outcomes of infections due to colistin-resistant carbapenem resistant Enterobacteriaceae (Co-CRE) as well as the factors associated with acquisition of Co-CRE.

**METHODS:** Retrospective cross sectional study from January, 2013 till December, 2017 on patients admitted to a tertiary care hospital in Karachi, Pakistan and found to have Co-CRE.

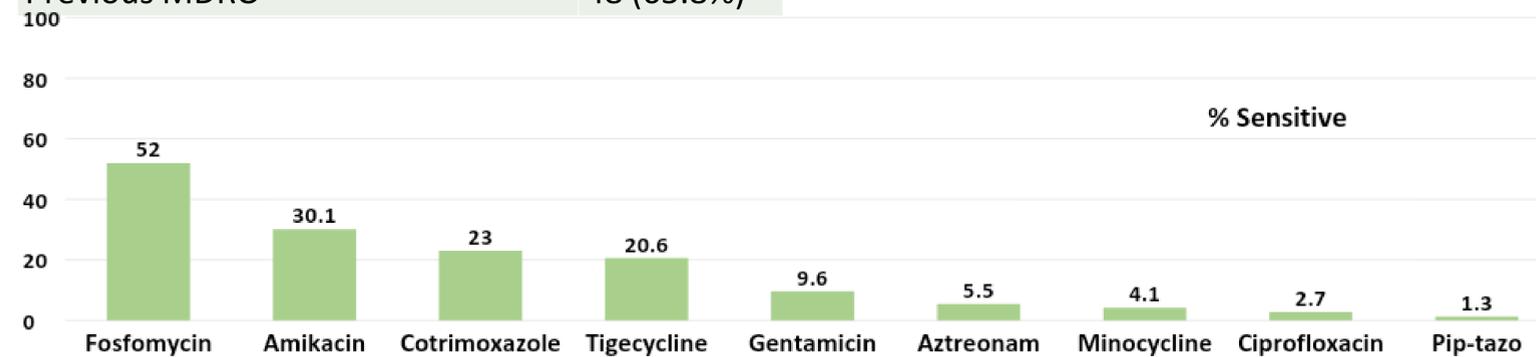
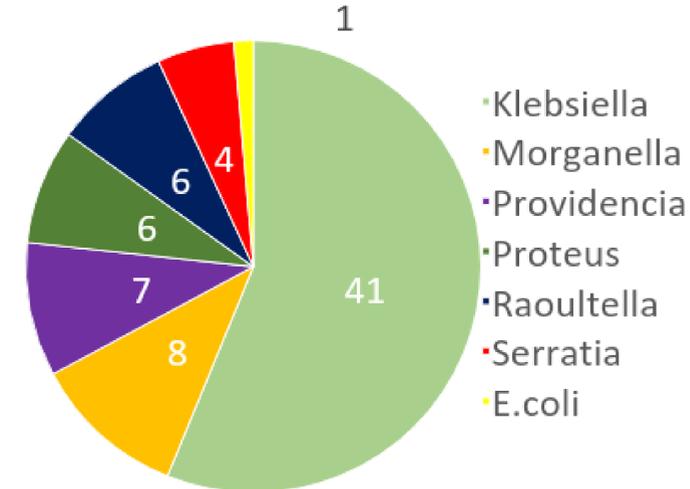
**RESULTS:** Seventy three patients with Co-CRE were identified of which 48 (65.8%) were males. Median age was 46 years. The most common organism isolated was Klebsiella in 41 (56.2%) followed by Morganella in 8 (11%) patients. Most common source of infection was the pulmonary in 22 (30.1%) and urinary in 22 (30.1%) patients. Similarly, the most common cause of bacteremia was pneumonia (45.5% of bacteremia cases). Forty eight (65.8%) patients had prior cultures with multi-drug resistant organisms and 67 (91.8%) had used antibiotics in the past. Fifteen percent (11) patients had pan resistant Co-CRE strains while of the remaining strains 60% were sensitive to fosfomycin. Most patients received meropenem with colistin in combination with 2 or 3 of the following: fosfomycin, amikacin, co-trimoxazole and tigecycline. Complete clinical cure was achieved in only 46.6% of patients whereas microbiological eradication was achieved in 54%. Renal failure, ICU stay and duration of ventilation were associated with mortality in patients with Co-CRE.

**CONCLUSION:** Infections with Co-CRE was seen in patients with prior nosocomial exposures and led to poor outcomes, despite combination treatment guided by susceptibilities.

## INTRODUCTION

- During the last decade, the rates of Carbapenem Resistant Enterobacteriaceae (CRE) have increased globally
- Colistin is considered the drug of choice against CRE leading to extensive use, leading to emergence of Colistin Resistant CRE (CoR-CRE) strains
- There are no defined antibiotic regimens for CoR-CRE which makes the treatment extremely challenging
- Moreover data about clinical parameters and outcome of infections due to CoR-CRE is limited

Median age	46
Diabetes	24 (32.9%)
Surgery done during last month	29 (39.7%)
ICU stay during last month	29 (39.7%)
Previous hospitalization	49 (67.1%)
Antibiotics within last month	67 (91.8%)
Central venous catheter	36 (49%)
Urinary catheter	62 (84.9%)
On ventilator	32 (43.8%)
Previous MDRO	48 (65.8%)



	Alive (n= 37)	Dead (n=15)	Odd ratio (95%CI)
AKI	06 (16.2%)	9 (60.0%)	7.75 (2.0-30.0)
ICU	10 (27.0%)	9 (60.0%)	4.05 (1.1-14.3)
Central line	14 (37.8%)	11 (73.3%)	7.42 (1.9-28.8)
Ventilation	10 (27.0%)	11 (73.3%)	0.92 (0.8-1.1)
Duration of ventilation	10.78 ± 7.71	8.0 ± 5.0	4.05 (1.1-14.3)
Bacteremia	07 (18.9%)	4 (26.7%)	1.55 (0.4-6.4)
Source control (if relevant)	17 (100%)	5 (83.3%)	*
At least one effective antibiotic used	19 (52.8%)	5 (33.3%)	0.44 (0.1-1.6)
Meropenem containing regimen	25 (67.6%)	12 (80.0%)	1.92 (0.5-8.1)
Colistin containing regimen	18 (66.7%)	12 (92.3%)	6.0 (0.7-53.7)

\*OR could not be calculated due to small numbers. P=0.2

## METHODS

- All adult patients admitted to the Aga Khan University Hospital (Karachi, Pakistan), between January 2013 to December 2017 were evaluated
- Data regarding demographics, possible risk factors and outcomes were retrospectively collected

## RESULTS

- A total of 73 patients with CoR-CRE identified
- Of these 58 (79.5%) had an active infection
- Most patients had significant nosocomial exposures
- Pneumonia and UTI accounted for 60.2% of infections
- Death occurred in 15 of the 58 infected (25.9%)
- Mortality was associated with presence of renal failure, ICU stay and duration of ventilation
- 21 different antibiotic combinations were used
- Regimens containing an effective antibiotic regimen were NOT associated with better outcomes
- Only AKI and ventilation were associated with mortality in multivariate analysis

## CONCLUSION

- As with other MDROs CoR-CRE is associated with significant nosocomial exposure
- Mortality is high
- Mortality is not affected by use of effective antibiotics
- More controlled studies are required to assess the ideal therapeutic option.

<sup>1</sup> ID Fellow, Aga Khan University Hospital, Karachi, Pakistan

<sup>2</sup> Associate Professor ID & Section Head, Aga Khan University Hospital, Karachi, Pakistan

<sup>3</sup> Medical Student, Aga Khan University, Karachi, Pakistan

<sup>4</sup> Medical Student, Dow University of Health Sciences, Karachi, Pakistan

<sup>5</sup> MSc statistics, Senior Instructor Research, Aga Khan University Hospital, Karachi, Pakistan

<sup>6</sup> Fellow, ID & Section Head, Aga Khan University Hospital, Karachi, Pakistan