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Letter to Editor

Molecular characterization of Carbapenem resistant Enterobacterales causing blood stream infections in critically ill patients

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The molecular characterization of CRE is required as considerable variation exist in epidemiology of carbapenemases geographically [1]. The continual variation in epidemiology of CRE in India can be witnessed by two global antimicrobial resistance surveillance programmes, one SMART (Study for Monitoring Antimicrobial Resistance Trends) study which reported $bla_{\rm NDM}$ as the predominant carbapenemase gene in 2009 while the ATLAS (Antimicrobial Testing Leadership and Surveillance) analysis which reported $bla_{\rm OXA-48-like}$ being the major contributor of carbapenem resistance in 2018–2019 [2,3]. Realizing the dearth of molecular data in our region and its pivotal role in clinical outcomes, we determined the genotypic characterization of CREs isolated from blood samples in our center.

A total of 22 blood isolates of CRE (17; *Klebsiella pneumoniae* and 5; *Escherichia coli*) identified by VITEK-2 automated system (bioMèrieux, Marcy l'Étoile, France) from septicemic patients admitted in adult ICU of Mahatma Gandhi Medical College & Hospital, Jaipur between March 2022 to June 2022 were included in the study. Molecular testing was performed by conventional multiplex PCR for detection of *bla*_{NDM}, *bla*_{KPC} and *bla*_{OXA-48-like} (arbapenemase genes. The most common carbapenemase gene detected was *bla*_{OXA-48-like} (11/22; 50%) followed by *bla*_{NDM} + OXA-48-like (7/22; 32%) (Table 1).

Our finding corroborates with the ATLAS analysis where $bla_{OXA-48-like}$ were most commonly reported followed by $bla_{NDM + OXA-48-like}$ in CREs [3]. Distinctively, Bhatt et al., found bla_{NDM} as the most common gene followed by bla_{IMP} and bla_{VIM} [4]. Another noteworthy finding of our study was detection of dual carbapenemase production in significant

Table 1

Isolates carrying carbapenemase genes (n = 22).

Isolate (n)	Carbapenemase genes			
	bla _{OXA-48} n (%)	bla _{NDM} n (%)	bla _{NDM + OXA-48-like} n (%)	bla _{KPC} n (%)
K. pneumoniae (17)	10 (59)	2 (12)	4 (23)	1 (6)
E.coli (5)	1 (20)	1 (20)	3 (60)	0
Total (22)	11 (50)	3 (14)	7 (32)	1 (4)

number (32%). Usually, CREs carry single carbapenemase gene conferring resistance to carbapenems and other beta lactam drugs but progressive increase in occurrence of dual or multiple carbapenemase producing organisms is a matter of concern [5]. Our findings thus, emphasize the pressing need for continuous molecular surveillance of CREs for targeted management and to prevent the further spread of CRE.

Author's Contribution

Shilpi Gupta: Literature search, data acquisition, and manuscript writing

Ekadashi Rajni: Concept, design, literature search, data acquisition, manuscript editing, review

Himanshi Galav: Literature search and data acquisition Devarshi Gajjar: Data acquisition, manuscript review

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Declaration of competing interests

The authors have no competing interests to declare that are relevant to the content submitted.

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