Rapid Susceptibility Profiling of *Aeromonas dhakensis* Using A Microscan: A high Prevalence of Carbapenem-Resistance In Clinical Strains

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Introduction

Aeromonas dhakensis, a member of aeromonads which are ubiquitous in aquatic environments, is recognised as a virulent species causing gastroenteritis, severe skin and soft tissue infection and bacteremia in humans [1]. Their pathogenic nature poses public health concerns especially with the rising of antimicrobial resistance (AMR).

Objectives

This study aimed to determine the minimum inhibitory concentration (MIC) of *A. dhakensis* humans isolates [2,3] in comparison to water environments [4,5] and farmed food fish [6] in Malaysia.

Methods

A. dhakensis (n=118)

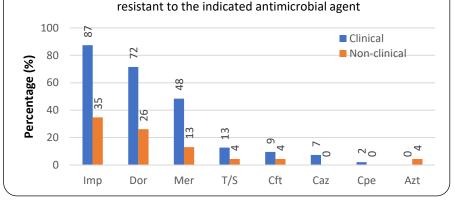| Clinical 45.2% (95/210)	Ornamental fish tank water 15.8% (18/114)	Farmed food fish 10.5% (4/38)	Recreational lake 1% (1/102)

Antimicrobial susceptibility testing for 17 antimicrobial agents using Microscan NM44 plates (Beckman Coulter, CA, USA).

Comparison of susceptibility categorisation based on interpretation using CLSI M45-A3 2018 [7] and EUCAST 2020 [8] where available.

Results & Discussion

- Based on the CLSI 2018, the highest AMR rates were against carbapenems (imipenem, doripenem, meropenem).
- Resistance rates to carbapenems in clinical were at least 2.5-fold higher than that of non-clinical strains (see Figure).
- Clinical empirical carbapenem therapy, should be used with caution before supporting antimicrobial susceptibility testing data are available.

Percentage of clinical and non-clinical *A. dhakensis* isolates resistant to the indicated antimicrobial agent

- Among non-clinical isolates, food fish isolates exhibited higher resistant rate to carbapenems than that of others (ornamental fish tank water and recreational lake): imipenem 100% vs 21%; doripenem 75% vs 16%; meropenem 25% vs 11%).
- Albeit the relatively small number size, the AMR pattern could be the most attributable between humans and aquatic food animals, warrants constant monitoring for aeromonads in aquaculture using larger sample size.

- Application of the EUCAST 2020 increased the number of resistant isolates when compared to CLSI 2015 for ceftazidime (8.5% vs 5.9%), aztreonam (1.7% vs 0.8%) and ciprofloxacin (11% vs 0%).

Susceptibility category	Guideline	Antimicrobial agents					
		No. of isolates (n=118)					
		Cpe	Caz	Azt	Cp	Lvx	T/S
Sensitive	CLSI 2015	114	108	116	114	117	105
	EUCAST 2020	113	107	115	0	0	105
Intermediate	CLSI 2015	2	3	1	0	0	0
	EUCAST 2020	0	0	0	0	0	0
Resistant	CLSI 2015	2	7	1	0	0	13
	EUCAST 2020	2	10	2	13	1	10
Uncategorised	CLSI 2015	0	0	0	4	1	0
	EUCAST 2020	3	1	1	105	117	3

Conclusion

- This study revealed a relatively higher prevalence of carbapenem-resistance in *A. dhakensis* clinical isolates.
- Albeit the lower prevalence of *A. dhakensis* in environmental and aquaculture samples in this study, continued monitoring of AMR *Aeromonas* is necessary for environment and food safety management.
- Harmonisation of MIC breakpoints for *Aeromonas* is needed for guiding therapy and surveillance for laboratories considering switching between CLSI and EUCAST.

References

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