Abstract #183

Impact of Revised Piperacillin/Tazobactam Clinical Breakpoints on Enterobacterales Isolates Identified in Blood Cultures

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INTRODUCTION

- Enterobacterales are a significant cause of bloodstream infections (BSI) in hospitalized patients.
- Prior evidence suggests that treatment with piperacillin/tazobactam may not be ideal for BSI despite an isolate having a susceptible result obtained from *in vitro* antimicrobial susceptibility testing.[1,2]
- Piperacillin/tazobactam clinical breakpoints were recently updated by the Clinical and Laboratory Standards Institute (CLSI).

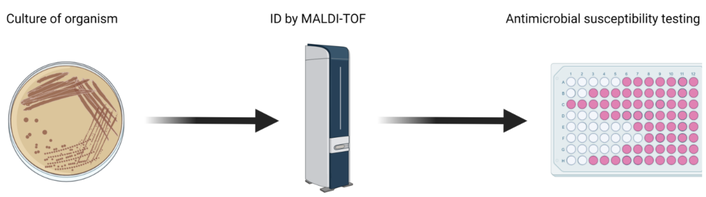
METHODS

Bacterial isolates investigated

- Retrospective evaluation of antibiotic susceptibility of Enterobacterales blood culture isolates.
- Isolates identified between January 1, 2017 through December 31, 2021 at Rush University Medical Center in Chicago, Illinois.

Identification and susceptibility testing methods

- Identification performed by MALDI-TOF (Vitek MS, bioMérieux) using v3.0 IVD cleared database.
- Susceptibility testing performed using NM43 or NM56 panels on the MicroScan WalkAway 96 (Beckman Coulter).
- We compared breakpoint interpretations of minimal inhibitory concentrations (MIC) using pre-2022 and revised 2022 CLSI breakpoints.



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RESULTS

Figure 1. Organism distribution.

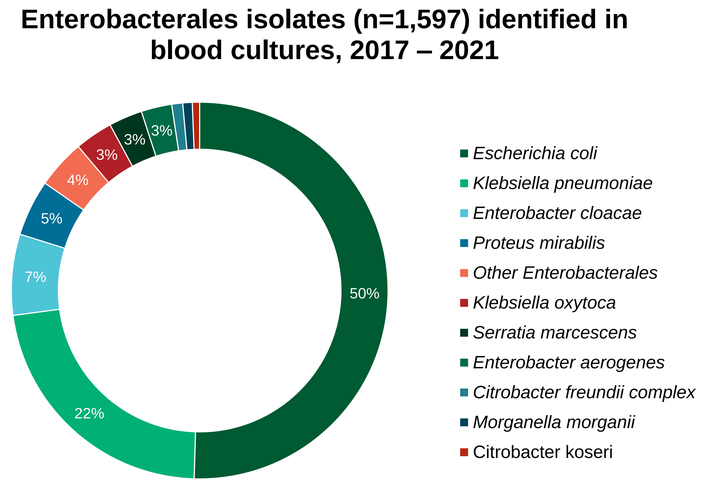


Figure 2. Interpretive changes based on breakpoint classification.

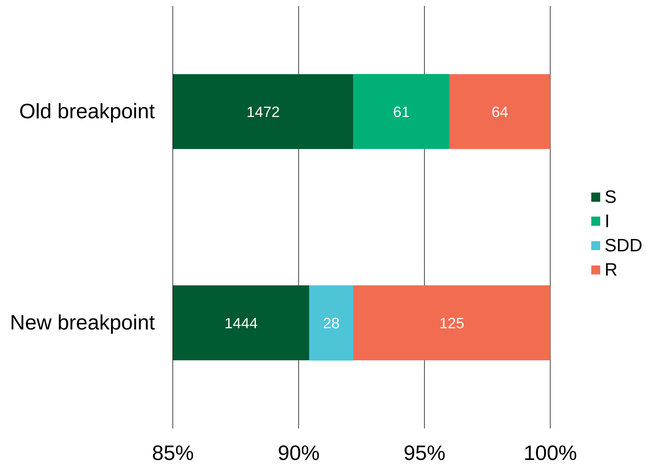
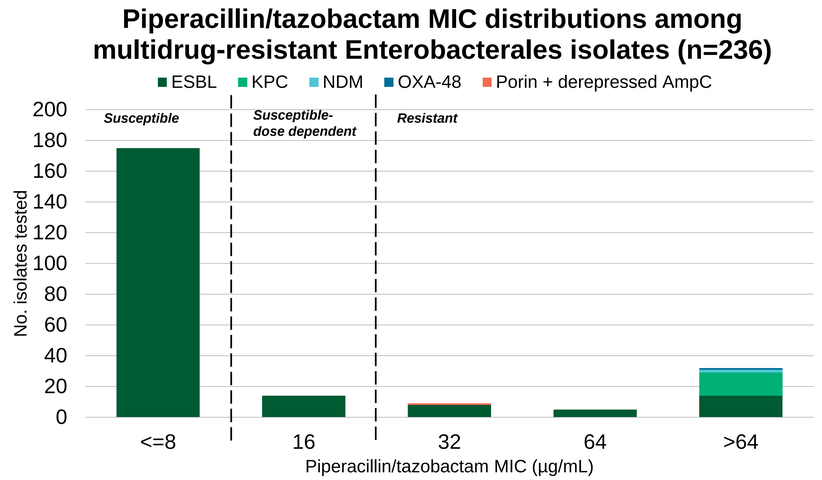


Table 1. Piperacillin/tazobactam interpretive breakpoints.

Agent	CLSI M100-S31 (2021)[3]			CLSI M100-S32 (2022)[4]		
	S	I	R	S	SDD	R
Piperacillin/tazobactam	≤16/4	32/4 – 64/4	≥128/4	≤8/4	16/4	≥32/4

- MIC breakpoint interpretations changed for 89 (5.6%) isolates.
- The number of susceptible Enterobacterales isolates decreased from 92% to 90%, whereas resistant isolates increased from 4% to 7.8% using the revised 2022 CLSI breakpoint for piperacillin/tazobactam. All intermediate isolates were reclassified as resistant with the revised breakpoints (Figure 2).
- ESBL production was common (13.5%), with most isolates testing susceptible to piperacillin/tazobactam (Figure 3). Carbapenemase production was rare (0.9%), but all carbapenemase-producing isolates displayed high-level piperacillin/tazobactam (>64 µg/mL) resistance.

Figure 3. MIC distributions among multidrug-resistant Enterobacterales isolates.



CONCLUSIONS

- While application of revised 2022 CLSI breakpoints resulted in nearly a doubling of categorical resistance to piperacillin/tazobactam among Enterobacterales bloodstream isolates, over 90% of isolates remained susceptible to piperacillin/tazobactam.

REFERENCES

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3. CLSI. 2021. M100-S31. Clinical and Laboratory Standards Institute, Wayne, PA.
4. CLSI. 2022. M100-S32. Clinical and Laboratory Standards Institute, Wayne, PA.

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