Detection of Multi-drug resistant *Acinetobacter baumannii* (MDR-*AB*) in Peri-Rectal Surveillance Cultures of Critically Ill Patients for Infection Control

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Abstract

Background: MDR-AB has emerged as an important cause of nosocomial infections in healthcare facilities globally. MDR-AB is often difficult and time consuming to identify using standard techniques; therefore the choice of detection method may be important for their prevention and spread. The objective of this study was to compare two selective media for active surveillance of MDR-AB.

Methods: Peri-rectal surveillance cultures obtained from a cohort of patients admitted to the medical and surgical intensive care units (ICUs) at the University of Maryland Medical Center between January 1, 2007 and February 15, 2007 were used for this study. Peri-rectal surveillance cultures were collected from patients on ICU admission, weekly, and upon discharge from the unit. Each peri-rectal culture was plated onto CHROMagar ™ *Acinetobacter* (CHROM) (Chromagar; Paris, France) and MacConkey agar with 1 µg/ml of ceftazidime (MAC/CAZ). Plates were incubated at 37°C for 24 and 48 hours. Colonies were identified as *A.baumannii* using API 20E identification strips or the Vitek II (bioMerieux; Durham, NC). Susceptibility testing was performed by the disk diffusion method. MDR-AB was defined as susceptible to two or fewer antibiotics excluding polymixin B and tigecycline.

Results: There were 788 peri-rectal cultures obtained during the study period from 376 unique patients. There were 48 (6%) *A.baumannii* isolates identified. CHROM detected 44 of 48 (92%) *A.baumannii isolates*, 26 (59%) of which were MDR-AB. MAC/CAZ detected 39 of 48 (81%) *A.baumannii isolates*, 21 (54%) of which were MDR-AB. CHROM missed 1 MDR-AB isolate while MAC/CAZ missed 6 MDR-AB isolates.

Conclusion: CHROM was more sensitive than MAC/CAZ for the detection of both *A.baumannii* and M*DR-AB* from peri-rectal surveillance cultures. This may have implications for identifying patients colonized wi*th* MDR-AB for infection control.

Background

- MDR-AB is an important cause of nosocomial infections
- MDR-AB is often difficult and time consuming to identify using standard microbiological techniques
- CHROMagar ™ *Acinetobacter* is a chromogenic media designed for the isolation and differentiation of Acinetobacter species.

Objective

- The objective of this study was to compare two selective media for identification of MDR-AB from peri-rectal active surveillance cultures.

Methods

- Peri-rectal surveillance cultures were obtained from patients admitted to the medical and surgical ICUs at the University of Maryland Medical Center between January 1, 2007 and February 15, 2007
- Cultures were plated onto CHROMagar ™ *Acinetobacter* (CHROM) (Chromagar; Paris, France) and MacConkey agar with 1 µg/ml of ceftazidime (MAC/CAZ)
- Plates were incubated at 37°C for 24 and 48 hours
- Colonies were identified as *A. baumannii* using API 20E identification strips or the Vitek II (bioMerieux; Durham, NC)
- Susceptibility testing was performed by the disk diffusion method
- MDR-*AB* was defined as susceptible to two or fewer antibiotics excluding polymixin B and tigecycline

Results

Table 1. Antibiotic Susceptibilities of MDR-*A. baumannii* Isolates Missed by MacConkey with ceftazidime (MAC/CAZ) or CHROMagar ™ *Acinetobacter (*CHROM*)*

Isolate #	MAC/CAZ only	CHROM only	SXT	SAM	AN30	IMI	GM10	TZP	CAZ	CIP	CRO	FEP	PB	TGC
1		+	R	S	S	R	I	R	R	R	R	R	S	S
2		+	R	S	R	R	S	R	R	R	R	R	S	I
3		+	R	S	R	R	I	R	R	R	R	R	S	I
4		+	R	S	R	R	I	R	R	R	R	R	S	I
5		+	R	S	S	R	R	R	R	R	R	R	S	I
6		+	S	R	R	R	R	R	R	R	R	R	S	I
7	+		R	S	R	R	S	R	R	R	R	R	S	I

SXT –sulfamethoxazole-trimethoprim, SAM – ampillin sulbactam, AN30 AN – amikacin, IMI – imipenem, GM10 – gentimicin, TZP – piperacillin tazobactum, CAZ – ceftazidime, CIP- Ciprofloxacin, CRO-Ceftriaxone, FEP- Cefipime, PB- polymyxin B, TGC – tigecycline, CHROME- CHROMagar™ *Acinetobacter*

Results

- 788 peri-rectal cultures were obtained from 376 unique patients
- A.*baumannii* was identified as large red colonies
- 48 (6%) *A.baumannii* isolates were identified
- CHROM detected 44/48 (92%) *A.baumannii* isolates, 26/48 (59%) were MDR-AB
- MAC/CAZ detected 39/48 (81%) *A.baumannii* isolates, 21/48 (54%) of which were MDR-AB
- CHROM missed 1 MDR-*AB* isolate while MAC/CAZ missed 6 MDR-AB isolates
- Missed isolates from both methods had similar susceptibility profiles

Conclusions

- CHROM was more sensitive than MAC/CAZ for the detection of both *A.baumannii* and MDR-AB from peri-rectal surveillance cultures
- Possible reasons why MAC/CAZ missed more MDR-AB: low colony count on peri-rectal swabs, low sensitivity for MDR-AB
- This may have implications for identifying patients colonized wi*th* MDR-AB for infection control

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