



Detection of *Acinetobacter baumannii* in Surveillance Cultures.

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Abstract

Background: Multi-drug resistant (MDR) *Acinetobacter baumannii* has emerged as a significant pathogen in healthcare facilities globally contributing to increased morbidity and mortality. As a result, institutions have instituted active surveillance to identify carriers and control its spread. The detection of *A. baumannii* from cultures can be difficult due to the abundance of other bacteria found in these specimens. The objective of this study was to determine the best medium to use for active surveillance of MDR *A. baumannii*.

Methods: We utilized a cohort of patient peri-rectal and sputum surveillance specimens sent to the University of Maryland Medical Center Microbiology Laboratory. Each specimen was plated onto CHROMagar™ *Acinetobacter* (Chromagar; Paris, France), 5% sheep blood agar (BD, Sparks, MD), MacConkey, and MacConkey with 6µg/ml of imipenem. Each plate was incubated at 37°C and read at 24 and 48 hours. All oxidase negative colonies were identified using the Vitek II (bioMérieux; Durham, NC). Susceptibilities were performed by disk diffusion and E-tests (bioMérieux; Durham, NC). MDR-*A. baumannii* was defined as susceptible to two or fewer antibiotics not including polymyxin B and tigecycline.

Results: There were 165 specimens (153 peri-rectal swabs and 12 sputums) during a 2 week period. We isolated 17 *Acinetobacter* species (13 MDR *A. baumannii* and one *A. Iwoffii*) using the CHROMagar™ *Acinetobacter* and sheep blood agar plates. MacConkey alone missed 1 MDR and 1 sensitive *A. baumannii*, MacConkey with imipenem missed 3 MDR *A. baumannii* with imipenem MICs above 12µg/ml. Other organisms that grew on the CHROMagar™ *Acinetobacter* included *Pseudomonas aeruginosa*, *Achromobacter xylosoxidans*, and *Stenotrophomonas maltophilia*.

Conclusions: CHROMagar™ *Acinetobacter* is a reliable media for the detection of *Acinetobacter baumannii* in surveillance specimens. This has implications in infection control for tracking patients colonized with *A. baumannii* as well as therapeutic implications.

Background

- MDR-*A. baumannii* has emerged as a significant pathogen in healthcare facilities globally contributing to increased morbidity and mortality.
- A. baumannii* causes a wide range of infections including hospital-acquired pneumonia, urinary tract infections, wound or surgical site infections, and bloodstream infections.
- Although the value of active surveillance for *A. baumannii* is unanswered, many institutions have begun active surveillance in order to control the spread of MDR-*A. baumannii*.
- The detection of *A. baumannii* can be laborious due to the undistinguishable colony morphology and the lack of a rapid diagnostic test.

Objective

Determine the best medium to use for active surveillance of multidrug resistant *A. baumannii*.

Results

Table 1. Susceptibilities of *A. baumannii* Isolated and Growth on Media

Isolate	SAM	TZP	CAZ	FEP	ERT	DOR	IPM	MER	AN	GM	SXT	CIP	PB	TRG	MDR	SBA	MAC	MACI	CA
AB26.1	R	R	R	R	R	NS	R	R	S	S	R	R	S	I	X	X	X	X	X
AB26.2	S	R	R	R	R	NS	R	R	S	S	R	R	S	S	X	X	X	X	X
AB27	S	R	R	R	R	NS	S	R	R	R	R	S	I	X	X	X	X	X	X
AB35	R	R	R	R	R	NS	R	R	R	S	R	S	S	X	X	X	X	X	X
AB40	R	R	R	I	R	NS	R	R	I	R	R	S	I	X	X	X	X	X	X
AB43	R	R	R	I	R	NS	R	R	I	R	R	S	I	X	X	X	X	X	X
AB57	R	R	R	R	R	NS	R	R	R	S	R	S	I	X	X	X	X	X	X
AB58	S	S	S	S	I	S	S	S	S	S	S	S	S	X	X	X	X	X	X
AB92	R	R	R	R	R	NS	R	R	R	R	R	R	S	I	X	X	X	X	X
AB98	S	S	S	S	I	S	S	S	S	S	S	S	S	X	X	X	X	X	X
AB112	S	R	R	I	R	NS	R	R	R	R	R	S	I	X	X	X	X	X	X
AL115	S	S	S	S	S	S	S	S	S	S	S	S	S	X	X	X	X	X	X
AB118	S	S	S	S	I	S	S	S	I	R	R	S	I	X	X	X	X	X	X
AB122	R	R	R	R	R	NS	R	R	R	R	R	S	I	X	X	X	X	X	X
AB123	R	R	I	R	R	NS	R	R	R	R	R	S	S	X	X	X	X	X	X
AB151	I	R	R	I	R	NS	R	R	R	S	R	S	I	X	X	X	X	X	X
AB155	R	R	R	R	R	NS	R	R	R	S	R	S	I	X	X	X	X	X	X
AB164	S	S	S	S	I	S	S	S	S	S	S	S	S	X	X	X	X	X	X

AB - *A. baumannii*, AL - *A. Iwoffii*, SAM - aminoglycoside sulbactam, TZP - piperacillin-tazobactam, CAZ - ceftazidime, FEP - Cefepime, ERT - eropenem, DOR - Doripenem, IPM - imipenem, MER - meropenem, AN - amikacin, GM - gentamicin, SXT - sulfamethoxazole-trimethoprim, CIP, Ciprofloxacin, PB, polymyxin B, TRG - tigecycline, MDR - multidrug resistant, SBA - sheep blood agar, MAC - MacConkey agar, MACI - MacConkey agar with 6µg/ml of imipenem, CA - CHROMagar™ *Acinetobacter*.

Results on CHROMagar™ *Acinetobacter*

- Both multi-drug resistant and sensitive *A. baumannii* grew which appear as red colonies.
- 6 specimens grew oxidase positive pink colonies identified as *Pseudomonas* spp.
- 2 specimens grew small pinpoint pink colonies that were oxidase negative and identified as *Stenotrophomonas maltophilia*.
- 2 specimens grew small pinpoint dark pink colonies that were oxidase negative and identified as *Achromobacter xylosoxidans*.



A. baumannii



S. maltophilia

Methods

- Specimens included all patient peri-rectal and sputum surveillance specimens sent to the University of Maryland Medical Center microbiology laboratory for the detection of *A. baumannii* between December 7, 2009 and December 21, 2009.
- Specimens were randomly plated onto CHROMagar™ *Acinetobacter* (Chromagar; Paris, France), 5% sheep blood agar (BD, Sparks, MD), MacConkey, and MacConkey with 6µg/ml of imipenem. Each plate was incubated at 37°C and read at 24 and 48 hours.
- All oxidase negative colonies were identified using the Vitek II (bioMérieux; Durham, NC).
- Susceptibilities were performed by disk diffusion and E-tests (bioMérieux; Durham, NC). MDR-*A. baumannii* was defined as susceptible to two or fewer antibiotics not including polymyxin B and tigecycline.

Results

- There were 165 specimens, 153 peri-rectal swabs and 12 sputums, that were plated to all four agar plates.
- CHROMagar™ *Acinetobacter* recovered all 17 *Acinetobacter* species identified in this study.
- There were 13 MDR-*A. baumannii* recovered during the study. 10 of them grew on all 4 agar plates.
- Two sensitive *A. baumannii* grew on all four plates even though the imipenem MICs were 0.38 and 0.25µg/ml.

Conclusions

- CHROMagar™ *Acinetobacter* is a reliable media for the detection of *Acinetobacter baumannii* in surveillance specimens. Bacteria other than *Acinetobacter* can be distinguished by the pinpoint colony size, pink color, or oxidase reaction.
- The use of a reliable selective media for *A. baumannii* has implications in an infection control program that includes active surveillance, isolation, and treatment of colonized patients.

Acknowledgements

- CHROMagar (Paris, France) supplied powdered media for the study.
- JKJ is supported by NIH grant 1K12RR023250-03