

Evaluation of the Vitek 2 AST-N055 Card for the Susceptibility Testing of *Acinetobacter baumannii* Isolates to Amikacin

Dong-Jin Park¹, Wonkeun Song¹, Taek-Kyung Kim², Jae-Seok Kim¹, Han-Sung Kim¹, Kyu Man Lee¹

Department of Laboratory Medicine, ¹Hallym University College of Medicine, ²Kangnam Sacred Heart Hospital, Seoul, Korea

We collected 76 clinical isolates of *Acinetobacter baumannii* (amikacin MIC by Vitek 2 AST-N055 card: $\leq 2 \mu\text{g/mL}$, 11 isolates; $4 \mu\text{g/mL}$, 19 isolates; $8 \mu\text{g/mL}$, 17 isolates; $16 \mu\text{g/mL}$, 27 isolates; and $\geq 64 \mu\text{g/mL}$, 2 isolates) from a university hospital and evaluated the Vitek 2 AST-N055 card vs the broth microdilution as a reference method for testing susceptibility to amikacin. Vitek 2 AST-N055 card yielded very major errors in 15 isolates (19.7%) and minor errors in 26 isolates (34.2%). Of the 15 isolates shown very major errors, 14 had Vitek 2 MICs ranging from

8 to $16 \mu\text{g/mL}$. The results of our study suggest strongly that it is unreliable to test the amikacin susceptibility by Vitek 2 AST-N055 card of *A. baumannii* with the Vitek 2 MICs ranging from 8 to $16 \mu\text{g/mL}$. In those cases, another susceptibility test, such as broth microdilution (BMD), should be performed to confirm the results. (Korean J Clin Microbiol 2009;12: 144-145)

Key Words: Amikacin, *Acinetobacter baumannii*, Vitek 2

Acinetobacter baumannii is an important pathogen that causes various hospital-acquired infections[1]. Multidrug-resistance in *A. baumannii* has been increasing rapidly worldwide[2-4].

The clinical microbiology laboratory of our hospital uses Vitek 2 system for the routine antimicrobial susceptibility testing of *A. baumannii* isolates. According to the manufacturer's guideline of Vitek 2 AST-N055 card, amikacin susceptibility to *A. baumannii* may be performed as an alternative method prior to reporting the results. Thus, we evaluated the AST-N055 card of the Vitek 2 system for amikacin susceptibility testing of *A. baumannii* isolates.

From August 2007 to December 2008, we collected 76 non-duplicate clinical isolates of *A. baumannii* (amikacin MIC by Vitek 2 AST-N055 card: $\leq 2 \mu\text{g/mL}$, 11 isolates; $4 \mu\text{g/mL}$, 19 isolates; $8 \mu\text{g/mL}$, 17 isolates; $16 \mu\text{g/mL}$, 27 isolates; and $\geq 64 \mu\text{g/mL}$, 2 isolates) from a hospital. The turbidity of bacterial suspension was adjusted to a 0.6 McFarland standard. The amikacin susceptibility testing of the 76 *A. baumannii* strains was performed with broth microdilution (BMD) method. The reference MIC was determined by the BMD with cation-adjusted Mueller-Hinton broth according to the Clinical and Laboratory Standards Institute (CLSI) guidelines[5]. *Pseudomonas aeruginosa* ATCC 27853 and *Escherichia coli* ATCC 25922 were used as the quality control strains.

Using the BMD as the reference method, Vitek 2 AST-N055 cards showed very major errors in 15 isolates (19.7%) and minor errors in 26 isolates (34.2%). Of the 15 isolates shown very major errors, 14 isolates had the Vitek 2 MICs ranging from 8 to $16 \mu\text{g/mL}$. Of the 44 isolates with Vitek 2 MICs of $8 \sim 16 \mu\text{g/mL}$, 33 isolates (75%) were intermediate (19 isolates) or resistant (14 isolates) (Table 1). The two previous studies that compared between amikacin Vitek 2 system and BMD for 31 and 20 *A. baumannii*

Table 1. Comparison of broth microdilution method and Vitek 2 AST-N055 card for amikacin susceptibility testing of 76 *A. baumannii* isolates

Category (MIC, $\mu\text{g/mL}$)		No. of isolates
Broth microdilution	Vitek 2	
R (≥ 512)	S (16)	1
R (128)	R (≥ 64)	2
R (128)	S (16)	1
R (64)	S (16)	7
R (64)	S (8)	5
R (64)	S (4)	1
I (32)	S (16)	12
I (32)	S (8)	7
I (32)	S (4)	7
S (16)	S (16)	6
S (16)	S (8)	3
S (16)	S (4)	10
S (8)	S (8)	2
S (8)	S (4)	1
S (8)	S (≤ 2)	5
S (4)	S (≤ 2)	6

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Correspondence: Wonkeun Song, Department of Laboratory Medicine, Hallym University College of Medicine, 948-1, Daerim 1-dong, Youngdeungpo-gu, Seoul 150-950, Korea. (Tel) 82-2-829-5259, (Fax) 82-2-847-2403, (E-mail) swonkeun@hallym.or.kr

isolates, respectively, showed a satisfactory agreement[6,7]. However, our investigation differed from those of the other researchers in that we used a well-selected collection of challenge strains with known amikacin MIC by Vitek 2 AST-N055 cards instead of using a collection of consecutive isolates from routine clinical specimens. Forty-four of the 76 *A. baumannii* isolates showed the Vitek 2 MIC ranging from 8 to 16 $\mu\text{g/mL}$. In our hospital, most of the amikacin-susceptible *A. baumannii* isolates showed MICs of 2 to 4 $\mu\text{g/mL}$, but the isolates with the MICs of 8 to 16 $\mu\text{g/mL}$ were rare (data not shown).

To evaluate inoculum size as a determinant in the difference of the MIC results obtained with the Vitek 2 system, 48 of the 76 *A. baumannii* isolates were also tested by using a 1.5 McFarland standard inoculum for Vitek 2 system. The categorical results of the amikacin susceptibility were the same as a 0.6 McFarland standard inoculum was used (data not shown).

In conclusions, the results of our study are strongly suggestive of the Vitek 2 AST-N055 card being unreliable in the amikacin susceptibility testing of *A. baumannii* with Vitek 2 MICs ranging from 8 to 16 $\mu\text{g/mL}$. So, in those cases, we recommend an additional susceptibility test such as BMD should be performed to confirm the results.

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=국문초록=

Vitek 2 AST-N055 카드를 이용한 *Acinetobacter baumannii*의 Amikacin에 대한 감수성시험의 평가

¹한림대학교 의과대학 진단검사의학교실, ²강남성심병원 진단검사의학과

박동진¹, 송원근¹, 김택경², 김재석¹, 김한성¹, 이규만¹

76주의 *Acinetobacter baumannii* (Vitek 2 AST-N055 카드의 amikacin MIC: $\leq 2 \mu\text{g/mL}$, 11 isolates; $4 \mu\text{g/mL}$, 19 isolates; $8 \mu\text{g/mL}$, 17 isolates; $16 \mu\text{g/mL}$, 27 isolates; $\geq 64 \mu\text{g/mL}$, 2 isolates)를 대상으로 액체배지 미량희석법을 표준방법으로 하여 Vitek 2 AST-N055 카드의 amikacin 감수성시험의 정확성을 평가하고자 하였다. Vitek 2 AST-N055 카드는 19.7% (15주)가 very major error이었고 34.2% (26주)가 minor error이었다. Very major error를 보인 15주의 *A. baumannii* 중 14주의 Vitek 2 MIC는 $8 \sim 16 \mu\text{g/mL}$ 이었다. 결과적으로 Vitek 2 AST-N055 카드의 *A. baumannii*에 대한 amikacin MIC가 $8 \sim 16 \mu\text{g/mL}$ 를 보이는 결과는 부정확하여 미량액체배지희석법과 같은 확인검사가 필요하다. [대한임상미생물학회지 2009;12:144-145]

교신저자 : 송원근, 150-950, 서울시 영등포구 대림 1동 948-1
한림대학교 의과대학 진단검사의학교실
Tel: 02-829-5259, Fax: 02-847-2403
E-mail: swonkeun@hallym.or.kr