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Comparative in vitro activity of sitafloxacin against clinical isolates of multidrug-resistant Acinetobacter baumannii in Thailand

Taniya Paiboonvong*[1], Preecha Montakantikul[2], Jantana Houngsaitong[2], Mullika Chomnawang[3], Chalermsri Pummangura[1]

[1]*Faculty of Pharmacy, Siam University*

[2]*Faculty of Pharmacy, Mahidol University; Pharmacy*

[3]*Faculty of Pharmacy, Mahidol University; Microbiology*

Background: The rapid emergence of multidrug-resistant *Acinetobacter baumannii* (MDR *A. baumannii*) remains a significant clinical problem, associated with high mortality rates. *A. baumannii* become resistant to numerous different classes of antimicrobial agents, especially carbapenems, resulting in a potential of treatment failure. An effective treatment for MDR *A. baumannii* is challenging due to limited therapeutic options. Sitafloxacin, a new fluoroquinolone, has a good activity against many drug resistant pathogens, including *A. baumannii*. Nevertheless, data testing the activity of sitafloxacin against MDR *A. baumannii* are still limited. Therefore, the aim of this study was to investigate the efficacy of sitafloxacin and compare that with other antimicrobial agents against MDR *A. baumannii* strains isolated from Thai patients.

Material/methods: A total of 117 MDR *A. baumannii* strains were isolated from clinical specimens during July to September 2016 at three tertiary care hospitals in Thailand. The most of isolates were from sputum samples (82%). MDR *A. baumannii* was defined as an isolate resistant to at least three antimicrobial classes determined using the disc diffusion method. All isolates were resistant to carbapenems, and also resistant to ciprofloxacin (94.0%), ceftazidime (96.6%), and amikacin (82.9%). Broth microdilution assay was used to determine minimum inhibitory concentration (MIC) for sitafloxacin and comparators; ciprofloxacin, ceftazidime, imipenem, meropenem, sulbactam, and

colistin in accordance with the Clinical and Laboratory Standards Institute (CLSI) guideline 2016. An isolate with MIC ≤ 2 µg/ml was provisionally considered as susceptible to sitafloxacin.

Results: The MICs of antimicrobial agents evaluated in this study were presented in Table 1. The MICs of sitafloxacin ranged from ≤ 0.5 to 16 µg/ml, and the MIC values which inhibit 50% (MIC_{50}) and 90% (MIC_{90}) of all isolates were 2 µg/ml and 4 µg/ml, respectively. The MICs frequency distribution of sitafloxacin was showed in Figure 1. Overall, colistin had the best activity among the comparators. However, sitafloxacin exhibited the promising activity (susceptibility rate, 55.56%) which was higher than that found in carbapenems.

Conclusions: This finding indicates that sitafloxacin is more active than ciprofloxacin, ceftazidime, imipenem, meropenem, and sulbactam against clinical isolates MDR *A. baumannii*. Interestingly, sitafloxacin may be considered as a promising alternative choice for treatment MDR *A. baumannii* infections.

Table 1: Antimicrobial susceptibility results of MDR *A. baumannii* isolates (N=117).

Antimicrobial agents	MIC ranges (µg/ml)	MIC_{50} (µg/ml)	MIC_{90} (µg/ml)	Rate of susceptibility (%)
Sitafloxacin	≤ 0.5 - 16	2	4	55.56
Ciprofloxacin	≤ 4 - > 256	256	> 256	1.71
Colistin	0.125 - 4	1	2	95.73
Sulbactam	1 - 512	32	128	11.11
Imipenem	0.25 - 512	64	128	1.71
Meropenem	0.25 - 512	32	64	1.71
Ceftazidime	16 - > 512	> 512	> 512	0

Figure 1: The MICs distribution of sitafloxacin against MDR *A. baumannii* isolates (N=117).