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Association of overexpression of *abeM* efflux pump gene with antibiotic resistance in *Acinetobacter baumannii* strains clinically isolated from a tertiary hospital

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Background: *A. baumannii* is the most frequently implicated in nosocomial infections, in particular in intensive care units. The increasing appearance of extensively drug-resistant (XDR) *A. baumannii* has become a serious problem worldwide. Recently, isolates of XDR *A. baumannii* have accounted for more than 30% of clinical isolates in some Korean hospitals. In this study, we investigated the prevalence of extended spectrum β -lactamases (ESBLs) genes and relative expression levels of efflux pump genes in XDR *A. baumannii* clinically isolated from a Korean tertiary hospital.

Material/methods: A total of 40 non-duplicate *A. baumannii* (20 XDR and 20 wild type) were isolated from a university hospital in Korea. We extracted the DNA and RNA from all isolates, and performed PCR for the detection of ESBLs genes, including *bla*_{KPC}, *bla*_{IMP}, *bla*_{VIM}, *bla*_{SPM}, *bla*_{GIM}, *bla*_{SIM}, *bla*_{OXA-23}, *bla*_{OXA-24}, *bla*_{OXA-51}, *bla*_{OXA-58}. Expression levels of seven efflux pump genes, *adeB*, *adeJ*, *adeE*, *adeG*, *abeM*, *craA*, *amvA* were measured by real-time reverse-transcription PCR.

Results: Class D β -lactamase genes, *bla*_{OXA-23} and *bla*_{OXA-51} were presented in all 20 XDR isolates, and *bla*_{OXA-51} was presented in 7 (35%) wild type isolates. Other ESBL genes were completely absent in all isolates. Relative expression levels of *adeB*, *adeJ*, *adeG*, *abeM* genes in XDR isolates were more 10-fold than those in wild type isolates. Especially, we found a significant association between the increased expression of *abeM* and XDR isolates (Odds ratio=7.25, P<0.001). Also, *adeB* gene showed close relation to XDR isolates with Odds ratio 2.73 (P<0.001).

Conclusions: We demonstrated that clinically isolated XDR *A. baumannii* carry *bla*_{OXA-23} and *bla*_{OXA-51} genes and overexpress efflux pump AdeABC, AdeIJK, AdeFGH, AbeM, and CraA. We also found *bla*_{OXA-23} gene was detected exclusively in XDR isolates and *abeM* gene showed largest relative expression level. In conclusion, OXA-23 carbapenemase and AbeM efflux pump may significantly associated with XDR *A. baumannii*.