Editorial
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# The Importance of the Early and Appropriate Treatment of Anaerobic Bacteremia Patients

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In the last decades, antibiotic resistance among anaerobes has increased and resistance patterns vary depending on hospitals and regions [1]. The Clinical and Laboratory Standards Institute recommends susceptibility tests for anaerobic organisms isolated from cases of serious infections such as bacteremia, brain abscesses, and endocarditis [2]. However, currently in Korea, even susceptibility tests for anaerobic organisms isolated from blood are not routinely performed in most laboratories because the clinical significance of inappropriate antimicrobial treatment for anaerobic bacteremia (AB) has not been adequately elucidated and convenient routine test methods for anaerobes are limited.

Kim et al. investigated the impact of inappropriate therapy on the mortality of AB [3]. They defined inappropriate therapy as a delay in starting antimicrobials even after objective data confirmed an infection or the use of an antimicrobial agent to which the pathogen was known to be resistant according to susceptibility test results [3]. They reported that the incidence of AB in 2012 was low (2.3%), but the mortality rate among AB patients was as high as 21.4% and it was significantly higher in patients who received inappropriate therapy (hazard ratio, 5.4; 95% confidence interval, 1.7–16.9; $P$ = 0.004) [3]. There have been studies on risk factors associated with mortality due to AB, but recent reports on the impact of inappropriate therapy on the mortality of AB patients, based on bacterial susceptibilities are limited. One recent report indicated that malignancy and susceptibility to clindamycin could be used to identify AB patients at a higher risk of 30-day mortality [4]. There is an old prospective study about the adverse clinical outcomes associated with the treatment of *Bacteroides* bacteremia with an antibiotic that the organism is not susceptible to, using three endpoints (30-day mortality, cure versus failure, and eradication versus persistence) [5].

In the study by Kim et al, the most frequently isolated organisms were *Bacteroides* spp. (50/70) [3], which are well known for their high virulence and unpredictable resistance. Recently a study that monitored antimicrobial susceptibility of anaerobic bacteria in Korea reported that the resistance rates of *B. fragilis* to piperacillin (48%), cefotetan (20%), clindamycin (52%), moxifloxacin (12%), and tigecycline (17%) were considerable, whereas cefoxitin, piperacillin-tazobactam, imipenem, and meropenem, which are generally recommended in suspect of systemic infections, were highly suceptible to *B. fragilis* [6]. Until now, laboratory resources and efforts have

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been focused on the early detection and correct identification of the causative agents of AB, but considering its impact on mortality, at least routine antimicrobial susceptibility testing of anaerobic organisms isolated from blood is necessary for the appropriate treatment of AB [3].

The agar dilution technique which uses supplemented Brucella agar and the broth microdilution which uses supplemented Brucella broth for *Bacteroides* and *Parabacteroides* spp. are approved susceptibility testing methods for anaerobes that can be used for the periodic monitoring of regional and institutional resistance trends and for guiding empirical antimicrobial therapy of anaerobic infections [7]. For routine tests, E-tests or microdilution (in house method) can be used, but the commercial kits such as Sensititre Anaerobe MIC Plate (Trek Diagnostics, Cleveland, OH, USA) are unavailable at the present time [8].

In conclusion, early and appropriate management is important for survival of AB patients. In addition to early detection and correct identification of causative agents, efficient susceptibility testing methods for anaerobes should be introduced and developed for better clinical outcomes.

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