EDITORIAL
DOI: 10.3904/kjim.2009.24.1.11

Clinical Significance of Anaerobic Infections

Dong-Gun Lee

Division of Infectious Diseases, Department of Internal Medicine, College of Medicine, The Catholic University of Korea, Seoul, Korea

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Anaerobic infections usually occur when an anatomical barrier becomes disrupted and constituents of the local flora enter a site that was previously sterile. Any site in the body is susceptible to infection with these indigenous organisms when a mucosal barrier or the skin is compromised by surgery, trauma, tumor, ischemia, or necrosis, all of which can reduce local tissue redox potentials [1]. Despite the relatively low incidence of anaerobic infection and decreased percentage among positive blood cultures, it remains associated with significant mortality [2].

There have been only a few studies in Korea about anaerobic pathogens, and these have had either a short study duration and limited information or number of cases [3,4]. Recently Park et al. reported the clinical features of anaerobic infections and defined the factors independently associated with mortality during 7 yr in a single university affiliated hospital [5]. Although these data had several limitations, they provided some very important information, such as clinical manifestations, frequent pathogens, mortality, and associated prognostic factors of anaerobic infections with the relatively large sample size examined.

They reported that the most common anaerobes by rank were *Bacteroides fragilis*, *Clostridium* spp., *Prevotella* spp., and *Peptostreptococcus* spp. However, when the anaerobes were combined according to genus, *Peptostreptococcus* spp. were the second most common organisms. It was also stated that there were no anaerobes isolated from the central nervous system and/or bone and joint infections. For example, central nervous system infections associated with anaerobic bacteria are brain abscess, epidural abscess, and subdural empyema. If optimal bacteriologic techniques are employed, it is reported that as many as 85% of brain abscesses yield anaerobic bacteria, which usually originate from an otolaryngeal infection [1].

Successful therapy for anaerobic infections requires the administration of a combination of appropriate antibiotics, surgical resection, debridement of devitalized tissues, and drainage either by surgery or percutaneously [6]. In this article, there was no correlation between surgical approach and mortality. A surgical procedure may be an adjunct to a medical treatment. In addition, drainage of pleuropulmonary abscesses, except empyema, is usually contraindicated because the abscesses may spread to other lung tissues during the procedure [6]. There are many confounding factors for analyzing the prognosis in these cases and that is why a prospective study is needed.

The outcome of anaerobic bacteremia is known to be significantly better in patients either initially given or switched to appropriate therapy based on known antibiotic susceptibilities [7]. When we try to define the appropriateness of antibiotic prescription for anaerobic infections, there are several factors to be considered. 1) Growing resistance pattern, for example, increasing resistance to metronidazole among gram-positive anaerobes and clindamycin resistance among isolates of the *B. fragilis* group [7]. There have been anecdotal reports that cefoxitin and cefotetan were discouraged as first line therapy for intra-abdominal infections [8]. Antibiotic resistance among anaerobes continues to rise, which is not surprising given the parallel observations among aerobes over the last several decades. 2) Switching initial empirical therapy to susceptible antibiotics after culture reports [7]. 3) Including antibiotics active against other gram-negative or positive facultative aerobes for treating mixed infections, especially in case of intra-abdominal sepsis [2,6]. In this

Correspondence to Dong-Gun Lee, MD
Division of Infectious Diseases, Department of Internal Medicine, College of Medicine, The Catholic University of Korea
St. Mary's Hospital, 62 Yeouido-dong, Yeongdeungpo-gu, Seoul 150-713, Korea
Tel: 82-2-3779-1099, Fax: 82-2-780-3132, E-mail: symonlee@catholic.ac.kr

article, although they defined the appropriate/inappropriate coverage of antibiotics, further detailed definition in the future would be needed. We should also focus on the new antibiotics (tigecycline and newer fluoroquinolones) that are known to be active against mixed aerobic-anaerobic infections [7]. Antimicrobial susceptibility testing of anaerobes is still rarely performed at most hospitals. Current and future adoption of the standardized method will allow better comparisons among studies, as well as susceptibility results that physicians could rely on with the same practice as for aerobes testing results [7].

Park et al. found that age and liver disease were strong, independent risk factors for mortality in a multivariate analysis, and the data demonstrated a 29.7% crude mortality for clinically significant anaerobic infections. Previous studies reported similar rates (25-44%) and risk factors [2]. Differences in clinical significance according to specific anaerobic pathogens will be elucidated in the future.

In conclusion, Park et al. demonstrated that the majority of patients infected with anaerobes had a polymicrobial infection and that mortality of anaerobic infections still remained high in the era of effective antibacterial therapy. They have also demonstrated the association between liver disease, old age and mortality. Further well designed prospective studies are warranted to confirm these associations and to determine the relationship between clinical failure and different species and/or resistant anaerobic pathogens. **(Korean J Intern Med 2009;24:11-12)**

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