

Editorial

Multiplex PCR in Respiratory Tract Infection diagnosis

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Lower respiratory tract infection (LRTI) is one of the important causes of morbidity and mortality in the world. According to the WHO, LRTI is the number one cause of infection-related deaths and is the third leading cause of all deaths¹. Nevertheless, conventional diagnostic methods are often insufficient for etiological diagnosis, and in half of these cases the causative pathogen cannot be determined². A wide range of pathogens are involved in ARI, including bacteria and viruses. The most common bacterial agents associated with LRTI are *S. pneumoniae*, *H. influenzae*, *M. catarrhalis*, and *S. aureus* and *E. coli*. Except *S. aureus* and *E. coli* other bacterial agents of LRTI are difficult to culture in the most of the laboratories in our country. Influenza A viruses, Influenza B viruses, Respiratory syncytial virus, Metapneumovirus, Parainfluenza viruses, Rhinoviruses, Coronaviruses, Adenoviruses, Bocaviruses are the common viruses that are responsible for LRTIs³. These viruses are difficult to culture and their sero diagnosis is also difficult.

Precise and rapid identification of the causative agents of Acute Respiratory Tract Infection is a serious need for many reasons. The main advantages of this strategy are (i) a better use of antimicrobials including antiviral drugs and antibiotics and thus limiting the development of bacterial resistance, (ii) the reduction of unnecessary paraclinical explorations and of the duration of hospitalization, (iii) the rapid implementation of isolation measures when necessary, thus limiting the risk of nosocomial transmission, (iv) the collection in real time of new epidemiological data on the seasonal spread of pathogens, and (v) the identification of simultaneous or successive infections that may justify specific intervention or explain the severity of the clinical picture.

Early identification of causative agents in LRTI, can reduce morbidity and prevent an overuse of antimicrobials. Conventional methods, such as culture and serology are not always adequate to detect lower respiratory tract pathogens. Therefore, new diagnosis methods are needed.

The use of multiplex polymerase chain reaction (PCR), which is reported to be a reliable molecular method for diagnosing lower respiratory tract infections, has been used increasingly in recent years. The prominent advantage of PCR method compared to culture is that, since PCR is based on replicating the DNA or RNA of very small amount of microorganisms, it does not require living organisms and therefore is not affected by the prior use of antibiotics. In addition, PCR is more sensitive for detection of multiple microorganisms and delivers fast results⁴.

Their performances are globally satisfactory, at least for those that are still commercially-available in 2013. Currently many commercial Multiplex diagnostic kits are available in global market with a wide range of common bacterial and viral panel. They vary in their characteristics, number of pathogen detection, degree of multiplexity, number of targets, time required for result, carryover contamination risk, quantification and throughput. Manufacturers are many namely RespPlex, Infinity, Jauar, FilmArray, STAR, PLEX-ID etc⁵. The overall sensitivity of multiplex PCR for the diagnosis of ALRIs ranged from 56.25% to 91.67%⁵.

The potentially important rate of excretors of viral nucleic acids of specific pathogens that are not directly associated with the acute illness presents a problem in this setting. Adenovirus DNA is often found in the respiratory secretions of asymptomatic children. Generally, multiplex-PCR should be used whenever consequences for the treatment will result-for example, stopping a course of antibiotic treatment. So far, there are no algorithms for such an approach that have been validated in practice⁶.

Multiplex PCR method is highly reliable and is superior in the detection of multiple pathogens and also provides rapid identification of bacteria and the etiological agents of infection. Therefore widespread use of PCR methods may contribute to the success of LRTI treatments.

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