PREVALENCE OF SOME PATHOGENS DETECTED BY MULTIPLEX REAL-TIME PCR IN HOSPITALISED CHILDREN WITH ACUTE RESPIRATORY INFECTIONS IN BAC GIANG PROVINCIAL GENERAL HOSPITAL

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ABSTRACT

Objective: Investigate the infection rate of some microorganisms using multiplex real-time PCR techniques in inpatient children with acute respiratory infection (ARI) in Bac Giang Provincial General Hospital.

Subjects and methods: A retrospective cross-sectional descriptive study. There were 450 cases ARI children treated at the Pediatrics Department in Bac Giang Provincial General Hospital though medical records with multiplex real-time PCR results of nasopharyngeal swab testing using both RP1 and RP4 kits were included in the study.

Results: Among 450 ARI children, the age group of under 60 months old accounted for the largest rate (81.6%). Influenza virus and RSV caused infection for infant and all ages group, focus on 2-60 months old group. The rate of pathogens detection using RP1 kit was 23.8% and the influenza infection rate was 13.6%, RSV was 10.2%. The rate of bacteria detected by RP4 kit was 40.0%. *S. pneumonia, H. influenza* infection were found across all age group, focus on children under 5 years old. The rate of *S. pneumoniae* infection was 24.4% and *H. influenzae* infection was 25.3%. *M. pneumoniae* infection was 2.4%, and such atypical pathogens mainly caused disease in the over 2 years old group. Some pathogens have low infection rate: *B. pertusis* (0.2%), *L. pneumophila* (0.2%), *C. pneumoniae* (0.2%).. Combining RP1 and RP4 kits could enhance the detected rate of the ARI pathogens to 53.8%. 10.0% of co-infections were detected. Influenza infection rate was highest in spring (10.5%), decreased in summer and autumn, and gradually increased in winter (5.6%). RSV infection rate was highest winter (5.6%). *S. pneumoniae* and *H. influenzae* infections were distributed equally over the year but the peaks were found in November 2020 (7.1% - 6.0% respectively) and January 2021 (5.8% - 6.9% respectively). The highest rate of *M. pneumoniae* infection was in April 2021 (1.8%).

Conclusions: Kit RP1 could detect 23.8% respiratory pathogens , of which 13.6% were influenza; 10.2% RSV. There were 40.0% positive for at least one pathogen in the RP4 kit, including 24.4% *S. pneumoniae*, 25.3% *H. influenzae*, 2.4% *M. pneumoniae*, 0.2% *B. pertusis*, 0.2% *L. pneumophila*, 0.2% *C. pneumoniae*. Combining RP1 and RP4 kit could enhance the positive rate to 53.8% including 13.8% were infected with 1 kind of virus, 30.0% were infected with 1 kind of bacteria and 10.0% were co-infection. The co-infection patterns still remain unclear and could be a result of random combination. Influenza, RSV and *M. pneumoniae*

infections were significant affected by seasoning, while *S. pneumoniae* and *H. influenzae* infections were sporadic all over the time.

BIOGRAPHY

Hue Nguyenthi is an expert in the field of molecular biology for clinical applications. She has 10 years of experience working and researching real-time PCR. There have been many practical contributions, initiatives, technical improvements and application of new real-time PCR techniques in diagnosing some infectious diseases in her local (Bac Giang Provincial General Hospital). The multiplex real-time PCR method is now increasingly being used in practical applications and is useful for diagnosing and treating many infectious diseases. Applicating this technology to provincial hospitals is a breakthrough step that helps diagnose and treat a number of infectious diseases.

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