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Comparison of Laboratory Detection of Influenza Virus Using Rapid Test and Real Time Polymerase Chain Reaction (PCR)

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Introduction

Influenza infection is one of the most common infectious diseases caused by the influenza viruses. It is an important public health problem in the world and also in Cambodia. This study aims to compare the prevalence of influenza virus detected by Immuno-chromatography technique (Rapid test) with Real-time Polymerase Chain Reaction (PCR) and specifically to determine and compare the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) of the two techniques among patients with acute undifferentiated febrile illness (AUFI).

Methods

We used the existing data from the cross-sectional study in six provinces: Kampong Speu, Kandal, Svay Rieng Kratie, Ratanakiri, Stung Treng, and in which it covered 13 health centers. This surveillance was collected 2469 samples from January until December 2013 and we compared the influenza virus detection prevalence by Real-Time Polymerase Chain Reaction (RT- PCR) and Immuno-chromatography technique (Rapid test).

Results

Of the total 2469 samples collected, male accounted for 49.3%, and female 50.7%. The mean age was 19.6 years old (SD = 16.3) and ranged from 2 to 96 years old. The positive cases detected by Rapid test and PCR was 11% (248/2469) and 21% (520/2469) respectively. We found that most positive cases were from Kampong Speu province for both techniques, Rapid Test 41.5% n=103 and RT-PCR 32.1 % n=167. In Kratie, we found no positive case by Rapid test, but Real Time PCR could detect up to 6.9% positive cases. We also found more positive cases from June - August (7.7% - 16.9%) and October- November (29.4% – 17.3%). We detected a relatively low sensitivity of Rapid test if compared to RT-PCR 48% (95% CI: 38% - 58%) and Positive Predictive

Value of 23% (95% CI: 15% - 32%) for Influenza A virus. However, specificity and Negative Predictive Value of Rapid Test is high at 82% (95%: CI 73% - 89%) and 93 % (95% CI: 86% - 97%) respectively.

Conclusion

RT-PCR is one of the best methods for diagnosing Influenza Virus because of their high sensitivity and the ability to subtype the virus species. However, a positive result by Rapid test could provide a rapid confirmation of influenza case which help facilitate patient's treatment and quick initiation of antiviral therapy. But a negative test would require further confirmatory techniques using more standard tests for confirmation of influenza. This study shows that RT-PCR is the test of choice for detecting Influenza Virus. We also observed that high prevalence of Influenza Virus was found between July to November from both rapid test and RT- PCR, with significant different from the rest of the year. This might be due to the rainy season and early dry-windy season that take place from July through November.