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Molecular assays for the diagnosis of respiratory viruses in hospitalized patients: is it cost-effective? A Brazilian perspective

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Background: Viruses are the major contributors to the morbidity and mortality of lower acute respiratory infections (ARIs) for all age groups and are associated with numerous challenges for infection control. Polymerase chain reaction (PCR) assays are more sensitive and are able to detect multiple respiratory viruses. However, questions remain regarding cost-effectiveness of performing these diagnostic tests in routine and their real impact on patient care. Moreover most of healthcare insurances in Brazil do not pay for molecular diagnostic tests. In 2016, H1N1 cases appeared in early autumn in south Brazil, maximizing the need for detection of Influenza in order to start proper treatment, and other viruses to make better strategies for bed management in the hospital setting.

Material/methods: From April 7th to July 26th, we investigated patients that came to emergency room (ER) in a private hospital in south Brazil with suspicion of ARIs that met criteria for in-hospital care. From time zero they were kept in isolation (droplets and contact) and began the diagnostic strategy as follows: all patients were submitted to serologic tests; in whom the test results were negative, we performed PCR assay that (9 different types of respiratory virus, results in 48h). Each PCR assay costs to the hospital US 277,00. Our infection control policy dictates that patients suspected/confirmed with viral acute disease must be in a private room with exclusive nursing care. Adding expenses with material (gloves, gowns, masks) and personnel, we estimated an extra cost of US 430, 00/day for each patient in isolation.

Results: We investigated a total of 450 patients: 76% were children aged less than 10 years, 15% were between 18 and 59 y and 9% were older than 60 years. Through serologic tests 240 (52%) specimens with respiratory virus were recognized and the most prevalent pathogen was respiratory syncytial virus (RSV). For the remaining negative serologic tests, PCR assay was able to detect viral pathogen in 53% of the cases (Influenza H1N1 (23%) , human rhinovirus (14%) and RSV (22%)). 96 patients had negative results in both diagnostic tests and the patients were drop out of isolation

precautions (average after 6 days). The total cost of PCR assay strategy was US 42.765,00. If PCR assay would be performed in the ER, the hospital could have saved US 165.420,00 since 4 days of exclusive care would be avoided.

Conclusions: The use of PCR assay increased the viral detection by 23% and revealed a larger number of respiratory viruses implicated in ARI cases that stayed at the hospital. Our study suggests that using PCR could be a cost-effective strategy even when the hospital is paying for the test, especially in setting of high costs for securing infection control measures.