Comparison of Luminex NxTAG™ Respiratory Pathogen Panel (RPP) and CLART® PneumoVir for the diagnosis of respiratory pathogens in bronchoalveolar lavage samples.

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Background

The Luminex NxTAG™ RPP (Luminex Molecular Diagnostics, Canada) allows simultaneous detection of 19 viruses and 3 atypical bacteria associated with pneumonia. It uses target specific amplification of different viral and bacterial sequences and microfluidic-based hybridization to fluorescently labeled beads.

The aim of this study was to evaluate the performance of Luminex assay using bronchoalveolar lavages (BAL) previously characterized by CLART® PneumoVir assay (Genomica, Spain) based on the principle of multiplex polymerase chain reaction and DNA microarray.

Material/Methods

Retrospective study from May-2012 to October-2015, of 158 frozen BAL (-80ºC) from 158 patients, were used. 38 were paediatric patients with a median age of 5 years (1-15), and 120 were adults with a median age of 58.5 years (23-89).

With PneumoVir assay, 62 samples were negative and 96 positive ones. Both assays were performed according to the manufacturer's instructions and nucleic acid extraction was executed with NucliSENS® easyMag® (bioMérieux). Results of Luminex were compared with those obtained with PneumoVir as the gold standard.

Data were compared by McNemar test using SPSS 21.0.

Figure 1. Luminex NxTAG™ RPP reagents and instrument.

Results

Luminex assay obtained 2 invalid samples which were excluded from the analysis. We obtained 55 true positive, 56 true negative, 24 false positive (FP) and 21 false negative (18/21 of adults). In FP we also included the discordant results.

Of 15 co-infections detected by PneumoVir assay (11/15 of paediatric patients), Luminex assay detected all viruses in 4 cases, in 9 detected at least one virus and 2 cases were negative.

In 9 samples (7/9 of paediatric patients) were detected co-infections by Luminex whereas single infections were detected by PneumoVir assay.

Sensitivity and specificity were 72.4% and 70.0% respectively. The positive predictive value (PPV) was 69.6% and negative predictive value (NPV) was 72.7%. Kappa coefficient was 0.423 (0.281-0.565; 95%CI) indicating a moderate strength of agreement.

We detected 2 samples with atypical bacteria (*C.pneumoniae* and *M.pneumoniae*). The results are shown in the table.

Conclusions

Luminex assay detects more co-infections occurring mainly in paediatric patients. False negatives results occur mostly in adults.

Besides the easy handling and the possibility of detect respiratory virus, the Luminex assay allows us to detect atypical bacteria associated with pneumonia which is one of its main advantages.

Virus	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Kappa coefficient	McNemar test p-value	Virus	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Kappa coefficient	McNemar test p-value
ADV	88,9	97,3	66,7	99,3	0,75	0,37	HMPV	60	97,4	42,9	98,7	0,48	0,68
HBoV	85,7	98,7	75	99,3	0,79	1	PIV-1	N/A	99,4	0	100	0	1
HCoV	100	98,7	50	100	0,66	0,48	PIV-2	100	99,4	50	100	0,66	1
INF A	0	99,4	0	98,1	-0,01	0,61	PIV-3	71,4	100	100	98,7	0,83	0,48
INF A H1	N/A	100	N/A	100	N/A	N/A	PIV-4	0	100	N/A	98,7	0	0,48
INF A 2009 H1N1	40	100	100	98,1	0,56	0,25	RhV/EV	74,5	97,8	92,7	88,7	0,76	0,02
INF A H3	100	98,7	50	100	0,66	0,48	RSV-A	50	100	100	98,7	0,66	0,48
INF B	87,5	100	100	99,3	0,93	1	RSV-B	42,9	100	100	97,4	0,59	0,13

Table 1. Results obtained with Luminex NxTAG™ RPP .