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Background and objectives

Pneumonia is the most frequent community-acquired infection responsible for Intensive Care Unit (ICU) admission. Rapid multiplex PCR enables early diagnosis of respiratory infections in daily routine testing. Few studies have been described since this technique has been made available in routine.

We aimed at assessing the prevalence and distribution of pathogens among ICU patients with community-acquired pneumonia (CAP) and the relationship of severity and outcome

Methods

We conducted a retrospective analysis of data obtained in a French 27 ICU-bed medical unit admitting around 1,000 patients a year. From November 2016 to October 2017, naso-pharyngeal swabs from 223 patients were collected within 72h after admission to ICU and tested for 24 pathogens using the sample to answer ePlex Respiratory Pathogen Panel which delivered results in 1.5 hours. Patients with a diagnosis of CAP were split into 4 groups according to causal agent : none, viruses, bacteria, combination of both. Comparisons were made with Kruskal-Wallis test.

Results

A total of 109 patients had CAP, 39 had aspiration/opportunistic pneumonia, 22 non-pulmonary infections, 11 pulmonary edema, 19 exacerbations of chronic lung disease, and 24 other diagnoses. Patients with CAP had the following characteristics: age 60+/-16 y, male sex 60.2%, length of stay (LOS) in ICU 8.7+/-9.0 days, mortality 10.1%. All received antibiotics. No infectious agent was found in 34 patients, whereas a virus was detected in 28 patients, bacteria in 31 and both in 16. The LOS in ICU was 5.6 (no agent), 7.7 (virus), 10.0 (bacteria) and 14.8 (mixed) days respectively (p=0.0496). Mortality was similar among groups.

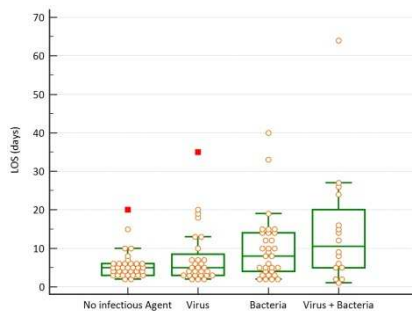


Figure 1 : Box-and-Whisker plot representing the distribution of the LOS depending of the 4 groups of patients

The main detected bacteria were *S. pneumoniae* (23%) and *H. influenzae* (6,5%). The main viruses were Rhinovirus/Enterovirus (13,8 %), Influenzae A (11 %) and Parainfluenzae virus (4,6%) and the most frequent virus-bacteria associations were *S. pneumoniae* with Influenzae A (3%) and *S. pneumoniae* with Rhinovirus/Enterovirus (3%).

Conclusion

In our ICU population, 56.9% of CAP had no infectious agent or respiratory viruses without bacteria. Patients with mixed infections had longer LOS. More studies are needed to evaluate if the implementation of rapid diagnostic testing using multiplex PCR could reduce overuse of antibiotics in patients with CAP.

Pathogens	Mean of Length of stay (days)	Patients number
No infectious agent	5,6	34
Virus only	7,7	28
BoV	3	1
CoV 229E	3	1
CoV NL63	4	1
Flu A	15,8	6
Flu A + HRV	5	1
hAdV	8,5	2
hMPV	2	1
HRV	4,5	10
PIV 1	19	1
PIV 3	5	2
PIV 4	6	1
RSV B + HRV	7	1
Bacteria only	10	31
Citrobacter koseri + S. aureus	9	1
E. coli	27,5	2
Fusobacterium nucleatum + Prevotella pleuritidis	33	1
H. influenzae	5,3	4
Hafnia alvei + Lactobacillus ramnosus + E. faecalis	12	1
L. pneumophila	7	2
Mycoplasma pneumoniae	3	1
P. aeruginosa	14	1
S. aureus	6	1
S. haemolyticus	2	1
S. pneumoniae	7,1	13
S. pneumoniae + E. coli	14	1
S. pneumoniae + H. influenzae	17	2
Virus and bacteria	14,8	16
Flu A + P. aeruginosa	12	1
Flu A + S. aureus + M. catarrhalis	27	1
Flu A + S. pneumoniae	10	2
Flu A + S. pneumoniae + M. catarrhalis	16	1
Flu A + Streptococcus pyogenes	15	1
hMPV + S. aureus	64	1
hMPV + S. pneumoniae	9	1
HRV + H. influenzae	1	1
HRV + S. pneumoniae	12	3
PIV 3 + H. influenzae	8	1
PIV 4 + S. pneumoniae	2	1
RSV A + hAdV + L. pneumophila	24	1
RSV B + S. pneumoniae	2	1
Total	8,7	109

Table 1 : Distribution of pathogens in 109 ICU patients with CAP
Abbreviations : hAdV : adenovirus, BoV : Bocavirus, CoV : Coronavirus, hMPV : Metapneumovirus, HRV : Rhinovirus/Entérovirus, Flu A and B : Influenza A and B, PIV : Parainfluenza virus
L. pneumophila : Legionella pneumophila, S. pneumoniae : Streptococcus pneumoniae, M. catarrhalis : Moraxella catarrhalis, H. influenzae : Haemophilus influenzae, S. aureus : Staphylococcus aureus , E. faecalis : Enterococcus faecalis