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Respiratory viruses in hospital-acquired pneumonia in an intensive care unit: a monocentric retrospective study

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Background: Respiratory viruses have been traditionally given minimal attention in nosocomial pathology except in hematopoietic stem cell or solid organ transplant recipients. The improvement of detection technique as multiplex PCR methods (mPCR), has greatly improved the ability to detect respiratory viruses in the past few years. We aimed to assess the proportion and prognosis of respiratory viruses (RV) in hospital-acquired pneumonias (HAP) in Intensive Care Unit (ICU).

Material/methods: HAPs were retrospectively selected from all patients that underwent RVs searching in the ICU of a French tertiary care hospital from May 2014 to April 2016. All patients underwent bronchoscopy with bronchoalveolar lavage (BAL). Microbiological evaluations such as blood culture, mycological and histological examination of endotracheal aspirates or BAL fluid were performed at the discretion of the physician's judgment, as well as CMV or HSV PCR. RV were tested by multiplex PCR assay. Four groups were established according to the identified pathogens: Virus only (V), Virus+Bacteria (VB), Bacteria only (B) and no pathogen (Neg). Patients' characteristics, ICU

length of stay and in-hospital mortality were compared between groups. When available, previous mPCR were retrieved in order to assess possible chronic viral carriage among selected patients.

Results: Overall, 95/999 (10%) patients with HAP in ICU who underwent mPCR had HAP, 95% of them were ventilator-acquired pneumonia. Median age was 61 years (IQR 52-69) and 45 (47%) were immunocompromised. Characteristics were similar between HAPs who underwent RV searching and those who did not (n=48). V, VB, B and Neg groups were respectively composed of 17 (18%), 13 (14%), 60 (63%) and 5 (5%) patients. Influenza virus (27%), Rhinovirus (27%) and respiratory syncytial virus (17%) were the most common virus. RVs were more frequent in immunocompromised patients (42% vs. 22%, p=0.04). The VB group displayed a non-significantly higher mortality rate than B and V groups (62% vs. 40% and 35%, p=0.3) and a significantly longer length of stay (31 days (18-48)) than V group (5 days (3-11), p=0.0002)) and B group (14.5 days (5.5-25.5), p=0.007)). Among the 15 patients with available mPCR tests before a HAP associated with a virus, seven were negatives before pneumonia and eight corresponded to long-term carriage of community acquired viruses. Among the latter, all immunocompromised patients, six were rhinoviruses carrier and all of them had coinfection with another pathogen at the time of HAP (4 bacteria, 2 viruses, 1 fungus).

Conclusions: In our setting, RVs were detected in 32% of HAP who underwent mPCR. Two situations are mainly encountered: (i) acute hospital acquired viral infection and (ii) long-term viral carriage (mostly rhinovirus) in immunocompromised patients complicated by a coinfection associated with higher length of stay.