29th ECCMID Amsterdam, Netherlands 13 – 16 April 2019

The congress of ESCMID

P2585 Impact of colonisation pressure on the epidemiology of multidrug-resistant organisms in two ICUs: a 19-year prospective surveillance

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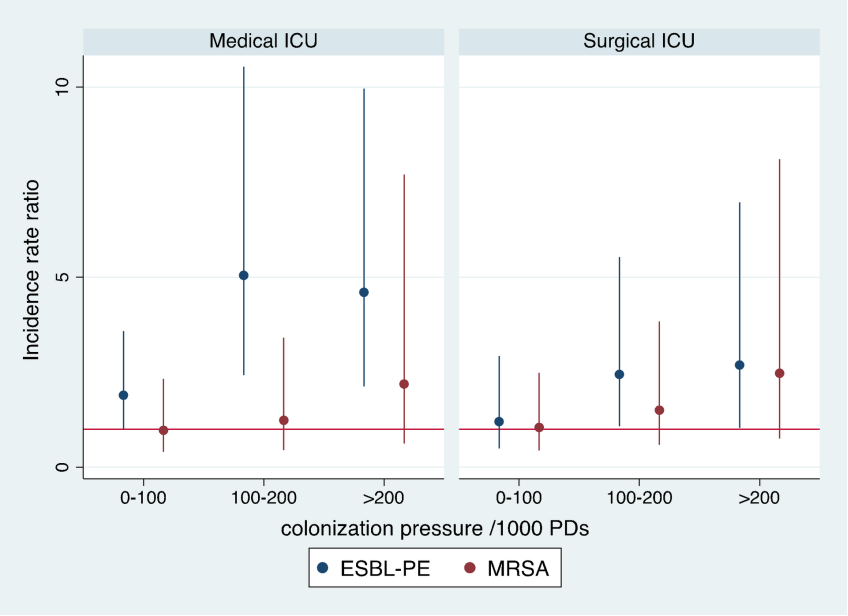
Background: Multidrug resistant organisms (MDROs) are responsible for ICU-acquired infections. ICU represent a hotspot of MDRO cross-transmission. Colonisation pressure (CP) is a demonstrated risk factor for ICU-acquired MDRO, but the long-term respective impact of CP on ICU-acquired extended-spectrum beta-lactamase-producing *Enterobacteriaceae* (ESBL-PE) and methicillin resistant *Staphylococcus aureus* (MRSA) is not known.

Materials/methods: All patients admitted between 01/1997 and 12/2015 in two ICUs (medical and surgical) in a French teaching hospital were included in this retrospective observational study. Rectal (ESBL-PE) and nasal (MRSA) surveillance cultures were obtained at admission and weekly thereafter. Contact precautions were applied for infected or colonised patients. Acquisition was defined as MDRO positive > 48 h after admission from surveillance or clinical samples and MDRO was considered imported if detected during the first 48 h or in the previous six months. Incidences of acquisition per 1000 exposed patients (EP) were calculated. CP was defined as the percentage of patient-days (PDs) with an MDRO to the number of PDs in the unit. Multi-level negative binomial regression models were used to evaluate the incidence of weekly MDRO acquisition.

Results: Among the 23,423 included patients (213,409 PDs), 2,284 (9.7%) and 1,405 (6.0%) were ESBL-PE and MRSA carriers, respectively, including 1,667 (7.1%) and 1,071 (4.6%) imported cases, and 617 (2.6%) and 334 (1.4%) acquisitions, with a median time to acquisition of 8 and 9 days. ESBL-PE acquisition were stable between 1997 and 2003 (0.51 and 0.26/1000 EP, respectively, p=0.91) and significantly increased from 0.26 in 2004 to 5.63/1000 EP in 2015 (p=0.02). In contrast, MRSA acquisition steadily decreased from 3.52 to 0.08/1000 EP (p<0.001). Controlling for period-level covariate, CP in the previous week was associated with MDRO acquisition for ESBL-PE (p<0.001 and p=0.04 for medical and surgical ICU), but not for MRSA (p=0.47 and p=0.39 for medical and surgical ICU) (Graph). The increase of CP was significant from 100/1000 PDs for ESBL-PE.

Conclusions: CP contributed to the increasing incidence of ESBL-PE but not MRSA. The dynamics of MDRO spread was different across ICUs. This suggests that preventive control measures could be customized to MDRO.

Graph: Multilevel negative binomial regression model analysis


Medical ICU
Surgical ICU
Incidence rate ratio
0
5
10
0-100
100-200
>200
colonization pressure /1000 PDs
ESBL-PE
MRSA