

Letter to the Editor

Reduced *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae* (KPC-KP) colonization in a hematological-emergency setting during the coronavirus disease 2019 (COVID-19) pandemic

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To the Editor—The coronavirus disease 2019 (COVID-19) pandemic prompted hospitals worldwide to adopt infection control measures to reduce viral transmission. As could have been predicted, during the pandemic, decreases in the incidence of other notifiable infectious diseases have been reported worldwide.^{1–3} Although an increase of multidrug-resistant infections diffusion has been reported in COVID-19 departments related to the intensity of care, in COVID-19-free departments COVID-19-associated interventions may have led to a favorable change in transmission dynamics involving healthcare-associated pathogens.^{2,4,5}

For several years, in view of the wide diffusion of *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae* (KPC-KP), active surveillance to detect its spread and the application of infection control measures have been implemented at the hematology departments and the outpatient hematologic emergency unit (HEU) of the AOU Policlinico Umberto I of Rome.⁶ Nevertheless, although an improved outcome of KPC-KP infections was obtained, the bacteria continued to spread widely.⁷ We defined primary colonization as cases with a known history for KPC-KP colonization in the previous 3 months or rectal swab positive for KPC-KP at admission. Patients with a negative history for KPC-KP and with a negative rectal swab at admission, when discovered to be colonized by KPC-KP during the hospitalization, were considered secondary colonization cases.

From March 9, 2020, according to COVID-19 national government and hospital guidelines, intensified infection control measures took place in the hematology departments and HEU of our Institute to prevent patients with hematological diseases and healthcare personnel from becoming infected by severe acute respiratory coronavirus virus 2 (SARS-CoV-2) as well as to guarantee continuity of care in a COVID-19-free setting.⁸ A reduction of KPC-KP diffusion since March 2020 was observed at the hematology departments of our institution. The colonization rate in hospitalized patients dropped from 52.5% in November 2019–February 2020 to 15.5% in March–August 2020 ($P < .0001$) and

secondary colonization fell from 27.5% to 8% during these periods ($P = .0003$).⁹

Similarly, we observed that these interventions led to a progressive decrease in the frequency of KPC-KP colonization transmission also among patients admitted to the HEU. To confirm the role of such measures in the reduction of KPC-KP transmission, we retrospectively compared the spread of KPC-KP colonization among patients hospitalized at the HEU from March 9, 2019 through March 8, 2020 (period 1) and the following year (March 9, 2020 through March 8, 2021, period 2). The same KPC-KP colonization screening (culture and real-time PCR assay on rectal swab at hospital admission and weekly during hospitalization) was applied during the 2 periods.

During the 2 periods, 3,760 patients acceded to the HEU (1,755 in period 1 and 2005 in period 2), and 404 of these were hospitalized in the HEU ward [209 (11.8%) in period 1 and 195 (9.8%) in period 2]. These 404 hospitalized patients represented the study population. Patient characteristics (age, sex, underlying hematologic disease, hematologic disease stage) were comparable in the 2 periods. The reason for hospital admission was an infectious complication in 112 cases (53.6%) in period 1 and for 90 cases (46.1%) in period 2 ($P = .16$). In period 1, the mean days of hospitalization was 11 (median, 8; range, 2–42) and in period 2, the mean days of hospitalization was 10 (mean, 8; range, 2–59; $P = .12$).

Overall, 35 cases of KPC-KP colonization were documented: 24 cases of primary colonization and 11 cases of secondary colonization (Fig. 1). Of the 11 secondary colonization cases, 10 were observed in the period 1 and the last one was observed in the first semester of the period 2. In the second semester of period 2, just 2 cases of primary colonization were detected and no case of secondary colonization occurred. All of the cases of secondary colonization concerned patients hospitalized for >8 days: 10 (9.8%) of 102 in period 1 versus 1 (1.1%) of 94 in period 2 ($P = .01$). Overall, in period 2 we observed a nonsignificant 25.6% reduction in the total KPC-KP primary colonization cases ($P = .53$). However, we observed a significant reduction in the second semester of the period 2 and a 90% reduction in the KPC-KP secondary colonization cases ($P = .01$). The reduction of cases of KPC-KP colonization cannot be attributed to a lower intensity of monitoring strategy, which was strictly adhered to during period 2.

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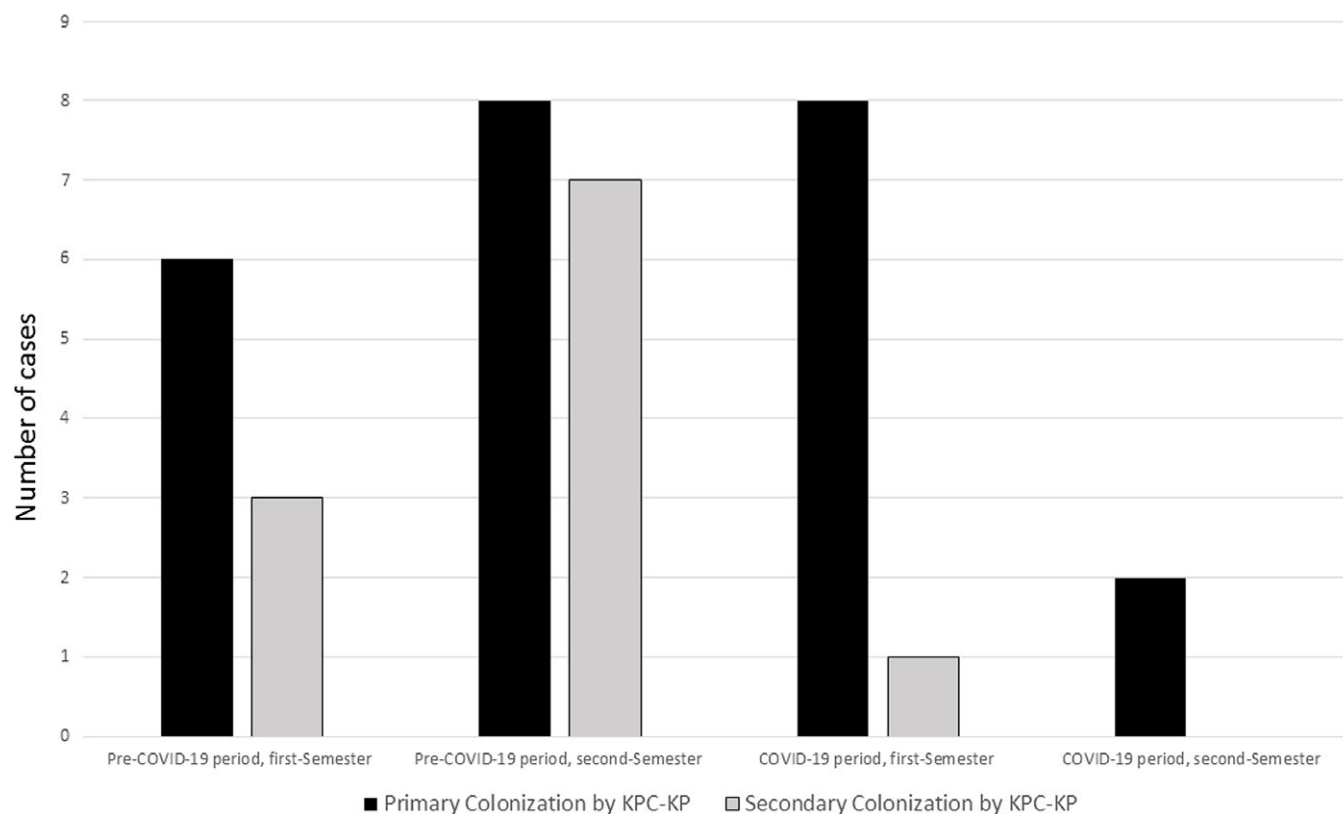


Fig. 1. Distribution of KPC-KP colonization cases in a pre-COVID-19 period and in a COVID-19 period at a hematologic emergency unit.

Despite the application of infection control measures, nosocomial transmission of KPC-KP represented an unsolved problem along the last decade at our institution.^{6,7} Since March 2020, an important reduction of KPC-KP cases has been observed at the hematology departments,⁹ which has resulted in the progressive reduction of cases of colonization in discharged patients who eventually attended the HEU. Thus, few cases of primary colonization were observed at the HEU during the second half of period 2. The COVID-19-related infection control measures led to decreased spread of KPC-KP, with a 90% reduction of secondary cases at the HEU even though this service is characterized by unpredictable and intensive care activities with high infectious risk.

Infection control measures for KPC-KP are similar to those implemented during the COVID-19 pandemic.¹⁰ However, according to our experience, the infection control procedures recommended for the prevention of nosocomial infections have been more effective during the COVID-19 period than in the past. The concern about being infected by SARS-CoV-2 or about transmitting it to patients and/or family members has probably strengthened compliance with certain measures, such as hand hygiene and social distancing, by healthcare personnel and patients themselves.

In conclusion, the strategies that we put in place in our institution, including the HEU dedicated to outpatients, successfully prevented the transmission of SARS-CoV-2 to hospitalized patients and avoided the horizontal transmission of KPC-KP.

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