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Letter to the Editor

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What is the rectal colonization rate of carbapenem-resistant Enterobacteriaceae (CRE)-infected patients? What is the decolonization rate of CRE-colonized patients in the hospital?

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To the Editor,

Carbapenem-resistant Enterobacteriaceae (CRE) is moving towards becoming a major health problem in Turkey as well as southern Europe (1–7). CRE infections are of major public health concern due to limited treatment options and high mortality (2). CRE colonization may facilitate infection and carriers may serve as an important source for its dissemination in healthcare facilities (3,4). The main reservoirs of CRE in humans are the lower gastrointestinal tract, oropharynx, skin, and urine (5). In the case of CRE colonization, time to negativity is important to stop the contact isolation period. This study aimed to analyze the rectal colonization rate of CRE-infected patients as well as the decolonization rates of the colonized patients by weekly sampling.

The study was performed between 1 March and 15 May 2015. A rectal swab (RS) was collected from every patient with any positive clinical samples as well as the other patients in the same room/ICU. All positive patients were sampled weekly until discharge or death. The swabs taken from each patient were processed according to CDC protocol; briefly, the swab was inoculated into 10 mL of trypticase soy broth (bioMérieux Inc., Marcy-l'Étoile, France) with the addition of one 10-µg ertapenem disk (Oxoid, Altrincham, UK) and incubated at 35 °C for 18–20 h. The next day, after vortexing, 100 µL of the inoculum was subcultured (8) onto chromID CARBA agar plates (bioMérieux) and incubated at 35 °C for 18–20 h. Suspected CRE colonies on chromID CARBA (blue/green to blue/gray in color) were identified by the VITEK MS system (bioMérieux) (9). Antimicrobial susceptibility testing of the isolates was performed with the VITEK 2 system (bioMérieux). Isolates were tested for their resistance phenotypes to imipenem, ertapenem, and meropenem by E-test (bioMérieux). The results were interpreted according to the EUCAST criteria (10).

A total of 32 patients' clinical samples (17 deep tracheal aspirate, 10 blood, 8 urine, 2 tissue biopsy cultures, and 1 drain fluid) yielded CRE. Of these 32 patients, 25 (78%) had rectal CRE carriage. Rectal colonization was also positive in 21 of the screened cases. All of these 46 strains were resistant to meropenem and imipenem. Of the overall 53 infected and/or colonized patients, 26 were female and the mean age was 60.4 years (range: 1–91). RS-positive patients had a median of three RS samples obtained weekly (range: 1–13). Of the 46 colonized patients, seven (15%) had negative RS culture at follow-up [3 of the 25 (12%) infected and 4 of the 21 (19%) only RS-colonized patients, $P > 0.05$]. Three had a negative RS in the first week, whereas the others' results were negative at the 2nd, 3rd, 6th, and 8th weeks. Three patients had only one negative result while three had two and one had four consecutive negative results.

In our study about 80% of the patients with CRE-positive clinical samples were also rectal carriers. In a study by Zimmerman et al. (6), of the 97 patients with follow-up cultures, 79 (81%) were identified in surveillance cultures whereas 18 (19%) were identified in clinical cultures. The median time to culture negativity (i.e. one consecutive negative test with no subsequent positive test) was 387 days. Seventy-eight percent of patients (64/82) had positive cultures at 3 months, 65% (38/58) at 6 months, and 39% (12/30) at 1 year. Duration of carriage was affected by repeated hospitalizations ($P = 0.001$) and clinical as opposed to surveillance culture ($P = 0.002$). Feldman et al. (7) followed 125 carriers of KPC-type carbapenemase-

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producing *K. pneumoniae* monthly for between 3 and 6 months after discharge from an acute-care hospital. Overall, resolution of carriage (i.e. two consecutive negative tests with no subsequent positive test) was documented for 65/125 (52%). Similar to these studies, in our sample only 15% of CRE-positive rectal carriers had become negative upon follow-up. When the criterion was increased to at least three consecutive negative cultures, less than 10% became negative. We had started to evaluate weekly RS screening to see whether this could decrease the number of isolated cases. However, after these results, we began to consider all RS-positive patients as positive until discharge.

This study has several limitations. First, the study sample is relatively small. In addition, oral colonization was not investigated. However, Wiener-Well et al. compared oral, perianal, and rectal swabs for sampling for CRE carriage and reported that RS was the most sensitive method (2). In addition, RS was not performed after discharge and we did not evaluate risk factors affecting CRE clearance. In spite of these disadvantages, to our knowledge this is the first study analyzing the rectal colonization rate of infected patients and the first study evaluating the clearance rates in Turkey as well as Asia. In conclusion, our findings suggest that weekly RS sampling seems to be irrational for CRE surveillance for identifying possible clearance.

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