

LETTER TO THE EDITOR

Infection control measures based on drug susceptibility to *Acinetobacter baumannii*

In recent decades, *Acinetobacter baumannii* has been recognized as a nosocomial pathogen most prevalent in summer, with broad clinical manifestations and multidrug resistance posing a global threat.^{1,2} We previously reported an outbreak of multidrug-resistant *A. baumannii* (MDR-AB) carrying oxacillinase(OXA)-51-like and IS*Abal* genes.³ Therefore, we carried out screening tests in the critical care center (CCC) and intensified countermeasures against *A. baumannii*. Here we present the results of the drug susceptibility-based infection control measures.

We included all patients in our CCC from January 2012 to December 2019 and screened a sputum or throat swab using selective medium for *Acinetobacter* spp. to determine the presence of *A. baumannii* and their drug susceptibility. Starting in January 2016, a new measure was introduced to isolate all cases in a private room for 72h until screening results were confirmed. When private rooms were not open, CCC admission was restricted. In addition to standard precautions, patients with MDR-AB and extensively drug-resistant *A. baumannii* (XDR-AB) were managed by a dedicated team of physicians and nurses, and disposal of equipment following use or use of separate sets of mobile devices were implemented. Multidrug-resistant AB is defined as resistance to at least three categories of antimicrobials and XDR-AB is defined as MDR plus resistance to carbapenems.⁴ Data are presented as the mean and SEM of infected patients every 3 months, to observe the seasonal changes, and compared by Student's *t*-test.

During active surveillance between January 2012 and December 2019, we identified 72 individuals with *A. baumannii*, including two ventilator-associated pneumonia and one bacteremia. Figure 1 shows that the number of patients with *A. baumannii* significantly decreased from $3.13 \pm 0.50/3$ months to $1.38 \pm 0.41/3$ months after the medical staff implemented systematic infection control measures based on the drug susceptibility in January 2016 ($p=0.01$). In addition, the numbers of MDR-AB and XDR-AB patients significantly decreased from $1.94 \pm 0.38/3$ months to $0.38 \pm 0.26/3$ months ($p < 0.002$).

We contained the outbreak by screening all patients admitted to the CCC and by focusing on MDR-AB and XDR-AB. *Acinetobacter baumannii* can persist in the environment of respiratory and medical equipment for several days,⁵ so the drug susceptibility-based isolation of the

medical team and medical devices led to the end of the outbreak. However, the decrease in *A. baumannii* might be due not only to isolation measures based on drug susceptibility, but also years of education for health-care workers, environmental cleanup, including temporary CCC closure, and repeated audits of handwashing by the infection control team. Therefore, drug susceptibility-based infection control is one of the effective strategies because of limited medical resources, both financial and human.

ACKNOWLEDGMENTS

This work was supported by JSPS KAKENHI Grant Number JP15H04795.

FUNDING INFORMATION

Japan Society for the Promotion of Science, Grant/Award Number: JP15H04795

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICS STATEMENT

Approval of the research protocol: This study was approved by the institutional review board of the National Human Genome Research Institute and the Ethics Committee of the Faculty of Medicine, Juntendo University Urayasu Hospital (approval No. 30-004), and conducted according to the principles of the Declaration of Helsinki.

Informed consent: Informed consent was obtained from guardians by opt-out in publicity documents.

Registry and registration no. of the study/trial: N/A.

Animal studies: N/A.

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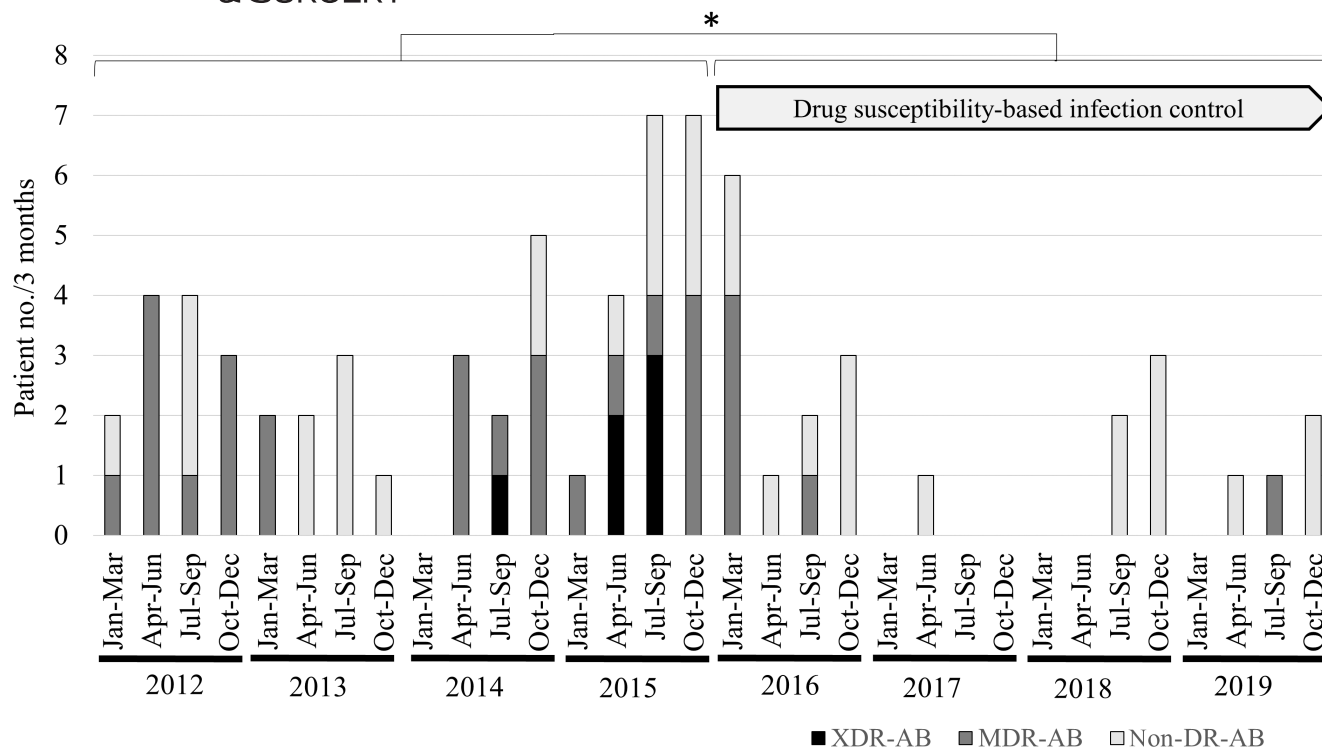


FIGURE 1 Patients with *Acinetobacter baumannii* infection between January 2012 and December 2019. The numbers of patients detected with *A. baumannii*, including multidrug-resistant *A. baumannii* (MDR-AB) and extensively drug-resistant *A. baumannii* (XDR-AB) significantly decreased after drug susceptibility-based infection control. Data are expressed as mean \pm SEM and compared by Student's *t*-test. * $p < 0.05$. Non-DR-AB, non-drug-resistant *A. baumannii*.

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