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Strategy to Limit Multi-Drug Resistant Acinetobacter baumannii Transmission in Cohort COVID-19 Critical Care Unit

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To Editor:

Co-infection with multidrug-resistant organisms (MDROs) among COVID-19 patients is common in critical care patients with a prolonged length of stay in critical care units, likely due to the co-administration of high dose steroids and the prolonged duration of mechanical ventilation.\(^1\) The control of MDROs among COVID-19 patients is also difficult, given the requirement for airborne plus contact isolation among these patients and the difficulty in wearing and changing personal protective equipment (PPE) in critical care units.\(^2\) The situation is much more challenging in middle/lower income countries where cohorting areas in airborne isolation critical care units was often designed, instead of a single airborne isolation rooms in the critical care unit. We report the experience of controlling an MDR-\textit{Acinetobacter baumannii} outbreak in a COVID-19 critical care unit that featured airborne isolation cohorting areas together with limited standard single airborne isolation rooms in Thailand.

On 1 March, 2021, at Thammasat University Hospital (Pratum Thani, Thailand), the first case of MDR-\textit{A. baumannii} was detected in a COVID-19 critical care unit followed by one additional patient who was located next to the index patient 2-day later in the same cohorting area. In this 10-bed critical care unit, there were 2 sections of 4-bed airborne isolation cohort areas and 2 single room beds which were airborne isolation rooms. The nurse-to-patient ratio in this unit was 2.5:1. After the detection of the first case, a root cause analysis revealed the possibility of cross transmission because healthcare personal (HCP) are unable to change PPE between caring for patients in the cohort area as well as the possibility of an unrecognized case of MDR-\textit{A. baumannii} in a referral from another hospital. A policy to prevent transmission were initiated and included isolation of MDR-\textit{A. baumannii} patients in single bed isolation rooms, assigning specific nurses to care for cases with MDR-\textit{A. baumannii}, changing gloves between cases and putting an extra sheet cover on the provider between care for MDR-\textit{A. baumannii} cases as well as daily environmental disinfection in cohort and single beds with a quaternary ammonium compound. Feedback on compliance on infection prevention practices to HCP was performed every day. After the next 2 weeks, 4 additional MDR-\textit{A. baumannii} cases occurred in the cohort area (the incidence rate, 16.9 cases/1000 patient-days), despite full compliance with policies. Root cause analysis suggested the possibility of widely disseminated environmental contamination with MDR-\textit{A. baumannii}.

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together with the possibility of cross transmission of MDR-A. *baumannii* by HCP who are unable to change gowns between the care of different patients in the cohort area.

Additional interventions at this stage include unit closure for hydrogen peroxide vapor disinfection, development of risk stratification criteria to house high-risk patients for MDR-*A. baumannii* in the 2 isolation rooms, development of an antibiotic stewardship program to limit broad spectrum/de-escalate broad-spectrum antibiotics among COVID-19 patients, and development of a policy to discontinue isolation for COVID-19 patients. Continuous monitoring and feedback of MDR-A. *baumannii* incidence and infection prevention compliances to such policies among HCP was performed every day. During the subsequent 8 weeks, 2 additional cases of MDR-A. *baumannii* was detected. There was a significant reduction in MDR-A. *baumannii* incidence, comparing to the period prior to intervention (16.9 cases/1000 patient-days vs. 3.6 cases/1000 patient-days; *P*<0.001). Infection prevention compliance monitoring among HCP suggested full compliance to all components of infection prevention measures.

It is well recognized that MDR-A. *baumannii* are selected by use of broad-spectrum antibiotics and often have an environmental reservoir that can facilitate rapid spreading in critical care units, if appropriate interventions are not introduced. It is also reported that constant use of gloves and gowns during SARS led to an increase in transmission of MDROs, particularly for methicillin-resistant *Staphylococcus aurues*. Outbreaks of MDR-A. *baumannii* can be even difficult to control in middle- and lower-income countries where infrastructure may not be adequate (e.g., suboptimal design of negative pressure airborne isolation units, inadequate nurse-to-patient ratio) and requiring a practical strategy to control MDROs in the resource limited settings. Our experience suggests that policies that place an additional sheet to protect contamination of HCP gowns, frequent changes of gloves, assignment of specific nurses to care for MDR-A. *baumannii* cases as well as basic environmental disinfection are not able to terminate an outbreak of MDR-A. *baumannii*, if the HCP cannot change PPE between care of different patients in cohort areas. Additional strategies, in these situations that do not allow changing PPE easily between cases in the cohort areas are needed. These strategies must feature the multi-modal approaches that include risk stratification for index patients that may potentially harbor a risk for MDR-A.
*baumannii* with isolation in single rooms, an antibiotic stewardship program for COVID-19 patients, and policies to discontinue COVID-19 isolations as well as a policy to perform robust terminal environmental disinfection. Such strategies together with fully compliance with infection prevention measures will help limit transmission of MDR-*.baumannii* in COVID-19 cohort areas in critical care unit. Additional studies to evaluate practical strategies to help limit transmission of MDR-pathogens in cohort-type COVID-19 critical care units are needed.
References:


