Termination of an Extreme-Drug Resistant Acinetobacter baumannii Outbreak in a Hospital After Flooding: Lessons Learned

To the Editor—Outbreaks of extreme-drug resistant (XDR)–Acinetobacter baumannii have occurred in several parts of the world and are associated with increased morbidity, mortality and healthcare resource utilization [1–3]. Termination of an outbreak can be challenging in a resource-limited setting, given the lack of infection prevention infrastructure and staff [4]. Little information is available concerning the impact of flooding on the incidence of XDR–A. baumannii. Herein, we report the incidence of XDR–A. baumannii in relation to infection control interventions implemented during pre- and post-flood periods at a Thai tertiary care center.

Since 24 October 2010, XDR–A. baumannii has been detected among patients in six medicine and four surgery units at Thammasat University Hospital, Pratumthani, Thailand. XDR–A. baumannii is defined as an A. baumannii isolate that is resistant to cephalosporins, carbapenems, aminoglycosides, fluoroquinolones, aztreonam, and sulbactam. In response to the XDR–A. baumannii outbreak, infection control interventions were implemented (Figure 1), starting in 5 December 2010. Adherence monitoring for each component was continuously monitored and isolates were submitted for further molecular typing according to standard molecular method [5]. An Infection Control Nurse (ICN) observed housekeepers cleaning patient areas throughout the study, including on weekends and night shifts. We noted whether environmental sites (eg, bed rails, over-bed tables, infusion pumps, clean countertops, and soiled countertops) were cleaned and recorded the results as “cleaned (during observation),” “not cleaned (during observation),” “not applicable” (ie, item not present), or “not observed.” The fraction of items per month scored as “cleaned” and “not cleaned” was calculated. Hand hygiene observations were made by the same ICN in each unit at various times of day. Hand hygiene observations began when a staff entered the unit and was observed in all activities that involved contact with a patient or their environment and ended when that staff completed the activities.

Between 5 December 2010 and 14 October 2011, the rate of XDR–A. baumannii declined only by 20%–25%, despite implementation of infection control measures as well as repeat educational program (Figure 1). Adherence to components of infection control measure during this period were: (1) hand hygiene before and after patient care (210 [60%] of 350 observed opportunities); (2) use of gowns and gloves for patient care of cases (158 [45%] of 350...
observed opportunities), (3) obtaining active surveillance cultures from XDR–A. baumannii from all patients in the index units (162 [30%] of 540 anticipated specimens), and (4) environmental cleaning with the recommended agents for surfaces contaminated with body fluids and/or blood (144 [32%] of 450 observed opportunities). There were 65 patients with XDR–A. baumannii colonization and/or infection on the medicine and surgery units. Forty-six (94%) of 49 isolates submitted for molecular analysis from these patients were a single clone. No point source was identified despite extensive outbreak investigation.

On 14 October 2011, the hospital was closed due to progressive flooding of the ground floor, up to three meters. It was reopened on 12 December 2011. An extensive hospital-wide environmental cleaning protocol was performed using 1:10 sodium hypochlorite. Serial monitoring of XDR–A. baumannii revealed the termination of outbreak in medicine and surgical units over 6 months after flood (Figure 1). Postflood there were improvements in hand hygiene before and after patient care (136 [91%] of 150 observed opportunities; $P < .001$ vs preflood), isolation precaution compliance (138 [92%] of 150 observed opportunities; $P < .001$), environmental cleaning (180 [90%] of 200 observed opportunities; $P < .001$) compared to before the flood. No other additional IC measures were implemented during postflood.

Termination of a XDR–A. baumannii outbreak after hospital closure due to flooding was most likely attributed to the combination of improved adherence to just basic infection control measures (eg, hand hygiene, contact isolation, environmental cleaning) and dispersion of...
endemic patient reservoirs. Unit closure and rotating patient to do deep environmental cleaning has been previously reported as a strategy to control epidemic of multidrug-resistant *A. baumannii* [6]. Our data suggested that adherence monitoring and feedback to staff are essential components to help control epidemic XDR-*A. baumannii*. Additional studies of other hospitals affected by flooding in central Thailand are needed to confirm the impact of these infection control measures on reduction of MDR-bacteria.

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