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SHORT REPORT

Elimination of routine screening and contact precautions for endemic methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant *Enterococcus* bacteremia: a retrospective study in intensive care units in Brazil

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Intensive care units (ICUs) are high-risk areas for transmission of antibiotic-resistant bacteria, mainly methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE) (1). Effort to control these organisms include contact precautions (CPs), being first recommended by the Centers for Disease Control and Prevention in 1970 (2). However, bacterial infections still occur, such as those caused by MRSA, the most common pathogen in catheter-associated infections (3), and VRE, which has been reported with increased prevalence in the world (4). In fact, there is little evidence to support the effectiveness of CP in the prevention of some bacterial infections, such as MRSA and VRE infections (5–8). In addition, reports suggesting that CPs prevent MRSA or VRE infections are in the context of outbreaks rather than endemics, the latter being a key concern for hospitals (8). Thus, there are limited controlled data demonstrating screening and CP to prevent MRSA and VRE infections in an endemic setting. Our study aimed to determine the impact of CP on the incidence of MRSA and VRE bacteremia before and after discontinuing these interventions in endemic settings.

Methods

The setting was a tertiary-care hospital in Rio de Janeiro, Brazil, with 60 hospital beds divided into six ICUs in the same hospital. All sites have medical, surgical, and transplantation units. The study lasted for 18 months from December 2020 to May 2022, and it was divided into two phases: phase 1 (December 2020–August 2021) was used as a control, where all patients were weekly active to surveillance for MRSA and VRE carried out through nasal and rectal swabs and remained under CP (use of gloves and gowns by the staff, single rooms, and exclusive blood pressure devices and stethoscopes, but without an exclusive team per patient) until discharged. Next, phase 2 (September 2021–May 2022) followed without these interventions, where the patients could leave the isolation rooms, did not have exclusive devices, and were examined by the health team only with hand hygiene (without the use of gloves and gowns). No significant changes in patients' health status, hospital infrastructure, or infection prevention techniques occurred at any of the sites during the study period.

Bacteria obtained from bloodstream infections in the ICUs were subjected to BD Phoenix™ (BD, Sao Paolo, Brazil) equipment for species identification and antibiotic susceptibility profile. Those identified as *S. aureus* and *Enterococcus* spp. had their minimum inhibitory concentration determined for cefoxitin and vancomycin, respectively, according to the Clinical and Laboratory Standards Institute guidelines (9). The incidence of MRSA and VRE bacteremia in all ICUs was determined monthly.

Descriptive statistics were calculated using counts, percentages, and proportions. The bacteremia rates during the phases were compared for the statistically significant difference using the Mantel–Haenszel test. The rates were calculated using Epi Info software (Centers for Disease Control and Prevention, Atlanta, GA, USA) and expressed as odds ratio (OR). The statistical significance was determined as $P \leq 0.05$.

Results

The present study observed the occurrence of MRSA and VRE bacteremia in a tertiary hospital in Rio de Janeiro, over 23,578 patient days in a period of 18 months (Table 1).

Table 1. Rates of MRSA and VRE bacteremia before (phase 1) and after (phase 2) discontinuation of contact precautions

Organisms	Phases	No. of bacteremia	No. of patient days	No. bacteremia per 1,000 patient days	*P*
Total	Phase 1	33	11,425	2.88	0.24
	Phase 2	26	12,153	2.13	
MRSA	Phase 1	7		0.61	0.88
	Phase 2	8		0.65	
VRE	Phase 1	26		2.27	0.15
	Phase 2	18		1.48	

The study was divided into two phases lasting 9 months each: in phase 1, CPs were applied to patients (n = 11,425), while in phase 2 there were no such precautions (n = 12,153). During the 18-month period, there were 59 cases of MRSA and VRE bacteremia, 33 in phase 1 and 26 in phase 2, corresponding to incidences of 2.88 and 2.13 per 1,000 patient-days, respectively (OR: 1.35; 95% confidence interval [CI]: 0.19 – 0.32; P = 0.24). The incidence rate of MRSA in phase 1 was 0.61 per 1,000 patient-days and 0.65 per 1,000 patient-days in phase 2 (OR: 0.93; 95% CI: 0.04 – 0.10; P = 0.88). The incidence rate of VRE in phase 1 was 2.27 per 1,000 patient-days and 1.48 per 1,000 patient-days (OR: 1.5; 95% CI: 0.14 – 0.25; P = 0.15). The difference in incidence during the two phases, both for the total number of bacteremia and for bacteremia caused by MRSA or VRE, was not statistically significant (P > 0.05) (Table 1).

Discussion

Several studies have been rethinking active surveillance and CP for patients colonized or infected with MRSA or VRE (5, 6). Concordantly, this study observed that discontinuing active surveillance and CP for MRSA and VRE has not increased bacteremia, particularly in a non-outbreak setting. Although the use of decolonization protocols can reduce the incidence of MRSA bloodstream infections in burn cases (10), this is not universal (5). Drum et al. (5) also found no differences in MRSA infection rates in burn patients after discontinuing active surveillance. They even observed lower rates than those found here, considering acute care unit patients (5). Another aspect considering CP is that the application of these interventions can cause harm to patients and unintended consequences (delays in transfer, prolongation of hospital discharge, lower satisfaction with healthcare) (8, 11, 12). Some hypotheses could explain our results: CPs are not effective at preventing endemic MRSA and VRE, therefore discontinuation of CPs does not change the rates of these infections; there is low healthcare worker compliance to CPs; and there is low transmission of endemic infections (12). We also identified some limitations in our study. Firstly, there were a small number of data points (incidence rates only); secondly, the 9-month follow-up period was short, and thus, may not have been sufficient to observe long-term impacts; thirdly, only a single center was involved; and fourthly, there is a lack of molecular epidemiological data. So, in conclusion, despite these limitations, our results are in agreement with several other studies that point out that the use of CP practices is not crucial to reducing the incidence of infections caused by MRSA and VRE.

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Conflict of interest and funding

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Ethics approval

Ethics approval was not required.

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