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Association of hospital contact precaution policies with emergency department admission time

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SUMMARY

Background: Contact precautions are a widely accepted strategy to reduce in-hospital transmission of meticillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE). However, these practices may have unintended deleterious effects on patients.

Aim: To evaluate the effect of a modification in hospital-wide contact precaution practices on emergency department (ED) admission times.

Methods: During the study period, the hospital changed its contact precaution policy from requiring contact precautions for all patients with a history of MRSA or VRE to only those who presented with clinical conditions likely to contaminate the environment with pathogens. An interrupted time series analysis of ED admission times for adults for one year preceding and one year following this change was performed at a two-campus hospital. The main outcome was admission time, defined as time from decision to admit to arrival in an inpatient bed, for patients with MRSA or VRE compared with all other patients. The in-hospital MRSA and VRE acquisition rates were evaluated over the same period and have been published previously.

Findings: At one campus, admission time decreased immediately by 161 min for MRSA patients (P=0.008) and 135 min for VRE patients (P=0.003), and both continued to decrease over the duration of the study. There was no significant change in admission time at the second campus.

Conclusions: Modifying contact precaution requirements for MRSA and VRE may be associated with improved ED admission time without significantly altering in-hospital MRSA and VRE acquisition.

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Introduction

The use of screening protocols and contact precautions has been a prevalent strategy to prevent transmission of pathogens in the healthcare setting. This practice has been endorsed by experts for the management of epidemiologically significant pathogens such as meticillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE) [1,2]. Recently, however, the prevalence of these pathogens has increased outside the hospital setting, making their control with these strategies potentially problematic. In fact, the efficacy of screening and contact isolation has come into question as three prospective multi-centre trials have shown no impact of this approach on MRSA and VRE transmission in intensive care unit (ICU) settings [3–5].

Additionally, it now appears that the use of these precautions can have unintended deleterious effects on isolated patients [6]. Traditionally, isolation practices have been presumed to have minimal impact on the patients that require isolation. However, there is a growing body of literature demonstrating that patients placed in contact precautions are at increased risk of multiple adverse outcomes [7–11]. Studies have shown decreased contact between patients and healthcare providers, as well as decreased total time spent with patients [9–12]. Additionally, a study found that patients placed in contact precautions for MRSA were twice as likely to experience adverse events including falls, pressure ulcers and electrolyte disturbances compared with a matched cohort [13]. Further, it appears that contact precautions can have a negative psychological impact on patients, such as increased prevalence of depression, anxiety and decreased patient satisfaction [7,14], although it has been suggested recently that these effects may be related to the patient population and not the actual precautions [15].

In addition to the above effects during the inpatient stay, there is now preliminary information indicating that patients who require contact precautions experience longer ED lengths of stay than other admitted patients [16,17]. Theoretically and anecdotally, patients on contact precautions are likely to have longer boarding times, defined as time from admission request to arrival in an inpatient bed, when private rooms are not readily available. Prolonged ED length of stay and boarding has been shown to have a negative effect on patient care [18–20]. Additionally, boarded patients contribute to overall ED crowding, and therefore admission delays due to contact precaution requirements may have a negative effect on other patients in the ED due to the effects of crowding reported previously [21–28].

Given the increasing prevalence of MRSA and VRE in the community based on surveillance data from the study institution and growing concerns regarding the risks and benefits of contact precautions, following discussions with the Massachusetts Department of Public Health in 2010, the UMass Memorial Medical Center (UMMMC) modified its approach to management of patients colonized or infected with MRSA or VRE. A prior analysis has shown that this change did not impact the rate of nosocomial transmission of these two pathogens [15]. The aim of this study was to compare the association between the two isolation precaution practices and ED admission times.

Methods

Study design and setting

A retrospective, hospital-based, interrupted time series analysis was undertaken of all adult medical-surgical and ICU patients admitted to the ED at UMMMC, Worcester, MA, USA.

UMMMC has two campuses: University and Memorial. The ED at University Campus serves approximately 60,000 patients annually, and the ED at Memorial Campus serves approximately 40,000 adult patients annually. The University Campus has 335 adult inpatient beds and the Memorial Campus has 133 inpatient beds. Both campuses are academic affiliates with a similar case mix. Inpatient floors at the University Campus contain 22% non-ICU private rooms (74 beds), compared with 39% (52 beds) at the Memorial Campus. All ICU beds are private rooms. During the year preceding the policy change, the institution's infection control department had staff working daily to actively cohort patients identified as having MRSA, VRE or both organisms. If an adequate number of private rooms was unavailable, two-patient rooms were converted into single-patient rooms.

On 1st November 2010, the institutional infection control isolation policy was changed to discontinue the use of contact isolation for patients based solely on current or historical colonization or infection with MRSA or VRE. The new policy required contact precautions, including private room placement, for clinical conditions that could lead to extensive soiling of the environment, including active diarrhoea, productive cough, and wound secretions not containable with a single dressing, regardless of MRSA and VRE status. For other epidemiologically significant multi-drug-resistant organisms, the original isolation practices were maintained. Daily infection control department assistance in room placement for patients with MRSA or VRE was discontinued three days prior to the policy change.

All adult patients admitted through the EDs at both University and Memorial Campuses were included. The study was approved by the Institutional Review Board of the University of Massachusetts Medical School, Worcester, MA, USA.

Methods and measurements

Adult patients admitted to the hospital through the University and Memorial EDs in the year preceding and the year following the isolation policy change were identified using electronic medical records. The time of admission request by the ED and the time of arrival in an inpatient bed for all admitted patients were abstracted from the database and used to calculate the admission time, defined as the time (in min) from admission request until the patient reached an inpatient hospital bed.

Outcomes

The primary outcome of this study was ED admission time for patients with MRSA or VRE compared with all other patients.

Statistical analysis

Descriptive statistics were used to assess admissions in monthly intervals by hospital, unit and group (MRSA, VRE and