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Brief report

# Evaluation of routine pretransplantation screening for methicillin-resistant *Staphylococcus aureus* in hematopoietic cell transplant recipients

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Methicillin-resistant *Staphylococcus aureus* (MRSA) screening guidelines for hematopoietic cell transplant (HCT) recipients are not well defined. Retrospective assessment of standardized pretransplantation MRSA screening in a large single-center cohort of HCT recipients demonstrated that colonization was uncommon, and that no colonized patients developed posttransplantation invasive complications.

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Hematopoietic cell transplant (HCT) recipients are at increased risk for infections, so screening for certain high-risk pathogens is recommended.[1] Although research on the prevalence and prevention of methicillin-resistant *Staphylococcus aureus* (MRSA) exists in other vulnerable populations,[2] data on MRSA carriage, screening, and associated morbidity and mortality in this population are limited.[3,4] National HCT guidelines do not offer recommendations for routine screening for MRSA carriage,[1] because, unlike for vancomycin-resistant enterococci,[5] no studies have demonstrated an association between pretransplantation carriage and posttransplantation infections.

At our center, infection prevention policy requires screening of all HCT recipients for MRSA nasal carriage on arrival. Using a retrospective cohort design, we assessed the prevalence of MRSA colonization detected from this screening program over a 5-year period, and explored relationships between nasal carriage and posttransplantation MRSA complications. These data are some of the first to assess standardized pretransplantation MRSA screening in HCT recipients.

**Table 1**
Selected characteristics of adult HCT recipients, 2008-2012 (n = 1895)

| Variable | Value |
|---|---|
| Age, y, median (interquartile range) | 55.5 (44.3-62.6) |
| Sex, n (%) | |
| Male | 1131 (59.7) |
| Female | 764 (40.3) |
| Race, n (%) | |
| Caucasian | 1496 (84.3) |
| Black | 44 (2.5) |
| Hispanic | 50 (2.8) |
| Asian/Pacific Islander | 109 (6.1) |
| Native American | 16 (0.9) |
| Other | 59 (3.3) |
| Transplant type, n (%) | |
| Allogeneic related | 324 (17.1) |
| Allogeneic unrelated | 595 (31.4) |
| Autologous | 965 (50.9) |
| Syngeneic | 11 (0.6) |
| Diagnosis, n (%) | |
| Acute leukemia* | 482 (25.4) |
| Multiple myeloma | 439 (23.2) |
| Myelodysplastic syndrome | 207 (10.9) |
| Non-Hodgkin lymphoma | 410 (21.6) |
| Other | 357 (18.8) |

*Includes acute myeloid leukemias and acute lymphoid leukemias.

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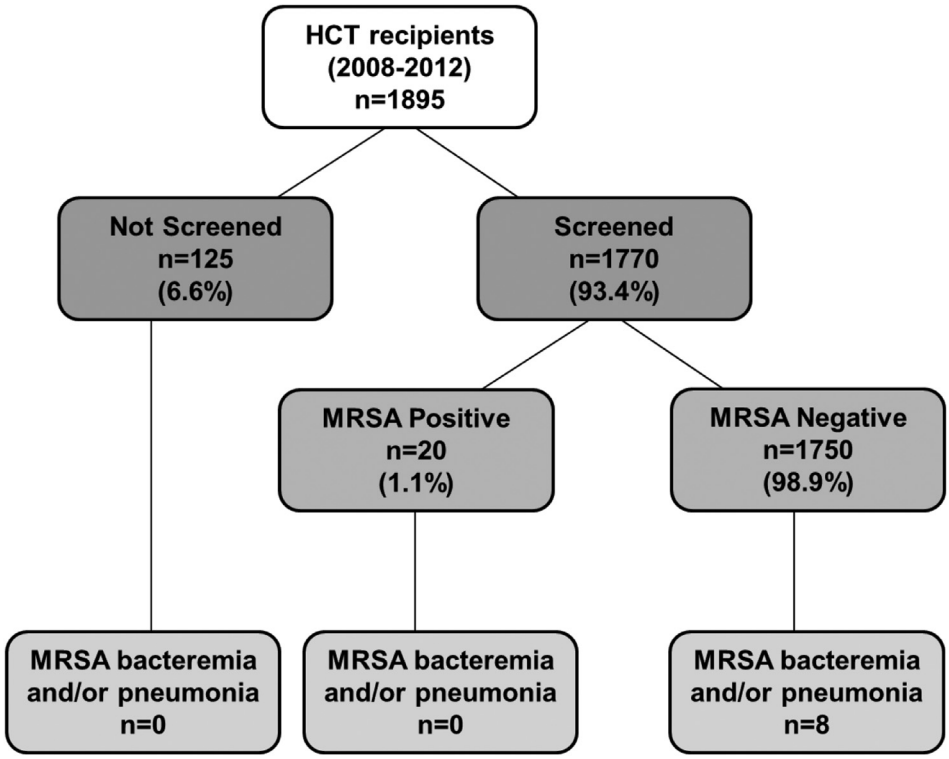


**Fig 1.** Relationship between pretransplantation screening and posttransplantation MRSA events in adult HCT recipients, 2008-2012.

## METHODS

We conducted a retrospective single-center cohort study of adults undergoing HCT between January 1, 2008 and December 31, 2012. All HCT recipients underwent a pretransplantation evaluation that included screening cultures for MRSA nasal carriage; swabs were cultured on MRSA chromogenic media (Spectra MRSA; Fisher Scientific, Lenexa, KS). Demographic data were retrieved from a prospectively collected center database and medical records review. Antimicrobial prophylaxis was administered as described elsewhere.[6] Chlorhexidine gluconate (CHG)-impregnated dressings (Biopatch; Ethicon, Somerville, NJ or Tegaderm; 3M, St Paul, MN) were applied to central lines; CHG wipes were routinely used on the inpatient units beginning in January 2010. Colonized patients were placed into contact isolation, with decolonization at the primary team's discretion.

MRSA carriage was defined by results of the first nasal swab collected between 2 weeks before transplantation arrival date and transplantation. Bacteremia was defined as isolation of MRSA from any blood culture. Pneumonia was defined as isolation of $\geq 10^3$ colony-forming units of MRSA from bronchoaveolar lavage fluid in conjunction with clinical/radiologic findings consistent with pneumonia. The incidence rates of bacteremia and pneumonia were assessed through 100 days posttransplantation; 95% confidence intervals (CIs) were estimated based on a Poisson distribution. Characteristics of patients with missed screens were assessed using the Pearson $\chi^2$ test. The study was approved by the center's Institutional Review Board.

## RESULTS

A total of 1895 patients underwent transplantation between January 1, 2008, and December 31, 2012, and were eligible for inclusion in the cohort. Demographic data are presented in Table 1. Nearly all of the patients, 1770 of 1895 (93.4%), were screened for MRSA, at a median of 8 days after arrival to the center (interquartile range, 7 days). Patients who were not screened (n = 125; 6.6%) were more likely to have undergone autologous transplantation ($P \leq .001$) or allogeneic transplantation with multiple arrival visits ($P = .02$).

The prevalence of MRSA nasal carriage was low among screened patients (20 of 1770; 1.13%). Six patients with a positive screen were treated with intranasal mupirocin. Seven patients in the cohort developed MRSA bacteremia, and 2 developed MRSA pneumonia, with an incidence rate of 0.39 (95% CI, 0.15-0.80) per 10,000 patient-days and 0.11 (95% CI, 0.01-0.40) per 10,000 patient-days, respectively. Most bacteremia cases (6 of 7) occurred within 2 weeks posttransplantation, whereas pneumonia developed later (days +16 and +95); there was no evidence of clustering of events. There were 2 MRSA-associated deaths, 1 occurring 12 days after a diagnosis of MRSA bacteremia and the other occurring 12 days after a diagnosis of MRSA pneumonia. All patients who developed MRSA bacteremia or pneumonia had a negative pretransplantation nasal culture for MRSA (Fig 1).

## DISCUSSION

This retrospective study conducted at a large comprehensive cancer center demonstrated a low prevalence of pretransplantation MRSA nasal carriage detected by culture in HCT recipients. Furthermore, no recipients with proven pretransplantation nasal carriage developed posttransplantation MRSA complications. Taken together, these findings call into question the value of pretransplantation MRSA screening by nasal culture in HCT recipients.

The limited published data on pretransplantation MRSA carriage in HCT recipients are consistent with our findings. A single-center study following a nosocomial outbreak reported that 15 of 776 HCT recipients (1.9%) were colonized with MRSA at any point before

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