

Control of Multidrug-Resistant *Pseudomonas aeruginosa* in Allogeneic Hematopoietic Stem Cell Transplant Recipients by a Novel Bundle Including Remodeling of Sanitary and Water Supply Systems.

Kossow A¹, Kampmeier S¹, Willems S¹, Berdel WE², Groll AH³, Burckhardt B³, Rossig C³, Groth C², Idelevich EA⁴, Kipp F¹, Mellmann A¹, Stelljes M².

Author information

- 1 Institute of Hygiene.
- 2 Department of Medicine A, Hematology and Oncology.
- 3 University Children's Hospital Muenster, Department of Pediatric Hematology and Oncology.
- 4 Institute of Medical Microbiology, University of Muenster, Germany.

Abstract

BACKGROUND: Infections by multidrug-resistant *Pseudomonas aeruginosa* (MDRPa) are an important cause of morbidity and mortality in patients after allogeneic hematopoietic stem cell transplantation (HSCT). Humid environments can serve as a reservoir and source of infection by this pathogen. To minimize the risk of infection from these reservoirs, we performed extensive remodeling of sanitation and water installations as the focus of our hygiene bundle.

METHODS: During the reconstruction of our transplantation unit (April 2011-April 2014) we implemented several technical modifications to reduce environmental contamination by and subsequent spreading of MDRPa, including a newly designed shower drain, disinfecting siphons underneath the sinks, and rimless toilets. During a 3-year study period (2012-2014), we tracked the number of patients affected by MDRPa (colonized and/or infected) and the outcome of infected patients, and monitored the environmental occurrence of this pathogen. We further performed whole-genome sequencing of nosocomial MDRPa strains to evaluate genotypic relationships between isolates.

RESULTS: Whereas 31 (9.2%; 18 colonized, 13 infected) patients were affected in 2012 and 2013, the number decreased to 3 in 2014 (17%; 3 colonized, 0 infected). Lethality by MDRPa similarly decreased from 3.6% to 0%. Environmental detection of MDRPa decreased in toilets from 18.9% in 2012-2013 to 6.1% in the following year and from 8.1% to 3.0%, respectively, in shower outlets. Whole-genome sequencing showed close relationships between environmental and patient-derived isolates.

CONCLUSIONS: Hospital construction measures aimed at controlling environmental contamination by and spread of MDRPa are effective at minimizing the risk of highly lethal

MDRPa infections.

© The Author 2017. Published by Oxford University Press for the Infectious Diseases Society of America. All rights reserved. For permissions, e-mail: journals.permissions@oup.com.

KEYWORDS: hospital acquired infection; hospital water system; immunocompromised hosts; infection control; multidrug-resistant *Pseudomonas aeruginosa*

PMID: 28520856 DOI: [10.1093/cid/cix465](https://doi.org/10.1093/cid/cix465)

[Indexed for MEDLINE]

MeSH terms

MeSH terms

[Adolescent](#)

[Adult](#)

[Aged](#)

[Child](#)

[Child, Preschool](#)

[Drug Resistance, Multiple, Bacterial](#)

[Evidence-Based Facility Design*](#)

[Female](#)

[Health Facility Environment](#)

[Hematopoietic Stem Cell Transplantation*/adverse effects](#)

[Humans](#)

[Infant](#)

[Infection Control/methods*](#)

[Male](#)

[Middle Aged](#)

[Patient Care Bundles](#)

[Pseudomonas Infections/etiology](#)

[Pseudomonas Infections/prevention & control*](#)

[Pseudomonas aeruginosa*](#)

[Toilet Facilities](#)

[Transplantation, Homologous](#)

[Water Supply](#)

[Young Adult](#)

LinkOut - more resources

