

The Amazing Race – To MBL Hell and Back AGAIN!

An Outbreak of Metallo-beta-lactamase producing *Pseudomonas aeruginosa* (MBL-Psa) on a Blood and Marrow Transplant (BMT) Unit

Introduction

Phase 1: Between June 2003 and Nov. 2004, 28 patients were involved in a clonal MBL-Psa outbreak on the BMT unit. The outbreak presented as sporadic cases of MBL-Psa infection occurring every 4-7 weeks.

Findings:

- MBL-Psa was found in a sink cold water shut-off valve in a patient room. The valve was replaced.

Subsequently between Nov. 2004 and May 2005 (a period of 7 months) there were no known MBL-Psa patients on the unit and no new cases identified.

Phase 2: Between June 2005 and June 2006, 14 patients were identified with the clonal MBL-Psa strain.

Findings:

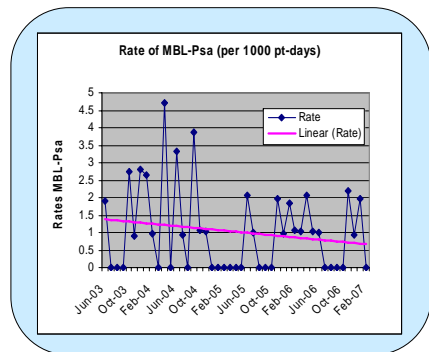
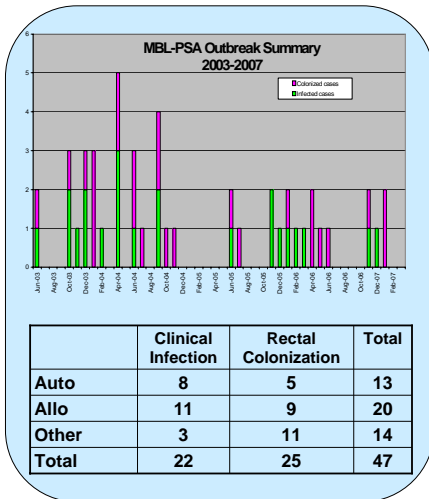
- Two patient toilets with MBL-Psa in areas inaccessible to cleaning.
- Two staff washroom sinks with multiple sources of MBL-Psa including incomplete silicone sealant, faucet/tap units and stagnant water on counter top.

For a period of 5 months, there was no known transmission despite the presence of a known MBL-Psa positive patient on the unit.

Phase 3: Between Nov. 2006 and Feb. 2007, there were 5 additional patients identified with the same clonal strain.

Findings:

- No source for MBL-Psa was found.



Surveillance	Description
Infection Control	<ul style="list-style-type: none"> • Continued weekly rectal screening for gram negative organisms.
Hand Hygiene	<ul style="list-style-type: none"> • 2% CHG replaced with plain soap. • Alcohol hand rub installed in patient rooms and throughout care unit as per Calgary Health Region hand hygiene initiative.
Environmental Surveillance Phase 2:	<ul style="list-style-type: none"> • Water sampling from all faucets (patient and staff areas). • Environmental sampling of the faucet/tap units. • Targeted toilet water/air sampling in 7 patient bathrooms, followed by toilet water sampling of the remaining toilets. • Environmental sampling of sink surrounds and assessment of the integrity of silicone sealant. • Extensive sampling of 2 MBL-Psa positive toilets before and after removal.
Environmental Surveillance Phase 3:	<ul style="list-style-type: none"> • Water sampling from all sinks and countertop water puddles. • Assessment of faucets and taps for excessive movement and integrity of sealant. • Environmental sampling of all silicone seals and potential water sources in the geographically remote Outpatient BMT Clinic.
Housekeeping Phase 2:	<ul style="list-style-type: none"> • Procedure and products used for toilet bowl cleaning reviewed. • Sink drain decontamination attempted.
Housekeeping Phase 3:	<ul style="list-style-type: none"> • Clean and dirty water samples and pad from automated floor cleaning machine tested for MBL-Psa. • Cleaning process for automated floor cleaning machine reviewed. • Twice weekly environmental disinfection with sodium hypochlorite of high touch surfaces on the patient care unit.
Patient Care	<ul style="list-style-type: none"> • Continued restricted usage of Carbapenems as routine therapy for febrile BMT patients. • Ciprofloxacin for antibiotic prophylaxis not recommended. • Off- service admissions restricted and private room accommodation for all BMT/Haematology/febrile neutropenic patients continued.
Maintenance Phases 2 and 3:	<ul style="list-style-type: none"> • Repairs made to sink sealants. • Replaced two MBL-Psa positive patient toilets and one staff sink. • Repaired cracked and or loose faucet/tap units.

Discussion

- MBL-Psa from water sources, even in low colony counts, can contribute to significant illness in this vulnerable patient population.
- Sophisticated and creative epidemiological investigations were required to identify the sources of the MBL-Psa
- This organism can survive on poorly designed or inadequately maintained plumbing fixtures.
- Quality workmanship by experienced maintenance personnel is fundamental to the correction of potential sources of MBL-Psa.



Take Home Message

Persistent investigations with multiple interventions has reduced the rate of MBL-Psa on this BMT unit.