2460. Hospital-Wide Outbreak of Serratia marcescens of Unclear Source: When Extensive Infection Control Measures Are Needed

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Session: 257. HAI: Outbreaks
Saturday, October 5, 2019: 12:15 PM

Background. Nosocomial outbreaks of Serratia marcescens have been widely reported and the source is identified in most cases. We report a Serratia marcescens outbreak in a community hospital with no obvious source.

Methods. An epidemiologic investigation was started after an outbreak was suspected. Clinical data were collected from charts of patients with positive culture for Serratia marcescens. Molecular relatedness of available isolates was determined by pulsed-field gel electrophoresis.

Results. Between December 2016 and August 2017, 13 non-pigmented Serratia marcescens isolates were identified from 11 patients. Bacteria were isolated from blood, abdominal and respiratory cultures. Susceptibility profiles showed variable resistance to ceftriaxone, cefazidime, imipenem, tobramycin and aztreonam. Infection control measures: Isolates were identified from adult patients who underwent various cardiothoracic/surgical surgeries. Patients were traced back to a single floor of the new hospital building. To control this outbreak, the infection prevention team started with hand hygiene initiatives and observations, environmental sampling, and reviewing management of ventilator, dialysis equipment, and ECMO machines. Ice machine carbonless filters were installed, UV disinfection systems were used, and new TEE cleaning rooms were designated. In conjunction with recommendations of department of health, hospital was contracted with a water cleaning company; laminar flow aerators were installed, water sampling plan was implemented and ultimately the whole building’s water system was hyper-chlorinated.

Conclusion. While water contamination was the most likely source, a specific cause could not be identified. An important lesson learnt is the quick implementation of infection control measures after identifying infected patients is key in controlling an outbreak.

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2461. Community-Acquired in Name Only: A Cluster of Carbapenem-Resistant Acinetobacter baumannii in a Burn Intensive Care Unit

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Background. Detection of nosocomial outbreaks often relies on epidemiological definitions of community and nosocomial acquisition. We report a cluster of three carbapenem-resistant Acinetobacter baumannii (CRAB) infections linked to a single source patient with infections occurring within 2 days of admission to a burn intensive care unit (ICU). The epidemiological investigation was supplemented by whole-genome sequencing (WGS) of clinical and environmental isolates.

Methods. Study participants included burn ICU patients identified with infections caused by CRAB. A detailed review of patient demographic and clinical data was conducted. Clinical A. baumannii isolates were assessed by antimicrobial susceptibility testing and WGS. Review of infection control practices on the affected unit was followed by environmental sampling. A. baumannii isolates obtained through environmental sampling were assessed for carbapenem resistance and then underwent WGS for comparison to the clinical isolates.

Results. Three cases of CRAB infection in the affected unit spanning a period of 3 months were linked to a preceding source patient, with CRAB isolates from the four patients differing by 5–7 single nucleotide variations. All case patients had been admitted to the same room within 2 days before development of CRAB infection. Environmental sampling performed while the third case patient occupied the room identified highly contaminated areas, and environmental CRAB isolates linked the patient isolates. The contaminated areas were subsequently re-sampled after enhanced terminal cleaning of the room. No additional CRAB was isolated, but other pathogenic organisms were recovered.

Conclusion. We report a cluster of three infections caused by highly resistant A. baumannii that occurred in a burn intensive care unit over a period of 3 months, linked to a single source patient. Three case patients developed infections classified as community-acquired using standard epidemiological definitions, however, whole-genome sequencing revealed clonality. An extensive investigation identified the role of environmental reservoirs. Burn patients may be particularly vulnerable to early-onset nosocomial infection from environmental contamination.

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2462. Public Health Response to Contain the First Outbreak of New Delhi Metallo-β-Lactamase-Producing Klebsiella pneumoniae in Minnesota

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Saturday, October 5, 2019: 12:15 PM

Background. Carbapenem-resistant Enterobacteriaceae (CRE) producing the New Delhi metallo-β-lactamase (NDM) carbapenemase are uncommon in the United States but are a serious threat for untreatable antibiotic-resistant infections. In Minnesota (MN), NDM-CRE is typically associated with receipt of healthcare abroad. We describe the public health response to contain the first outbreak of NDM-CRE in MN.

Methods. CRE is reportable, with isolate submission to the MN Department of Health (MDH) for MALDI-TOF identification, phenotypic carbapenemase production testing, and PCR for carbapenemase genes. On December 24, 2018, MDH identified a case of NDM-K. pneumoniae in a long-term care facility (LTCF) without travel. MDH initiated an investigation. We defined a case as having NDM-K. pneumoniae matching the outbreak PFGE pattern from a clinical or surveillance culture. Cases were identified through surveillance, point prevalence survey (PPS) rectal swab colonization testing, and PFGE at MDH. MDH collected a healthcare exposure history for all cases. A containment response occurred in any facility where a case received healthcare in the 30 days prior.

Results. Nine cases of clinical NDM-K. pneumoniae were identified. Three cases were identified between December 24, 2018 and March 26, 2019, and were residents of LTCF A and B, and was a roommate in LTCF B of a former LTCF A resident. PPS testing of 260 healthcare contacts occurred in 6 facilities, including LTCF A, LTCF B, and acute care hospitals (ACH) that accepted LTCF A transfers; 7/9 cases were identified through PPS and 2/9 cases were identified through CRE surveillance. One case from LTCF A was identified in an ACH, but PPS did not identify transmission in ACHs. MDH conducted on-site infection control assessments in 2 LTCFs, identified numerous infection control (IC) lapses at LTCF A, and provided telephone IC consultation to 4 ACHs.

Conclusion. Surveillance and PPS uncovered an outbreak of NDM CRE in 2 LTCFs. Patient transfers led to a regional public health response lasting several months that included IC consultation and additional PPS. Intervention to coordinate containment responses among interconnected healthcare facilities is critical to containing the spread of novel resistance mechanisms in the United States.

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2463. Increased Rates of Candida Bloodstream Infections Associated with Drug Use, United States 2012–2017

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Background. Opioid misuse is epidemic in the United States (US), and persons who inject drugs are at increased risk for serious bacterial and fungal infections, including Candida bloodstream infections. Historically, candidemia has occurred almost exclusively among patients with severe underlying illness and extensive healthcare exposure. We examined whether the opioid crisis may be having an impact on the epidemiology of candidemia in the United States.

Methods. Using data from 200 US hospitals reporting to the Premier Healthcare Database (PHD) between 2012–2017, we conducted a retrospective study among hospitalized persons ≥18 years. Candidemia was defined by any blood culture yielding Candida species. Drug use-associated (DUA)-candidemia hospitalizations were defined as hospitalizations having both candidemia and at least one ICD-9-CM or ICD-10-CM diagnostic code for recreational drug use; drugs were classified as opioids, cocaine, amphetamines, or other drugs (excluding cannabis, alcohol, and nicotine).

We described the characteristics and annual trends of candidemia hospitalizations stratified by drug use.

Results. Of 7,590 candidemia hospitalizations during 2012–2017, 679 (9%) were DUA-candidemia. During this time, the rate of DUA-candidemia increased from 3.6 to 9.1 per 100,000 hospitalizations, while the rate of non-DUA-candidemia decreased from 64.7 to 55.6 per 100,000 hospitalizations. Patients with DUA-candidemia were younger (median 40 vs. 64 years), had a longer lengths of stay (median 14 vs. 13 days), and had lower in-hospital mortality (12% vs. 26%). Among DUA-candidemia hospitalizations, opioids accounted for 78% of substances identified. Among patients aged 18–44 years, the proportion of candidemia hospitalizations associated with drug use more than tripled from 13% in 2012 to 44% in 2017 (Figure 1).

Conclusion. DUA-candidemia hospitalizations increased almost 3-fold during 2012–2017, with drug use identified in nearly half of candidemia patients ages 18–44 years in 2017. These data suggest that the opioid crisis is having an impact on the epidemiology of candidemia in the United States, especially among young adults, underscoring an additional negative consequence of the ongoing crisis.

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2465. Healthcare-Associated Pediatric Cutaneous Mucormycosis at Texas Children’s Hospital, 2012–2019

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Background. Cutaneous mucormycosis in children is a rare fungal infection which primarily occurs in patients with underlying medical conditions and is associated with significant morbidly. We describe characteristics of pediatric patients with healthcare-associated (HCA) cutaneous mucormycosis at Texas Children’s Hospital (TCH) and results of an outbreak investigation.

Methods. Patients at TCH were identified retrospectively through review of the TCH Microbiology Laboratory mycology culture reports from 1/1/2012–12/18/2019. Pediatric patients <21 years of age with cutaneous mucormycosis that developed during a hospitalization or was associated with a medical device were included. Demographic information was collected through review of the electronic medical record. Randomly amplified polymorphic DNA (RAPD) analysis were performed by the Fungus Testing Laboratory, University of Texas Health Science Center at San Antonio. This study was approved through the Baylor College of Medicine Institutional Review Board.

Results. We identified 12 patients with HCA cutaneous mucormycosis. The characteristics of these patients are detailed in the table. Six cases of Rhizopus infection occurred over a narrow 7 month period from March through September of 2017 prompting an outbreak investigation. Genotyping results revealed 4 molecular types from 5 available isolates suggesting that the isolates were not clonally related. Adhesive products were suspected as a potential source. Infection Control activities included site visits to the hospital supply warehouse and linen facility. Tape practices throughout the hospital were assessed through a nursing survey. Samples of adhesive products were cultured at an environmental microbiology laboratory and no Rhizopus spp. were isolated. A source was not identified.

Conclusion. Mucormycosis is a life-threatening infection in children. Providers should have a low threshold of suspicion for cutaneous mucormycosis in patients with underlying medical conditions (malignancies and extreme prematurity) that develop skin lesions near medical device dressings or securing sites.

Table. Characteristics of healthcare-associated cutaneous mucormycosis cases

| Characteristic | Cases N=12 |
|----------------|-----------|
| Age (median)   | 0.7 years (0-20.6) |
| Gender, N/%    | Female 8 (67) |
|               | Male 4 (33) |
| Underlying conditions, N/% | Extremity 5 (42) |
|               | Malnourished or BMI 5 (42) |
|               | Congenital heart disease 1 (8) |
|               | Solid organ transplant 1 (8) |
| Infection extent, N/% | Localized 6 (50) |
|               | Invasive 3 (25) |
|               | Disseminated 3 (25) |
| Infection location, N/% | CVC or PV site 5 (42) |
|               | External device securing site 3 (25) |
| Genres, N/%    | Rhizopus 11 (92) |
|               | Mucor 1 (8) |
| Outcomes, N/%  | Successful treatment 5 (42) |
|               | 30 day mortality 4 (33) |

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