Nurse stealing opioids from patients' syringes responsible for deadly hospital outbreak

A hospital nurse who tampered with opioid-containing syringes to syphon off the drug caused a 2014 outbreak of *Serratia marcescens* at the University of Wisconsin Hospital, resulting in five illnesses and one death, according to study findings publishing in *Infection Control and Hospital Epidemiology*.

"This incident sadly adds to the handful of health care-associated bacterial outbreaks related to drug diversion by a health care professional," **Nasia Safdar, MD, PhD,** hospital epidemiologist at the University Hospital in Madison, Wisconsin, said in a press release. "Our experience highlights the importance of active monitoring systems to prevent hospital-related drug diversion, and to consider this potential mechanism of infection when investigating health care-associated outbreaks related to gram-negative bacteria."

Hospital staff identified six patients infected with *S. marcescens* within a 5-week period from March 1 to April 8, 2014. Because fewer than 10 *S. marcescens* bloodstream infections are usually identified in the facility each year, an outbreak investigation was subsequently launched. Through molecular typing, investigators determined that five of the six patients had identical *S. marcescens* isolates and were included in the analysis. Four of the patients affected by the outbreak recovered; however, one died from *Serratia* sepsis infection.

Shortly after the outbreak was detected, hospital staff discovered four hydromorphone and six morphine patient-controlled analgesia (PCA) syringes in an automated medication dispensing cabinet that had been tampered with. Toxicology lab testing revealed that seven of these syringes had undetectable levels of medication, which triggered a controlled substance diversion investigation. Almost a month later, three more hydromorphone PCA syringes appeared to have been tampered with and had undetectable levels of medication. After hospital staff identified another contaminated syringe while testing a random sample collected from the pharmacy and cabinets of different patient units, they removed and restocked all morphine and hydromorphone PCA syringes. Overall, staff found 42 syringes with evidence of drug diversion. The syringes appeared to have been filled with a saline or lactate-ringers-like solution instead of the active medication. A nurse working in the post-anesthesia care unit (PACU) was eventually linked to the diversion and immediately terminated.

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> — NASIA SAFDAR, MD, PHD, AND COLLEAGUES

Investigators then set out to determine whether the outbreak and diversion were possibly connected. They found that four of the patients were exposed to *S. marcescens* during a postoperative stay in the PACU. In addition, they discovered that the nurse accessed cabinets containing contaminated PCA syringes within a short period before the syringes were administered to all four patients. The only patient who did not visit the PACU was identified as the suspected nurse's father, who lived with her before and after his hospitalization and was exposed to *S. marcescens* before his admission.

Safdar and colleagues hypothesized that the syringes became contaminated when the nurse withdrew the opioid medication and refilled them with saline-like solution. Because IV fluids from the PACU and inpatient pharmacy area did not have evidence of *S. marcescens* contamination, the researchers suggested that the replacement solution was brought in from a source outside of the hospital. No additional cases of *S. marcescens* were detected after the nurse was terminated.

"Unfortunately, in the context of the current U.S. epidemic of opioid addiction, our experience is not isolated," they researchers wrote. "The CDC has reported a total of nine health care-associated bacterial and hepatitis C outbreaks related to drug diversion by health care workers within the last 30 years. The common mechanisms of infection were tampering with injectable controlled substances, such as opioids administered by PCA pumps, fentanyl syringes and vials." – *by Stephanie Viguers* ■

Reference:
Schuppener LM, et al. *Infect Control Hosp Epidemiol*. 2017;doi:10.1017/ice.2017.137.

Disclosure: The researchers report no relevant financial disclosures.

C. auris survives 7 days on moist or dry surfaces

In an experiment, multiple strains of *Candida auris* survived for 7 days on both moist and dry surfaces, supporting a hypothesis about one of the ways the emerging and often drug-resistant fungal pathogen can spread, researchers said.

C. auris emerged suddenly on several continents in 2008 or 2009 and has been implicated in hospital outbreaks around the globe, including approximately100 cases in the United States, according to the CDC. Earlier this year, experts interviewed by *Infectious Disease News* voiced concern over the fungus' drug resistance and the difficulty of distinguishing it from other invasive *Candida* infections.

Writing in *Infection Control and Hospital Epidemiology*, researchers said that although *C. auris* has been recovered from health care surfaces, it was unclear how it compares with other *Candida* species in this regard. The results of their study showed that *C. auris* has a greater propensity to survive on surfaces than *C. albicans* but not *C. parapsilosis* or *C. glabrata*. Moreover, *Candida* species in general were likelier to persist on moist surfaces than other pathogens.

"In comparison to common bacterial pathogens, *Candida* species were recovered with similar frequencies from dry surfaces and were recovered significantly more often from moist areas such as sinks," **Curtis J. Donskey, MD,** professor of medicine at Case Western Reserve University and staff physician in the infectious diseases section at Louis Stokes Cleveland VA Medical Center, and colleagues wrote.

"These results provide support for the hypothesis that contaminated surfaces could be an important for transmission of *Candida auris*," they said.

> **"Further data are needed regarding the efficacy of different disinfectants against *C. auris*."**
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> — CURTIS J. DONSKEY, MD, AND COLLEAGUES

Donskey and colleagues conducted a culture survey examining eight strains of *C. auris* and three strains each of *C. albicans, C. parapsilosis* and *C. glabrata* on moist and dry surfaces for up to 7 days. The researchers used non-nutrient agar to simulate moist surfaces and steel disks for dry surfaces. These were inoculated with each species and then sampled after 2 hours and at 1, 2 and 7 days. In the hospital, they used swabs to test moist surfaces like sinks and shower drains and dry surfaces like bed rails, bedside tables, call buttons and telephones.

According to the results, each strain of *Candida* species was detectable on the steel disks after 7 days, although the percent of recovery of each species decreased. For *C. auris*, the recovery rates of all eight strains were similar, Donskey and colleagues reported. The rates were significantly greater at the beginning and end of the study period than those of *C. albicans* but significantly less than those of *C. parapsilosis*. Donskey and colleagues said no significant decrease was seen in the recovery rate of any *Candida* species on the moist non-nutrient agar.

C. auris was not isolated from any of the hospital samples, but other *Candida* species were recovered significantly more often than other pathogens from the moist surfaces, with no significant difference seen on dry surfaces.

"The high recovery rate of non-*albicans Candida* species from hospital surfaces suggests that the environment might be an underappreciated reservoir for spread of *Candida* species other than *C. auris,*" Donskey and colleagues wrote. "Non-*albicans Candida* species, including *C. lusitaniae, C. parapsilosis* and *C. glabrata*, have been recovered from the hospital environment. Further studies are warranted to investigate the role of contaminated surfaces in transmission of *Candida* species."

Donskey and colleagues noted that the CDC recommends using an EPA-registered, hospital-grade disinfectant that is effective against *Clostridium difficile* to protect against environmental infection with *C. auris*.

"Further data are needed regarding the efficacy of different disinfectants against *C. auris*," they wrote. "Given that we frequently recovered *Candida* species from moist surfaces, the potential for spread of *C. auris* from moist sites, such as sinks that have been implicated in dissemination of multidrug-resistant, gram-negative bacilli, should also be clarified." – *by Gerard Gallagher* ■

Reference:
Piedrahita CT, et al. *Infect Control Hosp Epidemiol*. 2017;doi:10.1017/ice.2017.127.

Disclosure: Donskey reports receiving research grants from Merck, GOJO, STERIS and EcoLab and serving on an advisory board for 3M.