E. coli outbreak at hospital associated with contaminated specialized GI endoscopes

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Despite no lapses in the disinfection process recommended by the manufacturer being identified, specialized gastrointestinal endoscopes called duodenoscopes had bacterial contamination associated with an outbreak of a highly resistant strain of *E coli* at a hospital in Illinois, according to a study in the October 8 *JAMA*, a theme issue on infectious disease.

The duodenoscope is different than that used for routine upper gastrointestinal endoscopy or colonoscopy. The procedure associated with these specialized scopes is endoscopic retrograde cholangiopancreatography (ERCP), an important and potentially lifesaving medical procedure that allows doctors to diagnose and treat life-threatening problems in the bile and pancreatic ducts.

Carbapenem-resistant Enterobacteriaceae (CRE) are multidrug-resistant organisms isolated predominantly from patients with exposures in health care facilities. CRE are a public health concern because treatment options are limited and invasive infections are associated with a risk of death. The New Delhi metallo-beta-lactamase (NDM) is a carbapenemase (an enzyme that breaks down antibiotics) that has been infrequently reported in the United States. However, NDM-producing CRE have the potential to add substantially to the total CRE burden. Understanding transmission and preventing further spread of CRE is a public health priority, according to background information in the article.

In March 2013, NDM-producing *Escherichia coli* was identified from a patient at a teaching hospital in Illinois. Between March 2013 and July 2013, 6 additional patients with a history of admission to this hospital had positive clinical cultures for NDM-producing *E coli*. In August 2013, Lauren Epstein, M.D., M.Sc., of the Centers for Disease Control and Prevention, Atlanta, and colleagues launched an investigation to identify the source and prevent further NDM¬-producing CRE transmission at this hospital. Interviews were conducted with health care personnel at the hospital.

A medical record review revealed that a history of ERCP procedures involving the use of a duodenoscope was common among initial cases. In total, 39 case patients were identified from January 2013 through December 2013, 35 with duodenoscope exposure. In this outbreak, 39 patients with NDM-producing CRE were identified from January 2013 – December 2013, 35 with duodenoscope exposure in 1 hospital. Some of those patients had positive blood cultures, often an indication of infection and others were found to be colonized with CRE but did not have a CRE infection.

NDM-producing *E coli* was recovered from a reprocessed duodenoscope and shared similarity to all case patient isolates. Based on a case-control study, case patients had significantly higher odds of being exposed to a duodenoscope. The authors write that the large number of exposed patients that ultimately had NDM-producing CRE isolated from clinical or screening cultures suggests that duodenoscopes were an efficient source of transmission.

An infection prevention assessment that focused on duodenoscope reprocessing (such as cleaning) was conducted, and it was found that the hospital followed all manufacturer-recommended procedures. After the hospital changed its duodenoscope reprocessing to a gas sterilization procedure, no additional case patients were identified.

"The complicated design of duodenoscopes makes cleaning difficult. It appears that these devices have the potential to remain contaminated with pathogenic bacteria even after recommended reprocessing is performed," the researchers write. They add that another option for ensuring adequate duodenoscope reprocessing might be to conduct testing for residual contamination during reprocessing. "Many international professional societies recommend periodic microbiological surveillance testing of duodenoscopes after full reprocessing."

"Facilities should be aware of the potential for transmission of antimicrobial-resistant organisms via this route and should conduct regular reviews of their duodenoscope reprocessing procedures to ensure optimal manual cleaning and disinfection."

William A. Rutala, PhD., M.P.H., and David J. Weber, M.D., M.P.H., of University of North Carolina Health Care, Chapel Hill, comment on the findings of this study in an accompanying editorial.

"Clinicians should be encouraged to report and publish cases of infectious diseases related to endoscopy, especially if current reprocessing methods were adhered to, so it can be determined if the report by Epstein et al is the tip of the iceberg or an isolated occurrence. If the former, then revision of the endoscope reprocessing guidelines will be necessary to ensure patient safety. However, regardless of when these issues are resolved, endoscopy will remain an important diagnostic and therapeutic modality and should continue to be used while clinicians strictly adhere to current endoscope reprocessing guidelines."

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