Presentation Type:
Poster Presentation

Investigation of the First Case of New Delhi Metallo-β-Lactamase-1–Producing *Pseudomonas aeruginosa* in Texas

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Background: New Delhi metallo-β-lactamases impart resistance to carbapenems. Enterobacteriaceae carrying New Delhi metallo-β-lactamases have been reported before. However, only 7 cases of *bla*NDM-carrying *Pseudomonas aeruginosa* has been reported from 4 states in the United States as of January 1, 2018, according to the CDC. We describe an epidemiologic investigation of the first reported case of *bla*NDM-carrying *Pseudomonas aeruginosa* in Texas and the measures that controlled the spread of the organisms carrying this gene at a 30-bed spinal cord injury unit (SCI) and the acute-care hospital within the Veterans' Affairs North Texas Health Care System. **Methods:** After identification of *bla*NDM-1–carrying *P. aeruginosa* from a urine culture in an SCI patient who received medical treatment in Thailand prior to transfer, we performed a rectal screen for the presence of *bla*NDM in the index patient's hospital roommates. Based on the results, we expanded the investigation to other patient care units that had provided care to the patient. We initiated universal contact isolation precautions, 1:1 nursing care, restricted movement, phased point-prevalence testing, and intense environmental cleaning until the threat of *bla*NDM was mitigated. Whole-genome sequencing (WGS) was performed on clinical isolates from the index patient and the roommates by the CDC. **Results:** Of the 2 roommates of the index, 1 patient had a urine culture positive for *bla*NDM-5-carrying *Escherichia coli*. The second roommate has subsequently grown *bla*NDM-1-carrying *P. aeruginosa* from a clinical culture. A third patient who was in the same unit as the index patient but not in the same room in an acute-care unit tested positive for *bla*NDM in a rectal screen. Of the 54 patients who were hospitalized in the same unit as the index patient, 26 refused to get the test and 28 tested negative. In addition, point-prevalence rectal screening was conducted in the SCI in 3 phases that were 3 to 4 weeks apart. All of these screening tests were negative. WGS revealed that the index patient and roommate 2 had *bla*NDM-1–carrying *P. aeruginosa*, whereas the roommate 1 had *bla*NDM-5–carrying *E. coli*. No further spread occurred.

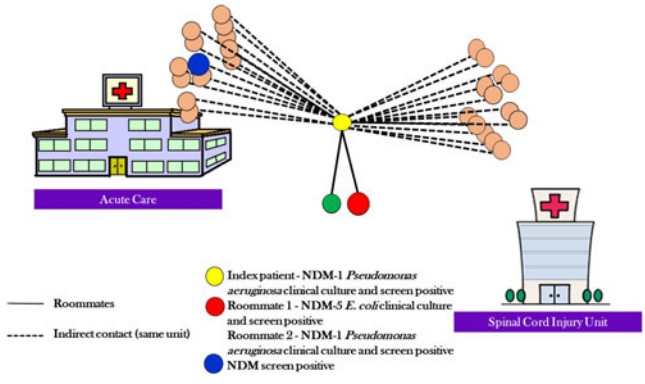

Fig. 1.

Whole Genome Sequencing

TX_1903_WGS - NDM		Antibiotic Resistance Genes	
Source	Species	blandm-1(beta-lactam)	blandm-5(beta-lactam)
Urine	*Pseudomonas aeruginosa*	[100/100]C:[100/100]S	
Tissue	*Pseudomonas aeruginosa*	[100/100]C:[100/100]S	
Urine	*Escherichia coli*		[100/100]C:[100/100]S

Fig. 2.

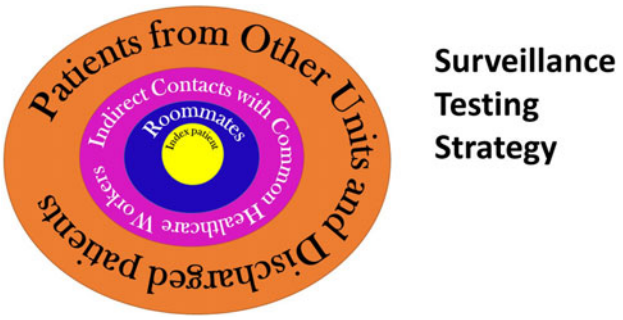

Fig. 3.

Conclusions: Our aggressive efforts quickly mitigated further spread of *bla*NDM. Our epidemiologic investigation indicates that an intergenus transfer of *bla*NDM from *P. aeruginosa* to *E. coli* likely took place. In addition, it appears there was an evolution of NDM-1 to NDM-5, which differs from the former by 2 amino acid substitutions at positions 88 (Val→Leu) and 154 (Met→Leu). This type of evolution has been shown by prior studies to confer increased antibiotic resistance in certain resource limited settings.

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Is Hospital-Onset Bloodstream Infection (HOBSI) a Useful Measure to Evaluate Infection Prevention Progress?

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Background: Acute-care hospitals in the United States are required to submit 6 healthcare-associated infection (HAI) metrics to the CMS for reporting and performance purposes prior to payment. We examined the association between HAI rate trends and hospital-onset bloodstream infection (HO-BSI) rate trends across a large, multihospital health system. **Methods:** HO-BSI events were identified across 52 hospitals attributable to *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Klebsiella pneumoniae,* or *Candida* spp using the NHSN Lab ID event definition of ≥day 4 of admission. We compared the performance from January 2016 to March 2019 for HO-BSI and the 6 NHSN-defined HAIs: central-line–associated bloodstream infection (CLABSI), catheter-associated urinary tract infection (CAUTI), *Clostridioides difficile*, methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia, abdominal hysterectomy surgical site infections (SSIs), and colon