Molecular Detection of Multi-Drug Resistant Organism (MDRO) Colonization in a High Risk Patient Population

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BACKGROUND

- Multi-Drug Resistant Organisms (MDROs) present substantial clinical and financial burden to patients and hospitals.
- Links between MDRO colonization and risk of subsequent infection in high risk patient populations are not fully characterized.
- Rapid molecular identification of MDRO could optimize detection, outbreak investigation, and implementation of measures to interrupt transmission.

METHODS

- Prospective surveillance for nasal and perianal MDRO colonization was instituted over a 3 month period in patients admitted to the Children’s National Medical Center oncology and stem-cell transplant wards.
- MDRO was defined as either Methicillin Resistant Staphylococcus aureus (MRSA), Vancomycin-Resistant Enterococcus (VRE), Extended-Spectrum Beta-lactamase producing gram negative bacilli (ESBL), or Carbapenem-resistant Enterobacteriaceae (CRE).
- Enrolled subjects were subsequently monitored for 3-6 months for presence of invasive infection and any correlation with colonization.
- Nasal and perianal E-swabs were simultaneously analyzed using standard culture-based screening methods, as well as OpGen’s Acuitas™ MDRO Gene Test.

RESULTS

- Forty-eight patients were enrolled, from whom 42 perianal and 32 nasal swabs were obtained.
- Using standard culture-based screening methodology, 14/42 (33%) perianal and 0/32 (0%) nasal swabs screened positive for possible MDRO.
- OpGen’s Acuitas MDRO Gene Test and subsequent standard culture and antibiotic susceptibility testing confirmed 4 of these 14 as actual MDRO (4/42;10%) [3 VRE (VanA) and 1 ESBL (CTX-M)].
- Three to six month follow-up revealed no MDRO invasive infections in the study cohort.
- Non-MDRO invasive infections were identified in 10/48 (21%) subjects due to Bacillus, Klebsiella, Micrococcus, Pseudomonas, rapid-growing Mycobacteria, Staphylococcus aureus, and Streptococcus viridans group.
- Eight of 10 infected subjects were not previously colonized with any pathogen
- 1 was colonized with different pathogens
- 1 was both colonized and infected with Pseudomonas, but with differing antibiotic susceptibilities.

CONCLUSIONS

- OpGen’s Acuitas MDRO Gene Test and standard culture accurately identified and excluded MDRO colonization in patients from the oncology and stem-cell transplant wards.
- Colonization with non-MDRO or MDRO pathogens did not predict likelihood or etiology of subsequent invasive infection.
- The utility of screening high-risk patient populations for MDRO colonization requires further characterization.