596. Distinct, Segregated Daptomycin-Susceptible and Daptomycin-Nonsusceptible Staphylococcus aureus Populations Associated with Tricuspid-Valve Infective Endocarditis

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Session: 65. Mechanisms of Antimicrobial Resistance
Thursday, October 3, 2019: 12:15 PM

Background. Loss of daptomycin susceptibility in Staphylococcus aureus is often associated with sequestered focci of infection, driven by selection pressure from both administered antibiotics and host defense peptides. Susceptibility testing of the organism cultured from blood is assumed to parallel that of the infectious foci, such as heart valves. We studied a case of tricuspid valve endocarditis where one leaflet yielded exclusively daptomycin-nonsusceptible S. aureus and another leaflet yielded purely daptomycin-susceptible S. aureus. We examined the responses of the two populations to different anti-staphylococcal therapies to identify regimens effective against both isolates.

Methods. Both isolates were whole-genome-sequenced using Illumina technologies. The presence of heterogeneous daptomycin-resistant subpopulations was assessed by deletion plating and population analysis profiling. One compartment pharmacokinetic/pharmacodynamic modeling was used to simulate different potential antistaphylococcal pharmacotherapies against each isolate. Hemolysin activity was evaluated as a surrogate for accessory gene regulator function.

Results. The daptomycin-susceptible isolate did not demonstrate heteroresistance while the daptomycin-resistant population was uniformly daptomycin-resistant with invasiveness. Good hand-washing and contact precautions reduce transmission. However, long-term contact isolation, sometimes for months, causes dissatisfaction among neonatal intensive care unit (NICU) care providers and parents. We examined the effectiveness of MRSA decolonization among neonates over 3 years.

Methods. Our NICU patients are routinely screened for MRSA colonization by PCR testing of nasal and rectal swabs upon admission and every 2 weeks. Patients with a history of MRSA infection or colonization became eligible for MRSA eradication upon reaching 2000g. Our protocol included intranasal mupirocin 2% ointment applied to both nares twice daily for 5 days and 2% chlorhexidine wipe bath daily for 7 days. Wipes were used for bathing from the neck down for at least 20 sec per wipe. Two wipes were used for patients < 10 kg with the first wipe being used on the neck, chest, arms, and back, and the second wipe being used on the legs, buttocks, and perineum. Patients were excluded from chlorhexidine bathing if they had a known allergy, were < 27 weeks gestation, < 1 week chronological age, receiving phototherapy, or had severe skin disease, open wounds, or burns. Contact isolation was discontinued if 2 sets of nares and rectal PCR swabs 5 days apart were negative and the patient had not been on antibiotics during the screening period. Surveillance MRSA PCR testing continued. Contact isolation was to be re-initiated if subsequent MRSA screening was positive.

Results. Patients were not decolonized a second time.

Conclusion. 85% of neonates with MRSA failed decolonization. Using mupirocin intranasally and chlorhexidine bathing to decolonize neonates with MRSA was welcomed by staff and families, but was poorly effective.

Disclosures. All authors: No reported disclosures.