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Oral Session

New transmission routes and genotypic diversity: are we looking at a new MRSA?

HIGHER INCIDENCE OF COMMUNITY-ASSOCIATED STAPHYLOCOCCUS AUREUS AND METHICILLIN-RESISTANT S. AUREUS BACTEREMIA IN SOUTHERN LATITUDES AMONG 104 UNITED STATES (US) HOSPITALS: RETROSPECTIVE COHORT STUDY

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Objectives. European MRSA epidemiology suggests that southern latitude countries have higher rates of MRSA infections. However, this association is less well studied in the US and analyses don't account for underlying *S. aureus* bacteremia rates. Certain ecological or climate differences between northern and southern locations may explain the higher rates of MRSA in southern latitudes. We examined the association between latitude and hospital-level incidence of *S. aureus* and MRSA bacteremia in a multicenter cohort of US hospitals.

Methods. We analyzed a retrospective cohort of all patients with a first episode of *S. aureus* bacteremia admitted to acute care facilities in the US Veterans Affairs Healthcare System during 2004-2010. Data collected from each facility included, number of *S. aureus* bacteremias/1000 admissions, latitude, season, and hospital complexity level. Cultures collected within 48 hours of admissions were considered community-associated; those collected after 48 hours were hospital-associated. The primary outcome was rate of community-associated *S. aureus* bacteremia since the environment would be expected to have a greater impact on community strains compared to hospital strains. Statistical analysis was completed using Poisson regression with monthly admission as denominator and autoregressive correlation over time. Our institutional review board approved this study and the abstract was prepared following the STROBE Statement criteria.

Results. 21,148 patients with *S. aureus* bacteremia admitted to 104 facilities during the 7-year study were included. Hospital latitude ranged from 18.4 to 47.7 degrees. Restricting the analysis to 9,048 community-associated *S. aureus* bacteremias and adjusting for season and hospital complexity level, a 10 degree increase in latitude was associated with a 14% decrease in relative risk of infection (RR = 0.86, 95% CI = [0.75, 0.99]); a 20 degree increase in latitude corresponded to a 25% decrease in infection (RR = 0.75, 95% CI = [0.57, 0.98]); and a 30 degree increase in latitude corresponded to a 36% decrease in infection (RR = 0.64, 95% CI = [0.43, 0.98]). (see Figure) Similarly, when analyzing 12,476 MRSA bacteremia cases, a 30-degree increase in latitude corresponded to a 36% decrease in relative risk of MRSA bacteremia (RR = 0.64, 95% CI = [0.43, 0.93]) after adjusting for seasonal variation and hospital complexity level.

Conclusion. After adjusting for hospital complexity level and season, higher (northern) latitude was associated with significantly lower rates of community-associated *S. aureus* bacteremia and MRSA bacteremia. A 30-degree increase in latitude was associated with 36% relative decrease in both the community-associated bacteremia and MRSA bacteremia incidence rate. Thus, regional variation in *S. aureus* and MRSA may be partially explained by geographical and climate factors and not specific hospital practices. Further analyses are needed to identify which geographic factors are driving this association.

