

Background. Daptomycin (dap) has been approved and successfully used for the treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) infections. However, reports of daptomycin nonsusceptible (DNS) MRSA strains have emerged over the recent years. This study describes the clinical characteristics of patients with DNS MRSA bloodstream infections (BSIs) with the objective of identifying risk factors and outcomes.

Methods. This is a retrospective case-control study in a tertiary healthcare system in southeast Michigan. Cases included 34 patients with DNS MRSA BSI between September 24, 2005 and March 31, 2018. Cases were matched with controls with MRSA BSI based on age, source of BSI, and time-period of BSI in a 1:1 ratio. Charts were reviewed for clinical and laboratory data. Vancomycin (van) and dap minimum inhibitory concentrations (MICs) were determined by E-test. DNS was defined as an MIC > 1.0 µg/mL. Chi-square test, Fisher's exact test, and t-test were used to determine statistical significance.

Results. In the case cohort, the source of BSI was endovascular in 11(32%) patients, central-line associated in 3(9%), secondary BSI in 13(38%), and unknown in 7(21%). Table 1 is a summary of the results.

Table 1. Clinical Characteristics and Outcomes of Cases and Controls

	Cases	Controls	P-value
	N = 34(%)	N = 34(%)	
Mean age (SD)	63.5 (12.0)	61.9 (11.2)	0.572
Male	18 (52.9)	21 (61.8)	0.462
Mean bacteremia duration in days (SD)	4.4 (3.2)	5.9 (4.9)	0.195
Mean LOS in days (SD)	19.5 (13.6)	18.4 (14.6)	0.751
Mean van MIC (SD)	2.04 (1.19)	1.39 (0.36)	0.003
Mean dap MIC (SD)	2.69 (1.32)	0.57 (0.24)	<0.0001
Epidemiologic acquisition			
Community-acquired	0 (0)	9 (26.5)	0.002
Healthcare-associated	21 (63.6)	22 (64.7)	0.927
Hospital-acquired	12 (36.4)	3 (8.8)	0.007
90-day prior dap exposure	23 (82.1)	3 (9.7)	<0.0001
Mean dap exposure in days	23.6 (21.0)	2.68 (10.6)	<0.0001
90-day prior van exposure	25 (89.3)	9 (29)	<0.0001
Mean van exposure in days	13.0 (14.7)	4.19 (12.7)	0.020
30-day mortality ^a	10 (32.3)	6 (18.8)	0.218
Mean Charlson Comorbidity Index (SD)	5.7 (3.07)	4.4 (2.9)	0.077
90-day MRSA BSI recurrence ^a	8 (44.4)	2 (9.5)	0.025

^aFrom date of index BSI.

Conclusion. Prior exposure to dap and van, and higher van MIC in MRSA isolates are risk factors for DNS MRSA BSI. DNS is associated with significantly higher rates of 90-day MRSA BSI recurrence.

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1223. Increasing Incidence of Methicillin-Resistant *Staphylococcus aureus* in Greenland

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Background. The first case of methicillin-resistant *Staphylococcus aureus* (MRSA) in Greenland was diagnosed in 2000 and led to the first guideline on screening and treatment for MRSA. Up to 2015 there were only 13 patients with MRSA but since then a nearly 4-fold increase in incidence has been seen. The objectives of this study were to analyze the reasons for this increase.

Methods. MRSA data were collected from the laboratory surveillance database at Dronning Ingrid's Hospital, typing results from the Reference Laboratory for Antimicrobial Resistance and Staphylococci at SSI, and the patient records.

Results. From 2000 to 2017, 48 patients (15 children and 33 adults) have been diagnosed with MRSA. Thirty patients were colonized with MRSA, predominantly in the nose and throat. Eighteen patients had infections: conjunctivitis, middle ear infections, wounds, skin abscesses, mastitis, surgical site infections, for example.

The increase since 2015 was mainly due to three large outbreaks in three different cities: Aasiaat in 2014/2015 (seven persons with MRSA; three children and four adults), the capital Nuuk in 2016 (six persons with MRSA; two children and four adults) and Tasiilaq in 2017 (13 persons with MRSA; three children and ten adults). The first two outbreaks were community-acquired with transmission in families and the last one was community-acquired or community-onset hospital acquired. Each outbreak was caused by a specific MRSA-type: t902 CC22 in Aasiaat (unknown epidemiology), t3979 CC5 in Nuuk (probably from Australia), and t304 CC6 in Tasiilaq (probably from Denmark).

MRSA was mainly imported from Denmark or abroad due to admission to hospital or due to traveling to high-endemic countries like Australia, but in some cases the epidemiology was unknown. Transmission occurred mainly in families with close contact.

Conclusion. The increasing number of patients with MRSA in Greenland can be explained by factors such as import from Denmark or abroad due to admission to hospital or traveling, and transmission in Greenland. An ongoing surveillance, compliance to screening procedures (especially patients admitted to hospitals abroad) and guidelines for infection prevention and control are necessary in order to combat MRSA in Greenland in the future.

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1224. Drug-Resistance Dynamics of *Staphylococcus aureus* at a Tertiary Hospital, Beijing, China: 2013–2017

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Background. To understand the drug-resistance dynamics of *Staphylococcus aureus* and provide references for effective control of methicillin-resistant *Staphylococcus aureus* (MRSA) infection.

Methods. All data were obtained from the healthcare-associated infection surveillance system. Different strains of *S. aureus* were identified using the VITEK-2 automated system, the drug susceptibility results of resistance and intermediate were classified into resistance. Chi-square test and variation analyses of *S. aureus* drug-resistant rate were performed.

Results. From 2013 to 2017, 2,289 strains of *S. aureus* were isolated, and the specimen were mostly collected from sputum (721, 31.50%), wound secretion (211, 9.22%), and blood (210, 9.17%). The resistance rate of *S. aureus* was highest for tigecycline (94.43% in 2013, 100% in 2017) and penicillin (96.49% in 2013, 95.60% in 2017) ($P = 0.028$). The resistance rates among other drugs such as clindamycin (65.28% in 2013, 71.39% in 2017) and erythromycin (69.62% in 2013, 62.59% in 2017) were more stable ($P = 0.056$). However, oxacillin (from 73.68% to 34.47%), gentamicin (from 51.51% to 24.13%), and tetracycline (from 46.78% to 30.81%) showed a declining trend ($P = 0.017$). Meanwhile, there were almost no *S. aureus* resistance to linezolid, vancomycin, and nitrofurantoin. During the previous 5-year period, MRSA rates decreased sharply and in 2017 rate was 34.47%. In 2017, MRSA was most frequently isolated in orthopedics, emergency ICU, and respiratory.

Conclusion. The reduction in drug-resistant MRSA may be evidence of effective antibiotic administration practice. Whereas more comprehensive infection control measures are needed to prevent the transmission of *S. aureus* and MRSA.

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1225. High Rate of Linezolid (LZD) Nonsusceptibility (LNS) Among Enteric Vancomycin-Resistant Enterococci (VRE) Recovered From Hospitalized Patients Actively Screened for VRE Rectal Colonization (VREC)

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Background. Select hospitalized patients are actively screened for VREC but VRE isolates may not undergo antibiotic susceptibility testing. We sought to identify predictors of daptomycin (DAP) nonsusceptibility (DNS, MIC > 4) and LNS (MIC > 2) among enteric VRE isolates recovered from patients actively screened for VREC for which antibiotic susceptibility testing was not performed.

Methods. This was a retrospective study of consecutive adults admitted to a surgical intensive care unit (ICU) or associated medical unit between June 1, 2017 and March 1, 2018 who had a VRE isolate from active screening. Only index isolates were included. DAP and LZD MICs were determined by Etest. Patient- and antimicrobial-level data, including ambulatory prescriptions, dating back to January 1, 2016 were collected. Multivariable logistic regression models were used to determine predictors of DNS and LNS VRE.

Results. In total, 64 patients' VRE rectal isolates were included. Fifty-nine (92.2%) were *E. faecium* and 50 (78.1%) were from ICU patients. Thirty-seven patients (57.8%) were female and the mean age ± SD was 60 ± 13 years. Five (7.8%) and 20 (31.3%) patients had previous abdominal transplant and VRE infection, respectively. DAP and LZD MIC distributions are shown in the table below. Forty-one (64.1%) VRE isolates were LNS, including five LZD-resistant isolates. Only one (1.6%) isolate was DNS precluding an analysis of DNS predictors; 12 (18.8%) isolates had a DAP MIC > 2 mg/L. Common antimicrobial exposures prior to index VRE isolate included: vancomycin (62.5%), ceftriaxone (64.1%), cefepime (53.1%), metronidazole (50%), and ciprofloxacin (50%). Previous LZD (17.2%) and DAP (15.6%) exposure were less common. In a multivariable model, number of previous ceftazolin doses (adjusted odds ratio (aOR) 0.74 95% confidence interval (CI) 0.55–0.95), and previous tobramycin exposure (aOR 0.15, 95% CI 0.02–0.81) were inversely associated with LNS. Previous LZD exposure was not associated with LNS.