real BSI, respectively. Of those judged to be contaminants, 10 (20%) were positive in both bottles within a set, and thus falsely suggested true BSI. Of the 3 judged to be true BSI, 2 (66%) were positive in 1 out of 2 bottles, and thus falsely suggested contamination.

42 (84%) patients had repeat BCx drawn following the initial positive culture, and 26 (52%) were continued on IV antibiotics. Forty (80%) of the cultures were judged contaminants by the primary medical service, and 77% stopped antibiotics (20/26) when CoNS was identified.

Conclusion. These data show that reporting the number of bottles which are positive within a set provides misleading information and should not be used to determine whether a culture result represents contamination or true BSI.

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162. Identifying Determinants of Therapeutic Switch to Linezolid among Patients with Methicillin-Resistant Staphylococcus aureus Bloodstream Infections

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Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. In order to target future randomized controlled trials (RCT) of treatment of methicillin-resistant *S aureus* bloodstream infections (MRSA BSI), it will be important to understand the drivers of antibiotic selection. We aimed to determine factors associated with switching from vancomycin to inpatient linezolid administration during the management of MRSA BSI.

Methods. This retrospective cohort included all patients admitted to Veteran Affairs hospitals from 2007 to 2014 and had received vancomycin for MRSA BSI. Patients were considered to have switched to linezolid from vancomycin if they received at least 2 consecutive days of inpatient treatment and were not on concurrent vancomycin treatment. Cox proportional hazards models were used to identify factors that were associated with switch within 14 days and 30 days. Median with interquartile range (IQR), hazard ratio (HR) and 95% confidence intervals were reported.

Results. Among 7289 patients diagnosed with MRSA BSI during their index admission, 474 (6.5%) switched to linezolid during the admission. The median inpatient duration of vancomycin treatment among all patients was 13 days (IQR: 5–34) and among patients who switched was 16 days (IQR: 6–52). The median inpatient duration of linezolid treatment was 5 days (IQR: 1–13 days). Patients who switched to linezolid were more likely to have a MRSA isolate with MIC >=2 μg/mL (6.8% vs. 4.9%), diagnosis of respiratory tract infection (36.7% vs. 32.9%), or be obese (16.5% vs. 13.6%) than those who continued on vancomycin ($P < 0.10$). In risk-adjustment models, presence of a respiratory tract infection diagnosis was associated with greater likelihood of being switched to linezolid within 14- and 30-days (HR=1.29, 95% CI 1.01–1.64; HR=1.32, 95% CI 1.06–1.65).

Conclusion. Less than 10% of patients initially treated with vancomycin for MRSA BSI were switched to linezolid in this real-world study. A diagnosis of respiratory tract infection was a major determinant of switching to linezolid. It is important to identify potential subsets of MRSA BSI patients so that future comparative effectiveness RCTs can be targeted to indications with clinical equipoise in real-world practice settings.

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163. Infective Endocarditis in Qatar: Risk Factors, Clinical Characteristics, Microbiology, and Outcomes

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Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. Infective endocarditis (IE) is a serious and life-threatening disease. The aim of the study is to describe the epidemiology, clinical characteristics and outcomes of patients with IE in Qatar.

Methods. Patients were identified from the electronic records of Hamad Medical Corporation hospitals, the national referral center for the State of Qatar. Those aged ≥18 years with Duke Criteria-based diagnosis of IE during the period from January 2015 to September 2017 were included. Data were analyzed using STATA software Version 15.

Results. Fifty-seven cases were included, of which 70% were males. Mean age was 51 years (± 16.8). Eleven (19%) were in association with prosthetic valves and 6 (11%) with implantable cardiac devices (Table 1). Fever (84%), dyspnea (46%) and heart failure were the commonest presentations. The majority of patients had preexisting valvular heart disease or intra-cardiac devices (Table 1). Skin infections (10, 18%) were the most prevalent portals of infection, followed by venous catheters, recent valve surgery and implantable cardiac devices (Table 1). Staphylococcus species were implicated in 19 (34%) and Streptococcaceae in 9 (16%); whereas 21 (37%) were culture-negative (Table 2). Left-side IE (49, 86%) was predominant. Acute kidney injury (AKI) (17, 30%) and heart failure (11, 19%) were common complications. The most frequently used treatment regimens included glycopeptides or B-lactams (Table 2). Only 9 (16%) patients underwent surgical intervention. Fourteen (25%) patients died of any cause before hospital discharge. Logistic regression analysis identified septic shock and AKI as the only risk factors independently associated with in-hospital mortality (Table 3).

Conclusion. Skin infections are an important risk for IE in Qatar. The majority of patients with IE have preexisting cardiac conditions. Staphylococci are the commonest confirmed bacterial etiology of IE in Qatar, but nearly one-third of cases are culture-negative. Only a small proportion of patients with IE undergo surgical intervention and overall mortality is high. The findings suggest that efforts should be directed toward improving IE prevention strategies in high-risk patients, encourage early microbiological investigations and improved medical and surgical management.

Table 1. Baseline characteristics of 57 patients with infective endocarditis in Qatar.

Variable		Number (%)
Demographics	Male gender	40 (70%)
	Age in years (mean ± SD)	51 (±16.8)
Underlying Cardiac condition	Acquired valvular disease	12 (21%)
	Prosthetic valves	11 (19%)
	Intra-cardiac device	8 (14%)
	Bicuspid aortic valve	1 (2%)
	Congenital heart disease	1 (2%)
Underlying co-morbidities	Hypertension	24 (42%)
	Diabetes mellitus	31 (54%)
	Chronic kidney disease	11 (19%)
	Hemodialysis	6 (11%)
Suspected port of infection	Dental procedures	3 (5%)
	Intravenous catheters	6 (11%)
	Valve surgery within ≤ 2 months	6 (11%)
	Pacemaker/implantable cardiac device	6 (11%)
	Skin and soft tissue infection	10 (18%)
	Intravenous drug use	0
Clinical Presentation	Fever	48 (84%)
	Dyspnea	26 (46%)
	Heart failure	21 (37%)
	Fatigue	19 (33%)
	Stroke	5 (9%)
	Chest pain	6 (10%)
	Shock	2 (4%)
	Cardiac arrest	1 (2%)
	Polyarthralgia	2 (4%)
Valvular involvement	Aortic valve	21 (37%)
	Mitral valve	27 (47%)
	Aortic and mitral valves	1 (2%)
	Tricuspid valve	1 (2%)
	Undefined	7 (12%)

Table 2. Microbiology, Management, Complications and Outcomes of IE in Qatar.

	Variable	Number (%)
Microbiology	Staphylococcus species	19 (34%)
	Methicillin-sensitive *S. aureus*	8 (14%)
	Methicillin-resistant *S. aureus*	6 (11%)
	Coagulase-negative staphylococci	5 (9%)
	Streptococcaceae	9 (16%)
	Viridans Streptococci	8 (14%)
	S. pneumoniae	1 (2%)
	Others	8 (13%)
	Klebsiella spp.	1 (2%)
	B. fragilis	1 (2%)
	C. parapsilosis	1 (2%)
	E. faecalis	1 (2%)
	E. gallinarum	1 (2%)
	P. aeruginosa	1 (2%)
	S. marcescens	1 (2%)
	Pandoraea species	1 (2%)
	Culture-negative	21 (37%)
Treatment	**Mode of treatment**	
	Medical only	48 (84%)
	Medical and surgical	9 (16%)
	Antibiotics Regimen	
	Beta-lactam monotherapy	19 (34%)
	Glycopeptide-base regimen	26 (46%)
	Glycopeptide + Beta-lactam	17 (30%)
	Glycopeptide monotherapy	9 (16%)
	Gentamicin based therapy	6 (11%)
	Others	5 (9%)
Complication	Acute kidney injury	17 (30%)
	Heart failure	11 (19%)
	Embolic stroke	4 (7%)
	Septic shock	10 (18%)
Outcomes	In-hospital Mortality	14 (25%)
	Length of hospital stay in days (± SD)	35 (± 30.1)

Table 3. Multivariate logistic regression analysis for risk factors for in-hospital mortality

Parameter	Odds Ratios (95% CI)
Acute kidney injury	30.9 (2.8 - 334.7)
Septic shock	143.5 (4.5 - 4,541)
Native heart valve	2.0 (0.13 - 30.6)
Gram-positive bacterial etiology	1.9 (0.2 - 16.8)
Glycopeptides based antibiotic regimen	0.49 (0.03 - 6.7)

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164. Analysis of Adult, Hospitalized Patients With Carbapenem-resistant (CR) Gram-Negative Bloodstream Infections (GN-BSIs) due to Lactose Fermenters (LFs) and Non-lactose Fermenters (NLFs): Is There a Difference in Outcomes?

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Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. The deleterious consequences of BSIs due to CR-GN bacteria among hospitalized adult patients are well described in the literature. However, scant data exist that compares the baseline features and outcomes of patients with CR-GN-BSIs due to LFs relative to those caused by NLFs.

Methods. We performed a retrospective cohort analysis of consecutive hospitalized adult patients (age ≥18 years) in the Premier Healthcare Database (January 2014–June 2018) with GN-BSI due to select LFs (*E. coli*, *Klebsiella* spp., *Citrobacter* spp., *Enterobacter* spp., and *Serratia* spp.) and NLFs (P*seudomonas* spp., *Acinetobacter* spp., and *Stenotrophomonas* spp.). Patients with a diagnosis of cystic fibrosis or who had both LF and NLF GNB on index BSI culture were excluded. Baseline demographics, medical history, comorbidities, hospitalization history, and outcomes were compared between patients with CR-GNB due to LFs and NLFs. Outcomes assessed included composite death (in-hospital death or discharge to hospice), in-hospital mortality, discharge to home, and hospital length of stay post index GNB-BSI culture collection.

Results. Of the 1749 patients with a CR-GNB-BSI due to an LF or NLF, 1505 met study criteria. Of the 1505, 418 (27.8%) were LFs and 1087 (72.2%) were NLFs. The most common LFs were *Klebsiella* spp. (55.7%) and *Enterobacter* spp. (25.7%), while *Stenotrophomonas* spp. (45.2%) was the most common NLF. Overall, groups were highly similar at baseline but patients with CR-GNB-BSIs due to an LF were slightly older and more likely to be in the ICU at index BSI culture collection (table). Outcomes were also comparable between patients with CR-GNB-BSIs due to LFs and NLFs but there were a few notable differences. Composite mortality was higher in patients with GNB-BSIs due to an LF and these patients were also less likely to be discharged home.

Conclusion. The findings indicate that CR-GNB-BSIs result in considerable morbidity and mortality irrespective of whether the GNB is an LF or NLF. One in five patients died during their hospitalization and less than half were discharged home. This highlights the need for better and more preventive and therapeutic strategies aimed at combating CR-GNB-BSIs.

Table. Baseline characteristics and outcomes between patients with CR-GNB-BSI due to LF or NLF

	Lactose Fermenters (N=418)		Non-lactose Fermenters (N=1087)	
	N	%	N	%
Baseline characteristics				
Age in years Mean (Std Dev)	63.32 (15.58)		58.64 (17.11)	
Sex Female	191	45.69%	497	45.72%
Baseline CCI Score Median (Q1–Q3)	3 (2–6)		3 (1–5)	
Days between admission and index culture[1] >3 days	127	30.38%	357	32.84%
Admission source Non-healthcare facility point of origin	295	70.6%	760	69.9%
ICU at index culture	181	43.3%	351	32.3%
Pathogen[2]				
Acinetobacter spp.	0	0.0%	190	17.4%
Citrobacter spp.	10	2.4%	0	0.0%
E. coli	57	13.6%	0	0.0%
Enterobacter spp.	108	25.7%	0	0.0%
Klebsiella spp.	234	55.7%	0	0.0%
Pseudomonas spp.	0	0.0%	410	37.5%
Serratia spp.	11	2.6%	0	0.0%
Stenotrophomonas spp.	0	0.0%	494	45.2%
Outcomes				
Composite death	120	28.7%	259	23.8%
In-hospital mortality	94	22.5%	218	20.1%
Home discharge	118	28.2%	450	41.4%
Infection-associated length of stay Median (Q1–Q3)	8 (4–14)		7 (4–12)	

[1] Day between admission and index culture: Number of days between admission and index culture day, calculated as index culture day-admission day +1. For example, 2 days represent having index culture one day after admission.

[2] Pathogen at index culture: Patients could have more than one pathogen present at index culture.

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165. Comparative Effectiveness of Oral Fluoroquinolones vs. β-Lactams for the Treatment of Patients with Enterobacteriaceae Bloodstream Infections

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Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. Fluoroquinolones (FQ) are associated with unacceptable rates of adverse drug events (ADE) and drug resistance. Safe and effective alternative oral agents are needed for definitive treatment of *Enterobacteriaceae* bloodstream infections (BSI). This study aims to determine whether treatment failure rates were similar in patients who received FQ or β-lactams (BL) for stepdown treatment of *Enterobacteriaceae* BSI.

Methods. We conducted a retrospective cohort study comparing oral BL vs. FQ as definitive therapy for patients with BSI due to *Escherichia coli*, *Klebsiella* spp., or *Proteus* spp. Eligible patients were ≥18 years old with a monomicrobial BSI treated with a single definitive oral antibiotic. Patients with a total antibiotic treatment duration of <6 or >21 days were excluded. Groups were matched based on age and gender. The primary outcome was treatment failure defined as recurrence or all-cause mortality within 90 days with a 10% non-inferiority margin. Secondary outcomes were death or recurrence within 30 and 90 days, symptomatic urinary tract infection (UTI) or BSI within 30 days, and the safety outcome of antibiotic-related ADE.

Results. The average age was 68 years, with 94% males. In the BL group, 80% had a urinary source of infection vs. 69% of the FQ group. The majority of patients had source control (88% of BL group vs. 83% of FQ group). The most common pathogens were *E. coli* (66%) and K. pneumoniae (24%). Cefpodoxime (71%) and ciprofloxacin (85%) were the most commonly used oral antibiotics. The average duration of oral therapy was 9.2 vs. 9.6 days and total duration was 14.4 vs. 13.9 days in the BL vs. FQ group, respectively. The primary outcome occurred in 15.4% of the BL group vs. 12.3% of the FQ group (P = 0.8002, RR = 0.80, 95% CI = 0.33–1.90). No deaths were directly attributed to infection. Symptomatic UTI or BSI within 30 days occurred in 20% of BL patients vs. 21.5% of FQ patients (P = 1.0000, RR = 1.07, 95% CI = 0.55–2.11). Mortality or recurrence at 30 days were similar between groups (4.6% of BL group vs. 9.2% of FQ group, P = 0.4920, RR = 2.00, 95% CI = 0.52–7.66). One FQ patient experienced an antibiotic-related ADE (*C. difficile* infection).

Conclusion. BL are non-inferior to FQ and appear to be as effective for oral step-down treatment of *Enterobacteriaceae* BSI without the associated risks.

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166. Comparison of Oral Fluoroquinolones to Alternative Oral Agents for Definitive Step-Down Therapy in Gram-Negative Bloodstream Infections

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Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. During the management of Gram-negative bloodstream infections (GN BSIs), definitive oral step-down therapy is often utilized. Fluoroquinolones (FQs) are commonly utilized due to excellent bioavailability; however, comparative evidence to oral trimethoprim/sulfamethoxazole (TMP/SMX) or β-lactams (BLs) are limited.

Methods. This multicenter, retrospective cohort included patients ≥18 years of age who had a GN BSI and received oral FQ, BL, or TMP/SMX as definitive oral step-down therapy for >33% of their total treatment duration. Patients were excluded if received <7 days or >17 days of total therapy, or had polymicrobial bacteremia. The primary outcome was treatment failure within 90 days. Treatment failure was a composite endpoint including both all-cause mortality and recurrence of infection. Secondary outcomes included all-cause and infection-related readmissions at 30 days.

Results. A total of 220 patients were included (FQ n = 106, BL n = 96, SMX/TMP n = 18). Patients were elderly (median age 70 years; IQR 59–79) and had a median Pitt bacteremia score of 1 (IQR 0–2). The most common pathogens were *E. coli* (58.2%) and *K. pneumoniae* (17.3%) and the primary source of infection was urinary (70%). Majority of BL use consisted of cephalexin (44.7%) and cefuroxime (21.3%) while FQ use was mostly ciprofloxacin (69.8%). Infectious diseases consultations were associated with 52.8%, 39.6%, and 72.2% of the prescribed FQ, BL, and SMX/TMP, respectively. Overall median intravenous, oral, and total effective antibiotic durations were 3.9, 9, and 13 days, respectively, and were similar between each group. Ninety day treatment failure rates were 9.5% in the FQ group vs. 14.6% in the BL group (P = 0.27) and 0% in the TMP/SMX group (P = 0.35). All-cause and infection-related readmissions were similar between FQ, BL, and TMP/SMX: (25.5%, 27.1%, 16.7%; P = 0.73) and (4.7%, 5.2%, 5.6%; P = 1.0), respectively.

Conclusion. We identified similar treatment failure rates between oral FQs, BLs, and TMP/SMX. Oral step-down therapy with BLs may be a promising