2267. Epidemiology of *Candida auris* Candidemia in a Teaching Hospital in North of Oman: One-Year Survival

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Background. Recent emergence of *Candida auris* as a multidrug resistant fungal pathogen, is a serious concerns for public health. However, there is a paucity of reported cases from Oman. Literature search resulted in finding only 7 cases from Oman, reporting *C. auris* infections in the articles first published in 2017. However, the rate of isolatin is increasing.

Methods. In this study, we included the results of all positive blood cultures of *C. auris* in Suhar teaching hospital from May 2018 (date of first detection) till end of April 2019. Further confirmation of the species was performed by MALDI-TOF and antibiotic susceptibility test (AST) by Vitek 2 in central public health laboratory (CPHL) of Oman.

Results. We detected 13 patients (9 females, 4 males). The mean age was 58.61% years (28–76 years). All candidemic patients had serious underlying conditions, including prolonged hospital stay or extensive and prolonged antimicrobial exposure or medical comorbidities (8 of 13). The time from hospital admission to onset of C. auris candidemia was 8–49 days, with a median of approximately 27 days. The most common isolated co- pathogen from blood culture was *K. pneumonia* (without regard to Coagulase-negative staphylococci). As average, every patient received 4.8 kind of different antibiotics in mean 88 doses before candidemia developed and piperacillin–tazobactam was the most common used antibiotics. AST was done just for 5 patients and revealed high-level resistance to fluconazole and Amphotricin B while, Echinocandins (anidulafungin, caspofungin) were fully sensitive and voricunazole had intermediate sensitivity. Mean duration of anti-fungal treatment was 12.5 days (5 – 26 days). 8 patients treated by Echinocandins (4/8 died), 4 by Fluconazole (3/4 died) and one without treatment discharged. 30-day all-cause mortality was 61.5%.

Conclusion. In Oman, *C. auris* has been reported from many hospitals. Resistance to several antifungal agents and persistence in the hospital environment make this organism a potential menace for the treating physician and the infection control personnel. In our hospital, every candidemic patient should be treated with Echinocandins and assumed to be resistant to Fluconazole until proven otherwise according to results of AST.

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2268. Clinical Implications of Azole-Resistant vs. Azole-Susceptible Invasive Aspergillosis in Hematological Malignancy (CLARITY): A Multicenter Study

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Background. In recent years, survival of patients with invasive aspergillosis (IA) has improved mainly due to availability of extended spectrum triazoles. These advances are jeopardized by the emergence of azole resistance in *Aspergillus fumigatus*, the most common causative pathogen of IA. Despite several studies suggesting high probability of azole treatment failure in patients with azole-resistant isolates, the clinical implications of azole-resistant IA compared with azole-susceptible IA remain unclear.

Methods. In patients with hematological malignancies, cases of proven or probable IA (EORTC/MSG 2008) caused by *A. fumigatus* are registered. Retrospective data are documented, comprising demographics, diagnosis, treatment, response and outcome. Participating sites provided susceptibility results or isolates. Provided isolates were analyzed in a central laboratory.

Results. Since January 2018, 51 sites in 15 countries worldwide enrolled 154 cases diagnosed with IA between 2010 and 2019, of which 23 (14.9%) had azole-resistant IA. Of 44 cases, the respective clinical fungal isolate was analyzed in the central laboratory. A mixed fungal infection was reported for 34 patients (22.1%), 1 (2.9%) in the azole-resistant group; most were related to non-*fumigatus Aspergillus* species (n = 12, 35.3%) and non-*Aspergillus* molds (n = 10, 29.4). Most patients were male (n = 98, 63.6%); 19 (82.6%) in the azole-resistant group, 79 (60.3%) in the azole-susceptible group. Age was documented in categories instead of the exact age. Median age group was 50–69 years in both groups (ranging from 7–11 to 70–89 years for azole-resistant cases, 1–12 months to 70–89 years for azole-susceptible cases). Underlying disease and survival are shown in the table.

Conclusion. A worldwide network of investigators contributes to the CLARITY registry study. Completion of recruitment and subsequent data analysis are planned for 2019. Further sites may be added if azole-resistant cases are encountered.

Patient characteristics

n (%)	Azole-resistant 23 (14.9)	Azole-susceptible 131 (85.1)	Total 154 (100)
Hematologic malignancy n (%)			
Acute leukemia	11 (47.8)	61 (46.6)	72 (46.8)
Chronic leukemia	1 (4.3)	9 (6.9)	10 (6.5)
Lymphoma	3 (13.0)	32 (24.4)	35 (22.7)
Multiple myeloma	1 (4.3)	9 (6.9)	10 (6.5)
Other	7 (30.4)	20 (15.3)	27 (17.5)
Survival status n (%)			
Missing values	0 (0)	2 (1.5)	2 (1.3)
Deceased	18 (78.3)	68 (51.9)	86 (55.8)
Alive	5 (21.7)	61 (46.6)	66 (42.9)

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2269. Clinical Outcomes in Patients with Carbapenem-Non-Susceptible, β-Lactam-Susceptible *Pseudomonas aeruginosa* Infections

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Background. *Pseudomonas aeruginosa* (PsAr) isolates harboring OprD mutations often present phenotypically as carbapenem nonsusceptible but susceptible to antipseudomonal β-lactams (APBLs). It is unknown whether this unique genotype–phenotype combination affects the clinical outcomes of patients infected with these pathogens. The objective of this study was to compare clinical outcomes of patients treated with APBLs for pneumonia and/or bacteremia caused by PsAr bearing this unique carbapenem nonsusceptible, β-lactam susceptible phenotype (Carba-NS) to those retaining susceptibility to both carbapenems and APBLs (Carba-S).

Methods. Retrospective multicenter cohort of adult in-patients who received effective APBL for PsAr pneumonia and/or bacteremia from January 2012 to November 2018. Baseline characteristics, treatment information, and clinical outcomes were obtained from the electronic medical record. The primary outcome was 14-day mortality. Secondary outcomes included 30-day mortality, 30-day infection recurrence, and infection-related length of stay (IR-LOS). IR-LOS was defined as the time from index culture to antibiotic discontinuation or hospital discharge, whichever was sooner. Descriptive statistics were analyzed using SPSS.

Results. 387 patients were evaluated; 60 Carba-S and 21 Carba-NS were included. The primary reason for exclusion was ineffective empiric therapy. Select demographics and clinical outcomes are displayed in Table 1. Compared with the Carba-S group, Carba-NS patients were younger, had better renal function, increased incidence of pneumonia, more severely ill, and higher rate of empiric ceftazidime use. Despite these differences at baseline there were no significant differences in empiric APBL treatment patterns, 14- or 30-day mortality, or recurrence at 30 days between the groups. Carba-NS patients had lower rate of oral step down therapy and a significantly longer LOS and IR-LOS.

Conclusion. In this cohort of patients who received appropriate and timely APBL therapy, the Carba-NS phenotype was not associated with increased rates of 14-day mortality, 30-day mortality, or 30-day infection recurrence. These data suggest that APBLs may be effective therapeutic options against this phenotype. Further research is warranted to confirm these findings.

Table 1.			
	Carba-S (60)	**Carba-NS (21)**	**P-value**
Demographics			
Age, y	61.2 ± 14.1	51.7 ± 17.8	0.02
Female sex	24 (40)	7 (33)	0.59
Height, cm	169.3 ± 10.8	172.5 ± 12.6	0.26
Weight, kg	75.2 [26.0]	68.0 [35.8]	0.23
BMI, kg/m^2	26.7 [9.2]	23.5 [11.2]	0.10
CrCl, mL/min	42.5 [48.75]	70 [43.5]	0.01
Charlson Comorbidity Index	4 [3]	3 [3]	0.11
APACHE II	16.5 ± 8.9	21.2 ± 7.7	0.03
Immunocompromised	19 (32)	7 (33)	0.89
Infection type			<0.001
Pneumonia	14 (23)	15 (71)	
Bacteremia	46 (77)	6 (29)	
Bacteremia source control	12 (26)	1 (17)	0.74
Bacteremia source			
Bone and joint	3 (7)	0	1
Cardiovascular	1 (2)	0	1
Central line	8 (17)	2 (33)	0.32
Lower Respiratory Tract	8 (17)	1 (17)	1
SSTI	4 (9)	0	1
Surgical Wound	5 (11)	0	1
Urinary Tract	12 (26)	2 (33)	0.65
Unknown	5 (11)	1 (17)	1
Treatment			
Time to effective therapy, h	2.5 [10.3]	5.5 [19.7]	0.31
Time to negative blood culture, d	1.3 [1]	1.7 [1]	0.20
Empiric β-lactam duration, d	3.8 [6.4]	7.0 [8.2]	0.24
Empiric β-lactam agent			
Aztreonam	7 (12)	1 (13)	0.67
Cefepime	19 (32)	6 (29)	1
Ceftazidime	0 (0)	4 (19)	0.004
Ceftazidime-avibactam	0 (0)	1 (13)	0.26
Piperacillin-tazobactam	34 (57)	9 (43)	0.32
Empiric combination therapy	4 (7)	3 (15)	0.36
Escalation of therapy	10 (17)	2 (9)	0.72
Oral step down therapy	22 (37)	1 (10)	0.02
Total treatment duration, d	14.2 [8.0]	13.0 [9.4]	0.69
Outcomes			
14 day mortality	9 (15)	1 (5)	0.44
30 day mortality	10 (17)	2 (10)	0.72
30 day recurrence	5 (8)	1 (5)	1.0
Length of stay, d	8.0 [12.6]	21 [40.7]	0.001
Infection-related length of stay, d	6.0 [5.6]	10.6 [9.2]	0.001

Data presented as mean ± SD, *n* (%), or median [IQR]

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2270. Initial Treatment Selection Among Patients with Recurrent *Pseudomonas aeruginosa* (PSA) Infections (Infxs): Does Prior PSA Antibiotic Susceptibility Results Effect Subsequent Empiric Treatment Decisions?

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Background. Resistance to commonly used anti-pseudomonal β-lactams (AP-BLs) like piperacillin/tazobactam (TZP), meropenem (MER) and cefepime (CEF) among patients (patients) with PSA infx is increasing. To minimize receipt of DAT among patients with PSA infxs, clinicians need to consider the patient's risk of having a PSA infx that is NS to commonly used AP-BLs. A well-described risk factor for having a NS AP-BL PSA infx is recent history of an NS AP PSA infx. This study evaluates the likelihood that a patient with a PSA infx receives an AP-BL that was found to be NS on a prior PSA culture.

Methods. This was a multi-center (*n* = 239), retrospective cohort analysis using the 2018 data from the BD Insights Research Database (Becton, Dickinson and Company). Inclusion criteria: age ≥ 18 years; hospitalized; PSA infx (index PSA infx); occurrence of a PSA infx ≤ 1 year of index PSA infx (post-index PSA infx); and received treatment for the post-index PSA infx for ≥ 24 hours. Frequency of NS to ≥ 1 AP-BL (MER, TZP, or CEF) for the index PSA infxs was calculated. Among patients with an index PSA infx that was NS ≥ 1 AP-BL, the number of patients who received an AP-BL for the post-index PSA infx that was NS on the index PSA infx was determined.

Results. During study period, 16,062 patients had a PSA infx and 2,386 (14.9%) of patients had a post-index PsA infx. The most common culture sites for the index and post-index PSA infxs were respiratory and urine. The most commonly prescribed AP-BL for the post-index PSA infx were TZP (41.9%), CEF (40.3%), and MER (30.8%). In total, 1,026 (43%) of patients had an index PSA infx that was NS to ≥1 AP-BL. Among the 1,026 patients with an index PSA infx that was NS to ≥1 AP-BL, 902 (88%) patients received an AP-BL as initial therapy for the post-index PSA infx and 558 (62%) patients received an AP-BL that was reported as NS on the index PSA culture.

Conclusion. The findings highlight the importance of considering prior PSA culture and susceptibility data when selecting initial antibiotic therapy for patients who present with a suspected or documented PSA infx and have a history of a prior PSA infx. Patients with history of a PsA infx that was NS to ≥1 AP-BL may benefit from initial use of novel AP-BL therapies.

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2271. Bacteremia Due to Multi-Drug-Resistant Organisms Is an Independent Risk Factor for Death Among Patients Supported by Extracorporeal Membrane Oxygenation (ECMO)

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Background. ECMO is a type of life-support for patients with refractory respiratory and/or cardiac failure. Our objective was to determine the incidence, resistance patterns and risk factors for development of blood stream infections (BSI) in patients receiving ECMO therapy.

Methods. This was a retrospective cohort study of a single intensive care unit. All patients receiving ECMO therapy between 7/1/13 and 4/28/18 were evaluated. Multidrug-resistant (MDR) pathogens were defined as non-susceptible to ≥1 agent in ≥3 antimicrobial classes, and vancomycin-resistant Enterococcus (VRE).

Results. 471 patients received ECMO, accounting for 4,739 ECMO days. Thirty-six patients (7.6%) had ≥1 episode of BSI; 47 episodes occurred, resulting in 10 events per 1,000 ECMO days. The most common organisms were Enterobacteriaceae (26%), 33% of which were MDR. *Staphylococcus aureus* (17%), coagulase-negative *Staphylococcus* (17%), *Enterococcus faecium* (11%) and *Candida* spp. (6%) were also identified. Overall, 20% of BSI were due to MDR bacteria. Median duration of BSI was significantly longer for infections due to VRE (8.5 days), than other organisms (1 day; $P = 0.0006$). Duration of ECMO ($P < 0.0001$), continuous renal replacement therapy ($P = 0.01$), units of blood transfused ($P = 0.0001$) and end-stage lung disease (ESLD) awaiting transplant ($P = 0.004$) were risk factors for BSI. Duration of ECMO, units of blood transfused and ESLD were independent risk factors for BSI. VV vs. VA-ECMO or central vs. peripheral cannulation were not significant risk factors. By logistic regression, MDR bacterial BSI was associated with longer duration of ECMO ($P = 0.001$) and number of units of blood transfused ($P = 0.01$). 1-year mortality after initiation of ECMO was 48%. Independent risk factors for 1-year mortality were age ($P < 0.0001$) and BSI due to MDR bacteria ($P = 0.049$).

Conclusion. The rate of BSIs during ECMO is relatively low, but these infections are commonly caused by MDR bacteria and associated with high 1-year mortality. Clinicians should consider empiric antibiotic coverage for MDR bacteria in patients with BSI on prolonged ECMO, and in patients on ECMO who received multiple blood transfusions. Since MDR bacterial BSI is an independent risk factor for mortality, future research on preventive strategies are warranted in high-risk ECMO cohorts.

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2272. Evaluation of Clinical Features, Carbapenem Resistance and Risk Factors of *Klebsiella* Species: A 4-Year Retrospective Study in Turkey

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Background. Gram-negative-resistant bacterial infections are increasing due to widespread use of antibiotics. Infections caused by *Klebsiella* spp. are an important part of healthcare-associated infections and cause morbidity and mortality. The aim of this study was to determine the epidemiological, clinical features, carbapenem resistance rates and risk factors of bloodstream infections of children with *Klebsiella* spp.

Methods. In this retropective study, medical records of 85 episodes of 75 patients caused by with *Klebsiella spp*. bacteriaemia who admitted to Ege University Faculty of Medicine, Pediatric Hospital in Turkey between 2014 and 2017 were evaluated. Conventional biochemical methods were performed using the automated systems of MALDİ-TOFF MS / VITEK 2 (Biomerieux, France). According to EUCAST recommendations, VITEK 2 (Biomerieux, France) automated microdilution method was used in sensitivity tests.

Results. The mean age of 85 episodes included in the study was 3.49 (±5.4) years. 58% of the patients were male and 42% were female. 18.8% of the patients were premature. The most common service was newborn service (30.6%). Neutropenia was 26% and thrombocytopenia was 55% at the time of diagnosis. *Klebsiella pneumonia* was 93% and *Klebsiella oxytoca* was 7%. Carbapenem resistance rate was found to be 30.6% in *Klebsiella* spp. Carbapenem resistance was found 18% in 2014, 38% in 2015, 42% in 2016 and 25% in 2017. In patients who developed carbapenem-resistant *Klebsiella*