followed by algorithms for the early detection of diseases. These concepts still need to be fully evaluated on large population studies.

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370. Efficacy of Cochleated Amphotericin B (C-AMB) in Mouse Models of Oropharyngeal and Vulvovaginal Candidiasis
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Session: 56. Fungal Disease: Management and Outcomes
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Background. Candida albicans causes debilitating mucosal infections in patients with inherited susceptibility to chronic mucocutaneous candidiasis (CMC) such as oropharyngeal candidiasis (OPC) and vulvovaginal candidiasis (VVC), which often require long-term azole-based treatment. Due to the high incidence of azole resistance in these patients, alternative treatment options are desirable. Acquired resistance against amphotericin B (AMB) has not been documented but parenteral administration of AMB is associated with nephrotoxicity and infusion reactions. Cochleated AMB (C-AMB) is a new formulation of AMB designed for oral administration and thus an attractive treatment option for OPC and VVC. The purpose of our study was to assess the efficacy of C-AMB in mouse models OPC and VVC.

Methods. IL-17 signaling deficient mice (Act1−/−) were infected with a clinical isolate of C. albicans in models of OPC and VVC. From day 1 post-infection (pi) through day 4 pi, mice were treated once daily via oral gavage with C-AMB or placebo or intraperitoneal AMB-deoxycholate (AMB-d). At day 5 pi, the mice were euthanized and tongue tissue (OPC) or vaginal fluid and vaginal tissue (VVC) were harvested to quantify fungal burden.

Results. During OPC, mice treated with C-AMB (25 or 83.5 mg/kg/day) displayed significantly reduced fungal burden compared with placebo-treated mice and comparable to that observed in mice treated with intraperitoneal AMB-d (25 mg/kg/day). During VVC, mice treated with C-AMB exhibited significantly decreased fungal burden in vaginal tissue, but not vaginal fluid, relative to placebo-treated mice.

Conclusion. Oral administration of C-AMB in IL-17 signaling deficient mice results in a reduction in tongue and vaginal tissue fungal burden during mucosal C. albi-
cans infections. Ongoing studies are aimed at characterizing the distribution of C-AMB in mouse mucosal tissues and examining C-AMB efficacy relative to fluconazole.

371. Risk Factors for Non-Albicans Candidal Vulvovaginitis
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Session: 56. Fungal Disease: Management and Outcomes
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Background. Non-Albicans Candida (NAC) species are emerging as important etiological agents of vulvovaginal candidiasis (VVC). Multiple studies are outdated. In this study, we explore the clinical risk factors for development of NAC VVC. The distribution of NAC species varies depending on geography, race and ethnicity, and past medical history. While there are studies that explore the relationship between these factors and the incidence of NAC many of these studies are outdated. In this study, we explore the clinical risk factors for development of NAC compared with the more common albicans candida infections.

Methods. We performed a retrospective cohort study. 174 women with a positive candida culture were identified via a database maintained by the Cleveland Clinic Microbiology department. Exclusion criteria were women with negative cultures, those under the age of 18, or with an initial encounter prior to 2004. The majority of women who were treated with NAC was 41.5 [31.0, 53.0] and was not statistically significant from women with no NAC, 43.0 [42.0, 45.0] (P = 0.19). Among all initial positive yeast cultures 34.5% were C. glabrata followed by C. parapsilosis at 34.4%. Women who had a positive NAC culture were more likely to be post-menopausal than those with no NAC, 73.8 NAC vs. 26.2 no NAC (P ≤ 0.001). Additionally, women cultured with NAC were more likely to be on hormone replacement therapy, 77.8 NAC vs. 22.2 no NAC (P = 0.011). However, we found that recent antibiotic use, diabetes, and probiotic use had no impact.

Conclusion. This study shows that post-menopausal women and women who are hormone replacement therapy are more likely to be colonized by NAC indicating that these are risk factors.

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372. Attributable Mortality of Candidemia After Introduction of Echinocandins
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Session: 56. Fungal Disease: Management and Outcomes
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Background. Treatment of candidemia is complex. Studies examining relationships between patient-related factors and treatment outcome are limited, often based on all-cause mortality. Our objectives were to compare concurrent prespecified factors between patients with and without treatment failure among adults with candidemia. Methods. This IRB-approved, single-center, case-cohort study included patients ≥18 years old admitted to Duke University Hospital between June 1, 2013 and June 1, 2017 with a blood culture positive for Candida spp. Treatment-, patient-, and disease-specific data were collected, and outcome (success/failure) determined 90 days after the index culture. An odds ratio (OR) and 95% confidence interval (95% CI) were determined for receipt of renal replacement therapy (RRT), fluconazole-containing regimen, ICU stay, and neutropenia between outcome groups.

Results. Among the 112 encounters (from 110 unique patients) included, treatment success was observed in 104/112 (92.9%). Demographics were comparable between treatment success and treatment failure groups. Among patients receiving concomitant RRT, 11/12 encounters (91.7%) were successfully treated. No significant differences were observed with regards to treatment failure with a fluconazole-containing regimen (OR, 1.59; 95% CI, 0.3–8.27), ICU stay (OR, 1.43; 95% CI, 0.32–6.29), and neutropenia (OR, 0.13) for those controls who died 12 and 19 days (P = 0.01), and for survivors 24 and 13 days (P = 0.006). Day 30 mortality rates were 38% and 11% for cases and controls (P = 0.03); thus attributable mortality was 27% (95% CI, 16–28%).

Conclusion. Attributable mortality of nosocomial candidemia is still substantial, but was lower in our study when compared with literature from before introduction of echinocandins.

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373. Impact of Concurrent Renal Replacement Therapy on Treatment Outcomes of Candidemia in Adults
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Session: 56. Fungal Disease: Management and Outcomes
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Background. Candidemia is among the most frequent nosocomial bloodstream infections and associated with considerable morbidity and mortality. Landmark case-control studies estimated an attributable mortality of 38% and 49%. After introduction of echinocandins, attributable mortality may have decreased.

Methods. In a case-control study of 100 hospitalized patients with candidemia at the University Hospital of Cologne. These cases had at least one blood culture positive for Candida spp. ≥48 hours post admission. We enrolled patients from January 2017 backwards until February 2014. Controls were patients without candidemia matched for age, sex, calendar year, duration of hospitalization, main admission diagnosis, and Patient Clinical Complexity Level. Risk factors for candidemia captured were malignancy, diabetes, infection other than candidemia, liver cirrhosis, hemorrhoidal, congestive heart failure, coronary artery disease, chronic lung disease, intensive care, mechanical ventilation, and presence of central lines. For each control patient, we considered the day of candidemia of its matched case to compare post diagnosis length of stay. We estimated attributable mortality until day 30 post candidemia diagnosis. We performed χ²-test for categorical and Student’s t-test for continuous variables, and defined a two-tailed P value of <0.05 statistically significant.

Results. Cases and controls were 68% males. Median age was 62 and 63 years, and 25th and 75th percentile 55 and 74 years in both groups. Candidemia occurred a median 18 days post admission. For cases and controls, median length of stay post diagnosis was 17 and 15.5 days (P = 0.13); for those controls who died 12 and 19 days (P = 0.21), and for survivors 24 and 13 days (P = 0.006). Day 30 mortality rates were 38% and 11% for cases and controls (P = 0.03); thus attributable mortality was 27% (95% CI, 16–28%).

Conclusion. Attributable mortality of nosocomial candidemia is still substantial, but was lower in our study when compared with literature from before introduction of echinocandins.
stays, and increased healthcare costs. This study aims to evaluate current practices of candidemia management and review associated clinical outcomes to identify potential targets for antifungal stewardship.

**Methods.** A retrospective chart review of all patients with a positive blood culture for *Candida* spp. between July 2016 and June 2017 was conducted at a large academic medical center. The primary endpoint was time to effective therapy defined as time from first positive blood culture to start of an antifungal with in vitro susceptibility. Secondary endpoints were time to clearance of candidemia and 30-day all-cause mortality. Data analysis was conducted and reported using descriptive statistics.

**Results.** A total of 36 patients with candidemia were included, a majority of whom were consulted by the Infectious Diseases (ID) team (81%). *C. albicans* and *C. parapsilosis* were the most common pathogens (36% and 25%, respectively) and sources of candidemia varied, with the most common being a line-related source (42%). Median time to effective therapy was 0.3 hours (IQR 0.12–9.95). Sixty-four percent of patients received a nonazole, primarily caspofungin, and 36% of patients received an azole as empiric antifungal therapy. Selection of empiric fluconazole was deemed suboptimal in 17% of patients, all of whom received delayed or no ID consult. Significantly more ID consult patients received an ophthalmology consult vs. non-ID consult patients (65% vs. 0%, *P = 0.002*). Additionally, echocardiograms were more frequent in ID consult vs. non-ID consult patients (52% vs. 29%, *P = 0.468*). Median time from candidemia clearance was 58 hours (IQR 46.4–95.6) and 30-day all-cause mortality was 25%.

**Conclusion.** Most patients were started on effective antifungal therapy once candidemia was identified. Patients with an ID consult were more likely to receive ophthalmology or echocardiograms to rule out optic or cardiac involvement, respectively. Antifungal stewardship efforts geared toward establishment of institutional guidelines, candidemia treatment bundles, or mandatory ID consult may be considered to improve current practices of candidemia management.

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375. Tolerability of Anidulafungin for Candidemia in Patients With Hepatic or Renal Dysfunction
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**Session:** 56. Fungal Disease: Management and Outcomes
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**Background.** Anidulafungin has been prescribed in patients with candidemia, especially hepatic or renal dysfunction because of not undergoing metabolism in the liver and kidney. The purpose of this study was to evaluate the safety of anidulafungin in these patient populations.

**Methods.** We retrospectively reviewed the electronic medical records of candidemia in 146 patients who were treated with anidulafungin for more than 7 days at Dong-A University Hospital from January 2012 to December 2017. We evaluated changes in AST, ALT, and total bilirubin (TB) between the start and end of anidulafungin therapy, and change in estimated GFR (eGFR), calculated by the Modification of Diet in Renal Disease (MDRD) study equations.

**Results.** There were 101 patients with impaired liver function at the start of anidulafungin therapy (group A) and 57 with renal insufficiency (group B). In group A, 61 (60%) were male and the median age was 69 (20–88) years. The patients had solid tumor (51, 50%) and 26 (26%) were liver disease. According to the Child Pugh score, 54 (53%) patients were class B and five (5%) were class C. The median changes in AST, ALT, and TB during anidulafungin therapy were −10 U/L, −8 U/L, −0.3 mg/dL (P = 0.023, P = 0.008, P = 0.013), respectively (Figure 1A). In group B, 35 (61%) were male and the median age was 71 (20–88) years. There were 21 (37%) patients with solid tumor and 30 (53%) had kidney disease. The median change of eGFR was +6.6 mL/minute/1.73 m² (P = 0.001) (Figure 1B). Over 75% (ALT, AST, eGFR) and nearly 60% (TB) of patients had favorable changes (values were stable or improved) in hepatic or renal function during the anidulafungin therapy (Figure 2).

**Conclusion.** Anidulafungin was tolerable for the treatment of candidemia in patients with hepatic or renal damage.

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376. Predictive Model for Fluconazole Resistance in Patient With Candida Bloodstream Infection
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**Background.** Candida bloodstream infection (CBI) is associated with high morbidity and mortality. Guidelines recommend echinocandins as initial therapy, with fluconazole as an acceptable alternative in selected patients, including those at low risk for fluconazole resistance. We aimed to create a predictive model to identify patient at high risk of fluconazole resistance.

**Methods.** We performed a retrospective analysis of hospitalized patients with CBSI at a large tertiary referral hospital between January 2007 and January 2015. Data were collected on demographics, comorbidities, medications, procedures, central lines, vitamins, and laboratory values. Univariate and multivariable logistic regression analyses were used to build the predictive model. Variables with P < 0.25 were considered for the multivariable analysis, and only those that remain significant (P < 0.05) were retained in the final model.

**Results.** We identified 1,083 patients with CBSI, of whom 684 had azole susceptibility data available. Among cases with available resistance data, *C. glabrata* was the most common species isolated, occurring in 240 cases (38%), followed by *C. parapsilosis*, 176 cases (25.7%) and *C. albicans*, 121 cases (17.6%). One hundred thirty-nine isolates were found to have fluconazole resistance (*C. glabrata* 55, *C. krusei* 36). Eighty-three variables were considered in the multivariable analysis; nine remained significant and were included in our final model. Variables associated with a higher risk of fluconazole resistance were: hematological cancer (OR 1.69 [95% CI 1.03, 2.79]), presence of an indwelling line (2.00 [1.30, 3.10]), prior fluconazole use (2.46 [1.32, 2.56]), prior voriconazole use (10.89 [1.18, 99.84]), prior calcineurin inhibitor use (2.65 [1.24, 5.66]), prior nitroimidazole use (1.63 [1.01, 2.64]), and prior tetracycline use (4.77 [1.96, 11.64]). Isolation of *C. parapsilosis* (0.20 [1.00, 0.39]), and chronic pulmonary disease (0.43 [0.21, 0.87]) were associated with a lower risk of resistance. The final model had a C-statistic of 0.75.

**Conclusion.** We identified nine risk factors that were significantly associated with fluconazole resistance. By creating a predictive model, patients at higher or lower risk for resistance may be identified earlier which may assist in the choice of initial antifungal treatment.

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377. High Resistance and Mortality Rates in Patients With Ventricular Assist Device (VAD)-Associated Candidemia: A Need for Alternative Antifungal Strategies
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**Background.** VADs are increasingly utilized in the management of end-stage heart disease. Infections are frequently encountered in VAD patients, are difficult to manage, and delay heart transplant. Prior studies have illustrated that fungal infections are far more prevalent than bacterial infections but carry a higher mortality rate. Published data regarding the treatment and outcomes of fungal infections in VAD patients are scarce. The objective of this study was to describe treatment outcomes, clinical outcomes and antifungal resistance rates in this unique patient population.

**Methods.** This was a retrospective cohort study that included VAD patients 18 years and older admitted to Baylor St. Luke’s Medical Center in Houston, Texas between 2009 and 2016 with a positive blood culture for *Candida* spp. Patients with