of AR genes per patient metagenome was 48.5 (range 23 to 87 genes). The median number of AR genes per control metagenome was 24 (range 16 to 25 genes). We detected 97 unique AR genes across all samples, 63 of which (65%) were detected in patient samples but not controls. All AR genes found in control metagenomes were present in at least one patient metagenome. No AR genes detected in patients were common to all patients. Subsets of clinically relevant genes corresponded with patient stool AR bacteria culture results.

Antimicrobial resistance gene detection heatmap for renal transplant recipient stool samples after antibiotic treatment for ESBL infection.

**Conclusion.** Viable AR bacteria and diverse AR gene profiles were frequently detected from renal transplant recipient stool samples after antibiotic treatment for infection. These data suggest that AR bacterial colonization and AR gene profiles may require distinct treatments other than systemic antibiotics for eradication.

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1079. The Risk of Cytomegalovirus (CMV) Infection and Recurrence Among Solid Organ Transplant Recipients

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**MATCH Study Group**

**Session:** P-49. Infections in Immunocompromised Individuals

**Background.** Solid organ transplant (SOT) recipients are at a high risk of developing cytomegalovirus (CMV) post-transplant (tx) with many experiencing a recurrence shortly after clearing the first episode. We aimed to identify risk factors associated with CMV infection and recurrence.

**Methods.** SOT recipients (≥ 18 years) transplanted between 2011-2016 were investigated for factors associated with CMV infection within 1 year from baseline and recurrent CMV within 6 months of stopping CMV treatment for the first infection using cumulative incidence curves and Cox proportional hazards models. Baseline was defined as either tx date or stopping CMV prophylaxis for those initiating CMV prophylaxis within one year of baseline with CMV disease present at diagnosis in 17% of the cases.

The risk of CMV infection was lower in patients with low (aHR 0.19, 95%CI 0.12-0.29) and intermediate (aHR 0.35, 95%CI 0.19-0.64) risk CMV IgG serostatus compared to high risk (Figure 1). Liver and lung tx, female sex, older age and year of tx were also associated with an increased risk of CMV infection (Figure 2). Among the 470 (62%) patients who received CMV prophylaxis those who received < 85 days had a higher risk of CMV infection than those receiving ≥ 85 days (aHR 1.80, 95%CI 1.19-2.72).

99 recipients were investigated for recurrent CMV; 40 (40%) experienced relapse within 6 months of stopping treatment for their first infection. The risk of recurrent CMV was significantly lower in those with low (aHR 0.20, 95%CI 0.06-0.74) and intermediate (aHR 0.35, 95%CI 0.19-0.84) (Figure 3). Older age (aHR 1.23 per 5 years older, 95%CI 1.06-1.44) was also significantly associated with recurrent CMV infection (Figure 4).

Figure 3 Risk of recurrent CMV infection in the 6 months following clearance and stopping of treatment for the first CMV infection (N=99), stratified by CMV serostatus at the time of transplant.
Conclusion. Recurrent CMV infection remains a significant complication among SOT recipients, especially in those with high risk CMV IgG serostatus. These findings highlight the necessity to successfully treat and monitor this subgroup following their first infection. Novel medical interventions and strategies to prevent CMV infection are of particular importance to this high risk group.

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1080. Changing Epidemiology and Long-Term Outcome of Bloodstream Infection Due to Enterococcus for Patients with Acute Leukemia: Impacts and Limitations on Strategy of Restricting Antibiotics

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Session: P-49. Infections in Immunocompromised Individuals

Background. Gastrointestinal dysbiosis due to antibiotics and mucosal injury by intensive chemotherapy are important risk factors for Enterococcal infection in patients with acute leukemia. However, there is still disagreement about trends of incidence and outcome of bloodstream infection (BSI) due to Enterococcus species. This study was aimed to identify the changes in the epidemiology of Enterococcal BSI and to estimate the long-term impact of Enterococcal BSI on outcome in an acute leukemia cohort.

Methods. All adult acute leukemia patients diagnosed with Enterococcal BSI (N = 512) between 2014 to 2018 at the Catholic Hematology Hospital were retrospectively reviewed. The incidence rate was compared with antibiotic use and multivariable models were used to estimate the impact of Enterococcal BSI on the outcome.

Results. Of 433 patients, 512 episodes of Enterococcal BSI occurred: 172 (33.6%) of 512 were vancomycin-resistant Enterococcus (VRE) and baseline characteristics were similar in comparison with vancomycin-susceptible Enterococcus (VSE) BSI. The incidence rate of VRE seemed to decrease for 6 months after a change in the strategy of restricting prophylactic use of fluoroquinolone and empirical use of carbapenem (39.2% vs 12.2%, Odds ratio [OR]=0.312, 95% confidence interval [CI], 0.116-0.843, p=0.018). However, overall Enterococcal BSI continued to increase with the rapidly increased use of unrestricted antibiotics. VRE BSI was associated with higher 100-day mortality than VSE BSI after adjusting for covariates (hazard ratio [HR]=1.477; 95% CI, 1.027-2.125, p=0.035), but there was no difference in long-term outcome at one year. In multivariable models, high-risk groups such as old age, advanced stage of disease, polymicrobial infection, high Pitt bacteremia score, and BSI complications after hematopoietic cell transplantation (H SCT) were strongly associated with worse long-term outcome (p<0.05 for all variables).

Table 1. Baseline characteristics of Enterococcal bloodstream infection (BSI)

| Variable                      | Total (n=512) | VRE BSI (n=172) | VSE BSI (n=340) | p-value |
|-------------------------------|---------------|-----------------|-----------------|---------|
| Age group, ≤60 years          | N (%)         | N (%)           | N (%)           |         |
| Sex, female                   | 184 (36.0%)   | 119 (31.1%)     | 65 (19.1%)      | 0.017   |
| Diagnosis                     |               |                 |                 |         |
| AML                           | 372 (72.8%)   | 242 (71.4%)     | 130 (38.5%)     | 0.018   |
| ALL                           | 126 (24.0%)   | 97 (28.5%)      | 29 (8.5%)       | 0.018   |
| MPAL                          | 3 (0.6%)      | 2 (0.6%)        | 1 (0.3%)        |         |
| Duration at BSI               |               |                 |                 | 0.158   |
| Native                        | 321 (62.6%)   | 264 (78.0%)     | 57 (17.0%)      |         |
| CR                            | 192 (37.4%)   | 48 (14.0%)      | 144 (42.0%)     |         |
| Advanced                      | 192 (37.4%)   | 118 (34.4%)     | 74 (22.4%)      |         |
| Treatment at BSI              |               |                 |                 | 0.230   |
| Chemotherapy                  |               |                 |                 |         |
| HSCCT                         | 47 (9.3%)     | 35 (10.4%)      | 12 (3.5%)       |         |
| PEG-HSCCT                     | 39 (7.7%)     | 28 (8.4%)       | 11 (3.2%)       |         |
| Time of BSI after treatment   | 12.0 [11.0-18.0] | 12.0 [11.0-18.0] | 16.0 [13.0-20.0] | 0.025   |
| Pitt bacteremia score, median | 0.0 [0.0-1.0] | 0.0 [0.0-1.0]   | 0.0 [0.0-1.0]   | 0.055   |
| P-value of glycopeptide       |               |                 |                 | -0.001  |
| Time of appropriate antibiotic therapy after BSI, median | 1.0 [1.0-2.0] | 1.0 [1.0-2.0] | 1.0 [1.0-2.0] | -0.001  |
| Fluorquinolone prophylaxis     |               |                 |                 |         |
| Antibiotic                    |               |                 |                 |         |
| Gyrasease                      | 354 (69.8%)   | 294 (83.6%)     | 60 (17.6%)      |         |
| Guanine                        | 152 (30.5%)   | 60 (16.4%)      | 92 (27.4%)      |         |
| Mortality                     |               |                 |                 | 0.198   |
| In-hospital mortality          | 133 (26.4%)   | 83 (24.5%)      | 50 (14.7%)      |         |
| 100-Day mortality             | 178 (34.3%)   | 109 (32.2%)     | 69 (20.3%)      | 0.092   |
| 365-Day mortality             | 307 (60.7%)   | 200 (58.0%)     | 107 (34.2%)     | 0.340   |

Abbreviations: VSE, vancomycin-susceptible Enterococcus; VRE, vancomycin-resistant Enterococcus; AML, acute myelogenous leukemia; ALL, acute lymphoblastic leukemia; MPAL, mixed phenotypic acute leukemia; CR, complete remission; HSCCT, hematopoietic stem cell transplantation; CRP, C-reactive protein; IQR, interquartile range

*Antibiotic susceptibility of 1 isolate out of 512 Enterococcal BSI was not reported

**Advanced stage includes refractory and relapsed leukemia state

Figure 1. Incidence rate of Enterococcal BSI with changes of aggregated antibiotics utilization in acute leukemia cohort. Vertical black dash line is the time of new institutional strategy of restricting fluoroquinolone prophylaxis and use of carbapenem.