Prophylactic acyclovir has been shown to decrease the risk of varicella zoster virus (VZV) reactivation following hematopoietic stem cell transplantation (HSCT). In order to improve compliance and to minimize potential toxicity, we investigated the role of a single daily ultra low-dose of acyclovir in preventing the occurrence of herpes zoster (HZ) following HSCT. Between June 2008 till date, all HSCT patients in this center are being randomized after informed consent, to either receive low-dose acyclovir (LD Group) at 800mg twice daily (20mg/kg twice daily if <40kg or ultra low-dose acyclovir (uLD Group) at 200mg once daily (5mg/kg/day if <40kg) for one year following HSCT. The primary endpoint of this study is the occurrence of HZ at one year. For this interim per-protocol analysis, a total of 80 consecutive patients with a minimum of 6 months of follow up following cessation of therapy were eligible for analysis. There were 40 patients in each group. Both groups were comparable for age, median 11 yrs (0.3-53) in the LD group vs 13 yrs (0.5-43) in the uLD group, underlying disease, type of transplant, graft versus host disease and median time of randomization (33.4 vs 38 days post HSCT). None of the patients in the uLD group developed HZ while on prophylaxis. One patient in the LD group developed HZ (2.5%). This patient had a past history of recurrent herpes zoster in the same dermatomal distribution prior to HSCT while on therapy for acute leukemia. Five patients developed HZ within 5 months after discontinuing acyclovir (LD group = 1, uLD group = 4, P = .358). Amongst these patients the median time to develop HZ after stopping prophylaxis was 31 days (9-142 days). This prospective randomized study shows that a single daily ultra low-dose of acyclovir given for one year following HSCT is sufficient to prevent HZ while on therapy for acute leukemia. Five patients developed HZ during a time when the patient is most vulnerable to the consequences of VZV reactivation. Prolongation of prophylaxis beyond a year may be necessary for patients who continue to be severely immunosuppressed.

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Low Dose Liposomal Amphotericin B Followed by Micafungin Prophylaxis of Invasive Fungal Infections (IFI) in Pediatric Allogeneic Stem Cell Transplantation Recipients

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Background: We have previously demonstrated the safety/efficacy of prophylactic liposomal amphotericin B (L-AMB) in preventing IFI for 100 days in pediatric allogeneic stem cell transplant (AlloSCT) recipients (Roman/Cairo et al PBC, 2008). Prophylaxis with L-AMB 3 mg/kg/day (Day 0 to +44) and micafungin (Day +45 to +100) has been shown by our group to be both safe and effective in preventing IFI (Small/Cairo et al ASBMT, 2011).

Methods: Pediatric AlloSCT recipients received low dose L-AMB at 1.5 mg/kg IV daily (Day 0 to +44), followed by micafungin 1.5 mg/kg (max 50 mg) (Day +45 to +100). All patients received Tacrolimus and MMF for acute GVHD prophylaxis as we previously described Bhatia / Cairo, BBMT, 2010. Plasma galactomannan and beta-glucan assays were monitored BIW. Treatment success was defined as prevention of IFI by day 100.

Results: 23 patients (8 ALL, 2 AML, 3 T NHL, 1 HL, 1 DLBCL, 2 SAA, 1 FA, 1 SC, 2 CGD, 1 SCID, 1 HLH) Median age: 11.7 yrs (1mo-23.5 yr) Sex: 3F, 20M Conditioning: 12 myeloablative, 11 reduced toxicity; 7 CB donors (6 -unrelated, 1-related), 2 related PBSC, 6 R BM , 7 U RBM, and 1 R BM+CB. Median time to myeloid and platelet engraftment was 17 and 32.5 days, respectively. Chimerism = 98-100% day +100. Absolute CD4 count day +100 was (29-439 cells/µL). Probability of Grade II-IV aGVHD was 17% and cGVHD 4%. Probability of 1-yr OS was 87% (95% CI: 64.8-95.6). One patient, history of CGD, had IFI Aspergillus spp on lung biopsy Day +49. Probability of IFI by day 100 was 4% (95% CI 0-64.3). Grade 3-4 toxicities: renal insufficiency with concomitant other nephrotoxins occurred in 14 pts (60.8%), low K+ in 12 (52.1%), and low Mg++ in 5 (21.7%). L-AMB dosing was changed to reduced dose in 1, decreased frequency in 4, changed to micafungin in 2, and held doses in 3). False positive beta-glucan was observed in 8 and galactomannan in 3 pts.

Conclusions: Low dose (1.5 mg/kg/day) L-AMB followed by micafungin is as effective as preventing IFI as prior studies higher doses (3 mg/kg/day). Future studies should focus on reducing toxicity but maintaining efficacy. Beta-glucan and galactomannan assays may be associated with a high incidence of false positive results in pediatric AlloSCT recipients and should not be used alone in clinical decision making.

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Music Therapy for the Hematopoietic Stem Cell Transplant Patients

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Background: In a large cancer center, the average in-patient admission for Hematopoietic Stem Cell Transplant (HSCT) patients ranges between three to five weeks based on the type of transplant. HSCT patients may experience not only physiological complications but also psychological, emotional, and spiritual distress during hospitalization. A number of HSCT patients are from out of state and may not have adequate family support throughout the course of hospitalization further aggravating patients’ level of distress. Music Therapy is a complementary treatment that addresses physical, emotional, cognitive, and social needs of individuals. It was introduced to HSCT patients as a supportive measure to assist in alleviating stressors experienced during the hospital stay.

Purpose: A group of HSCT nurses wanted to evaluate the patient perceived benefits of music therapy on HSCT patients during their hospitalization. A secondary aim of this project was to explore the literature regarding music therapy, with the potential for incorporating it as a standard of practice in the care of HSCT patients.

Intervention: After conducting a review of literature on the benefits of music therapy on HSCT patients, HSCT nurses in collaboration with Music Therapists promoted a regular
program of music therapy during hospitalization. Music therapy is available to HSCT patients as a weekly group session, incorporated in an existing exercise class three times a week, or on an individual consult basis.

**Evaluation:** At the end of each week, participants in music therapy are asked to complete a short survey on their perceptions of the effects of the therapy on a number of factors, including stress, anxiety, sleep, comfort, pain and others. Results will be used to refine the program and potentially lead to nursing research.

**Discussion:** Music therapy has been reported to reduce pain and depression, promote rest and relaxation, and enhance patient care outcomes and promote patient satisfaction. Given the complexities involved in hematopoietic stem cell transplantation, interdisciplinary collaboration between nurses and music therapists can support the integration of music therapy to enhance patient care outcomes and promote patient satisfaction.

### 303

**Phototoxic Dermatoses in Pediatric BMT Patients Receiving Voriconazole**

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Voriconazole has been increasingly used in the treatment of invasive aspergillosis and for antifungal prophylaxis after allogeneic BMT. The incidence of drug-induced skin reactions is estimated to be 7%. There is a growing awareness of the higher risk of acute and cumulative phototoxicity, and the risk of chronic photo-damage and non-melanoma sun-related skin cancers in immunocompromised patients. Between August 2009 and June 2012, 40 of 43 consecutive allo-BMT recipients (mean age 9.8 y; 83% Caucasian) received voriconazole prophylaxis (7 mg/kg/dose BID (≤ 12 yrs age); 200 mg BID (>12 yrs); adjusted to target trough ≥1.0 mg/mL). Nine of forty (22.5%) patients, all Caucasian, developed skin rashes in sun-exposed distributions during spring-summer season. The average prior voriconazole exposure was 6 months (1.8–12.5 mo). Dermatologic findings included 1) diffuse sunburn-like erythema over the face, outer aspects of forearm, and hands 2) linear papulovesicular lesions 3) severe bullous cheilitis (Figure 1) dermatoheliosis and 5) lentiginous. Voriconazole was continued in four, substituted with fluconazole in four and with posaconazole in one patient. Patients were treated with sun avoidance, high-potency sun-screens, and topical steroids with significant improvement in all cases.

<table>
<thead>
<tr>
<th></th>
<th>All (40)</th>
<th>No Phototoxic rash (31)</th>
<th>Phototoxic rash (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Vori- level (mg/mL)</td>
<td>1.3</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Mean N-oxide (mg/mL)</td>
<td>3.5</td>
<td>3.2</td>
<td>4.8</td>
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While trough voriconazole plasma concentrations do not appear to be different, N-oxide metabolite concentrations were higher in photosensitive patients. Significant higher incidence of photosensitivity occurs in voriconazole-treated children, especially Caucasians, during prolonged drug use and intense sunshine. Voriconazole N-oxide may act as a chromophore for phototoxicity, and its potential role in individual susceptibility should be explored. Voriconazole may be continued, although change to other azoles may be necessary in some patients. Prolonged voriconazole use requires close monitoring for chronic skin toxicities. Long-term risks including the risk of skin cancer need to be investigated.

### 304

**Evaluation of Pre-Transplant Risk Factors of Bacterial Bloodstream Infection (BSI) in Patients with Hematopoietic Stem Cell Transplantation (HSCT) and Comparison of BSI Between Allogeneic and Autologous HSCT**

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**Background:** Although improvement of supportive cares including antimicrobial prophylaxis has significantly ameliorated treatment outcomes in patients with hematopoietic stem cell transplantation (HSCT), bacterial bloodstream infection (BSI) is still a major cause of morbidity and mortality of HSCT. The purpose of this study is to evaluate pre-transplant risk factors of BSI after HSCT and compare the nature of BSIs between allogeneic and autologous HSCT.

**Methods:** Adult patients (age ≥ 18 years) who received either allogeneic or autologous HSCT in a single institution between November 2002 and June 2012, were analyzed. Report of blood cultures from the start time of conditioning therapy to hospital discharge, and clinical relevance of the BSIs, were reviewed. Evaluated potential risk factors of BSI were type of HSCT (allogeneic vs. autologous), age, gender, disease (AML vs. others), time from diagnosis to HSCT, amount of infused CD34\(^+\) stem cell, HCT-CI score, and use of antibiotics from conditioning for prophylactic or therapeutic intent. Blood level of C-reactive protein (CRP), albumin, and ferritin within 14 days from HSCT were also included in the analysis. Among patients with allogeneic HSCT, modified EBMT score, concomitant acute GVHD, type of donor and intensity of conditioning were additionally evaluated.