Censoring occurred at the time of death, loss to follow-up or 10 years. Univariable and multivariable hazard ratios (HR) were calculated using a Cox model, treating relapse and rejection following CMV as time-varying covariates.

Results. Seventy-nine kidney, 52 heart, 34 liver and five liver-kidney transplant recipients were included. Sixty-two of 170 died, at a median of 3.8 years (interquartile range [IQR] 0.8–6.6 years). Median follow-up amongst the 108 survivors was 7.4 years (IQR 3.7–10 years) although 22 (13%) were censored before 3 years. CMV relapse occurred in 49/170 (29%), 67% within 6 months of treatment completion. Overall mortality amongst those who relapsed was 39% (19/49) vs. 36% (43/121) in those who remained relapse free. On univariable analysis, CMV relapse was not associated with a significantly increased risk of death (unadjusted HR 1.59, 95% CI 0.92–2.75, $P = 0.10$). After controlling for age and transplanted organ type, findings were similar (adjusted HR 1.68, 95% CI 0.93–3.04, $P = 0.09$).

Conclusion. Mortality rates following CMV remain high even in the valganciclovir era. In our study, we did not identify a significant relationship between the development of recurrent CMV disease and death. However, the complex nature of these patients, multiple layers of potential confounding and limited statistical power of our cohort make detection of small effects difficult. Future prospective studies evaluating the clinical efficacy of strategies to reduce recurrence are needed to further assess this relationship.

Disclosures. **D. Snydman**, Merck: Board Member, Consulting fee and Grant recipient; Shire: Board Member, Consulting fee; Takeda: Board Member, Consulting fee; Chimerix: Board Member, Consulting fee; Seres Therapeutics: Grant Investigator, Grant recipient; Actelion: Grant Investigator, Grant recipient; Moderna: Board Member, Consulting fee; Summit: Grant Investigator, Grant recipient; Tetraphase: Grant Investigator, Grant recipient.

1552. Absolute Lymphocyte Threshold: A Simple Readily Available Tool to Predict Risk of Cytomegalovirus Infection After Transplantation

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Background. Cytomegalovirus (CMV) is a common infection after solid-organ (SOT) and hematologic stem cell transplantation (HSCT). We correlated peripheral blood absolute lymphocyte count (PBALC) with risk of CMV infection in transplant patients.

Methods. Thirty-six SOT and 28 HSCT consecutive patients with plasma CMV viral load (VL) testing for surveillance were enrolled. Clinical variables, including PBALC, were abstracted for correlation with CMV infection.

Results. The median age was 54.5 years (IQR 40–63). Forty-three (67.2%) patients developed CMV infection (asymptomatic, 67.4%; CMV syndrome, 14%; gastrointestinal disease, 14%) at median of 4.4 months (IQR 1.4–7.7). Median VL was higher for symptomatic than asymptomatic infection (10,110 vs. 262 IU/mL, $P = 0.006$). PBALC <830 cells/mm^3 correlated with CMV infection (sensitivity 95%; specificity 71%). Median PBALC among CMV infection patients was lower than those without infection (450 vs. 1,060 cells/mm^3, $P < 0.0001$). Among SOT patients, PBALC <610 cells/mm^3 correlated with CMV infection (sensitivity 80%; specificity 73%); median PBALC was significantly lower among those who developed CMV infection (270 and 450 vs. 1,120 cells/ mm^3). Among HSCT recipients, PBALC <830 cells/mm^3 correlated with CMV infection (sensitivity 100%; specificity 80%); median PBALC was lower among those who developed CMV infection (520 and 510 vs. 1,020 cells/ mm^3) (Table 1).

Conclusion. In the current era when sophisticated immunologic measures are being proposed as CMV prognosticator, we highlight the clinical importance of a simple readily available PBALC.

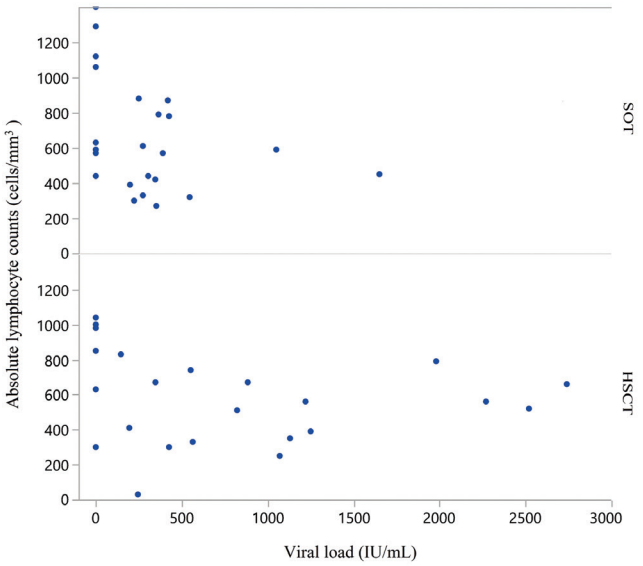
Table 1. CMV VL and PBALC in Patients with or Without CMV Infection

	CMV Disease	Asymptomatic CMV Viremia	No CMV infection	*P* Value
SOT, *N* = 36	*N* = 7	*N* = 18	*N* = 11	
Median CMV VL (IQR) (IU/mL)	32,500 (352–118,000)	423 (297–6,315)	0	0.05*
Median PBALC (IQR) (cells/mm^3)	270 (140–460)	450 (388–675)	1,120 (590–1,400)	0.001
HSCT, *N* = 28	*N* = 3	*N* = 15	*N* = 10	
Median CMV VL (IQR) (IU/mL)	1,220 (426–2,520)	884 (347–1,980)	0	0.62*
Median PBALC (IQR) (cells/mm^3)	520 (300–560)	510 (330–670)	1,020 (795–3,308)	0.03

PBALC, peripheral blood absolute lymphocyte count; CMV, cytomegalovirus; HSCT, hematologic stem cell transplantation; IQR, interquartile range; SOT, solid-organ transplantation; VL, viral load.

*Comparison between CMV disease and CMV viremia recipients.

Figure 1. CMV viral load and absolute lymphocyte count by solid organ transplantations (SOT) and hematologic stem cell transplantations (HSCT)



Disclosures. **All authors:** No reported disclosures.

1553. Infectious Complications Following Hematopoietic Cell Transplantation in Patients With Primary Immunodeficiency Diseases

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Background. Hematopoietic cell transplantation (HCT) has significantly improved long-term survival for children with primary immunodeficiency diseases (PID). Little is known about specific risk factors for infections after transplant in PID patients and differences from others undergoing HCT. Factors impacting success of HCT in PID include age at HCT, underlying genetic defect, type of donor and conditioning regimen, and importantly, the presence of pre-existing infection. We describe the epidemiology and risk factors for bacterial, viral and fungal infections in patients undergoing HCT for PID.

Methods. After IRB approval, medical records of patients undergoing HCT at Seattle Children's Hospital for PID between 1998 and 2017 were reviewed. Donor and stem cell source, conditioning regimen, development of graft vs. host disease (GVHD), chimerism and mortality were considered, in addition to details of pre-HCT infections. Timing, character and treatment details of each incident infection during 12 months post-HCT were collected. Standardized antimicrobial prophylactic regimens were administered. Primary outcomes included mortality and infection-free survival. Kaplan–Meier curves were used to examine infection-free survival, by diagnosis and by HCT era.

Results. Sixty-nine patients with PID underwent HCT during the study period. Mean age at HCT was 6.2 years and varied by underlying PID. Altogether, 24 children (34.8%) had severe combined immune deficiency (SCID), 14 (20.3%) had chronic granulomatous disease (CGD), nine (13%) had combined immune deficiency (CID), and six (8.7%) had hyper IgM syndrome. Fifty-six patients received HLA-matched grafts. Umbilical cord blood was utilized in 10% of patients. Acute GVHD grades II–IV developed in 46 (67%) patients. Bacterial infections were the most common infection post-HCT, followed by respiratory and herpes group viral infections. Overall mortality at 1 year was 19%, of which at least 50% was infection related.

Conclusion. Infection occurs frequently and contributes to morbidity and mortality in patients undergoing HCT for PID. Understanding the timing of infections and contributing risk factors could help develop preemptive and monitoring strategies to improve outcomes in this patient population.

Figure 1a

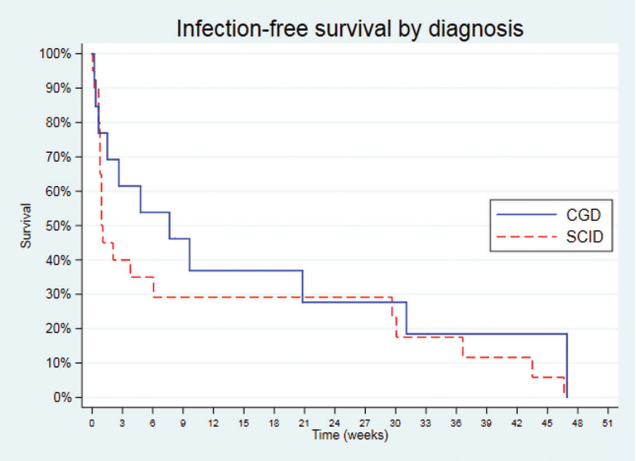
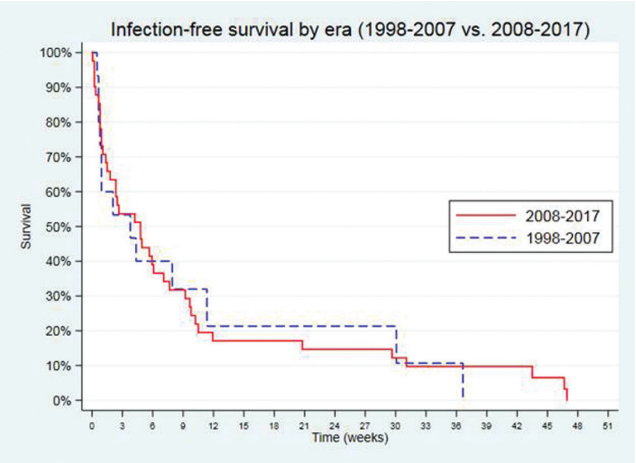


Figure 1b



Disclosures. **All authors:** No reported disclosures.

1554. Reactivation of Varicella Zoster Virus in Solid Organ Transplant Recipients: Identification of Risk Factors Using Data Mining Tools

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Background. We created a retrospective database of solid-organ transplant (SOT) recipients using innovative data mining tools. This study describing the epidemiology of Varicella Zoster Virus (VZV) reactivation in SOT serves as a proof of concept of such techniques in clinical research.

Methods. The study design was a retrospective single-center cohort study. Using data mining tools, information was extracted from the electronic medical record and merged with data from the Scientific Registry of Transplant Recipients. First SOT from January 1, 2010–December 31, 2016 were included. Charts of subjects with ICD9/10 codes related to VZV/Herpes infections; positive VZV PCR, DFA or cultures; and recipients of acyclovir, valacyclovir or famciclovir were manually reviewed. The cumulative incidence was calculated using the Kaplan–Meier method. Cox proportional hazards models were used to identify risk factors for VZV reactivation among heart transplant (HT) recipients.

Results. A total of 1,076 SOT recipients met inclusion criteria (203 heart, 395 lung, 280 kidney, 198 liver). Forty-nine patients experienced at least one episode of VZV reactivation; median time post-transplant was 2.25 years (IQR 1.44–4.20 years). The cumulative incidence was 11.9% at 8 years post-transplant. Heart transplant (HT) recipients were at highest risk (Figure 1), with an 8-year cumulative incidence of 26.3% (Figure 2). Thirty-nine of 49 (80%) patients presented with localized disease and 4/49 (8%) with disseminated disease. In multivariable analysis (Figure 3), the risk of VZV reactivation in HT recipients after 12 months (47 patients) was associated with CMV infection before 12 months (HR [95% CI] = 4.74 [1.67–13.47]). Postherpetic neuralgia (PHN) occurred in 23/49 (47%), recurrence in 3/49 (6%), and other complications in 11/49 (22%). In univariable analysis, no risk factors for PHN were identified.

Figure 1

Patient Characteristics (Heart Transplant Recipients, N=203)

	n	% or St dev
Age (median)	58	±12.4
Gender (Male)	147	72.4%
Race/Ethnicity		
Caucasian	133	65.5%
African American	48	23.6%
Hispanic	16	7.9%
Asian	6	3.0%
Diabetes Mellitus	78	38.4%
Underlying Disease		
Ischemic Cardiomyopathy	81	39.9%
Non-Ischemic Cardiomyopathy	98	48.3%
Other	24	11.8%
UNOS listing status		
1A	156	76.8%
1B	43	21.2%
2	4	2.0%
Pre-Transplant VZV IgG seropositivity	187	92.1%
CMV serostatus		
CMV D+/R-	58	28.6%
CMV D+/R+; D-/R+	127	62.6%
CMV D-/R-	18	8.9%
CMV infection	28	13.8%
Pre-transplant LVAD	71	35.0%
Post-transplant ECMO	9	4.4%
Post-transplant RRT	21	10.3%
Rejection	62	30.5%
Pulse Steroids	30	14.8%
Induction Immunosuppression (Basiliximab)	201	99.0%
Maintenance Immunosuppression (at 1 yr)		
Prednisone	89	43.8%
Cyclosporine	99	48.8%
Tacrolimus	83	40.9%
Azathioprine	66	32.5%
MMF/MPA	117	57.6%
Other (Methotrexate/Sirolimus)	13	6.4%
Maintenance Immunosuppression Regimen (at 1 yr)		
CyA/Aza, CyA/Myc, Tac/Aza, Tac/Myc, Aza/Sir, Pred/Myc, Pred/Tac, Cya/Myc/Sir	101	49.8%
Pred/Tac/Myc, Pred/Myc/Sir, Pred/Tac/Aza, Pred/CyA/Myc, Pred/CyA/Aza	76	37.4%
Pred/Tac/Myc/MTX, Pred/Tac/Myc/Sir, Pred/Tac/Aza/MTX, Pred/Tac/Aza/Sir	9	4.4%
Slow steroid taper (12 months)	40	19.7%

Figure 2