***Conclusion.*** DDTB presents early as febrile illness after SOT, and carries a high mortality risk. Donors should be screened, with particular attention to risk factors.

**Table 1:** Summary of Characteristics of Donors and Recipients With DDTB

| Characteristics | *N* (% or range) |
|---|---|
| Age, year | 48 (23–68) |
| Gender, M (*N* = 35) | 21 (60) |
| Type of transplant | |
| Kidney | 13 (36.1) |
| Liver | 6 (16.7) |
| Lung/heart–lung | 16 (44.4) |
| Heart | 1 (2.8) |
| h/o T-cell depleting agent (*N* = 9) | 5 (55.6) |
| h/o acute rejection (*N* = 19) | 11 (57.9) |
| Immunosuppressive regimen w/ | 8 (38.1) |
| Cyclosporine (*N* = 21) | |
| Donor characteristics, *N* = 28 | |
| Deceased | 24 (85.7) |
| Living | 2 (7.1) |
| Not specified | 2 (7.1) |
| Donor risk factor for TB[a] | |
| Latent or active TB | 5 |
| Residence in endemic country | 13 |
| Socio-economic[b] | 5 |
| None | 5 |
| Type of TB | |
| Pulmonary | 13 (36.1) |
| Extrapulmonary | 10 (27.8) |
| Disseminated | 13 (36.1) |
| Type of DDTB | |
| Proven | 17 |
| Probable | 8 |
| Possible | 11 |
| Clinical presentation (*N* = 33) | |
| Fever | 20 (60.6) |
| Other[c] | 13 (39.4) |
| Time to diagnosis, med in months | 2.7 (0.2–29) |
| Diagnosis, *N* = 34[a] | |
| AFB smear or culture | 30 |
| Histopathology | 8 |
| PCR | 2 |
| Outcome | |
| Graft loss or failure (*N* = 22) | 4 (18) |
| Death | 9 (25) |

[a]may have more than one. [b]Homelessness, incarceration, alcohol abuse, and travel.

[c]Pain (2), cough/dyspnea (3), Effusion (1), nephritis (1), nausea (1) no symptoms (5), NR,– not reported.

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### 1537. Reactivation of Latent Cytomegalovirus Infection in Patients with Rheumatologic Disease: A Case–Control Study

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***Background.*** While there are emerging reports of cytomegalovirus (CMV) disease in patients with underlying rheumatic conditions, the disease burden, risk factors and clinical sequelae in this population are poorly understood. We sought to describe a cohort of patients with underlying rheumatic disease and CMV infection, then compare those with systemic lupus erythematosus (SLE), the largest subgroup, using case–control methodology to identify risk factors for reactivation and differences in outcomes.

***Methods.*** Adults with rheumatic disease and CMV reactivation diagnosed by viral load, viral culture or histopathology from Tufts Medical Center between 2000 and 2015 were identified. Due to SLE cases comprising 43% of the total, these patients were matched 3:1 with SLE controls based on age, sex and year of admission.

***Results.*** Fourteen patients with rheumatic disease and CMV were included (six SLE, four rheumatoid arthritis, two sarcoid, one psoriatic arthritis, one microscopic polyangiitis). Seven patients had viremia alone and the remainder had tissue-invasive disease (four gastrointestinal, three pulmonary). Thirteen (93%) received corticosteroids within 3 months prior to CMV reactivation. Fever (86%) was the most common symptom. Coinfections were seen in eight (57%), including four with bacteremia. Thirteen (93%) were treated with antiviral therapy for a median of 33 days (range 13–171). Relapse occurred in three patients and four died during hospitalization. Six patients with underlying SLE and CMV reactivation were compared with 18 controls. Cases received significantly more corticosteroids during the 8-week period prior to admission (median 36.5 vs. 2.5 mg/day, $P = 0.006$), had longer hospitalizations (median 46.5 vs. 6.5 days, $P = 0.006$) and more frequent co-infections (67% vs. 17%, $P = 0.04$). There were no significant differences in symptoms at presentation.

***Conclusion.*** CMV reactivation occurs in patients with rheumatic disease, and can result in severe clinical sequelae that may be difficult to distinguish from a flare of the underlying disease. Patients with CMV were more likely to have received high doses of corticosteroids, and developed more co-infections during their hospitalization. Clinicians should consider this diagnosis during the evaluation of a febrile illness in the rheumatologic population.

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### 1538. High Mortality of Cytomegalovirus (CMV) Pneumonia in Hematopietic Cell Transplant Recipients

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***Background.*** CMV infection remains a leading cause of morbidity and mortality in allogeneic hematopoietic cell transplant (allo-HCT) recipients. CMV can cause tissue-invasive disease, especially pneumonitis, with poor outcomes.

***Methods.*** We performed a retrospective study in HCT recipients who had CMV pneumonia between January 2014 and December 2017. The microbiology laboratory records were queried to identify patients with CMV pneumonia based on CMV viral culture and CMV viral load (VL) in plasma and in bronchoalveolar lavage (BAL). Data on demographics, clinical characteristics, management and mortality were collected.

***Results.*** A total of 23 patients were diagnosed with CMV pneumonia and nine (39%) were male, with a median age of 59 years (range 18–83), and median time from HCT to CMV pneumonia of 104 days (range 25–1,177). Most patients had an allo-HCT (20, 87%) and three (13%) had an autologous HCT. All patients except one were CMV seropositive, 13 (57%) were on steroids and eight (42%) had GVHD. The median plasma CMV VL at diagnosis was 137 UI/mL (range: 0–6,586) while the median VL in BAL was 1,700 UI/mL (range 79–64,800) (Figure 1). Foscarnet was the most common antiviral agent used (12, 52%) followed by ganciclovir (7, 30.4%). Seventeen (81%) patients received combination therapy with IVIGs with a mean number of doses of 4 (range, 1–7). All-cause mortality was 87% and CMV-associated mortality was 52%. The median VL in BAL in patients with CMV-associated mortality was higher (12,340 vs. 2,863 IU/mL, $P = 0.059$) than the remaining cohort.

***Conclusion.*** CMV pneumonia remains a significant cause of mortality after HCT. The correlation between CMV VL in BAL and plasma was poor. High CMV VL in BAL was associated with fatal outcome.

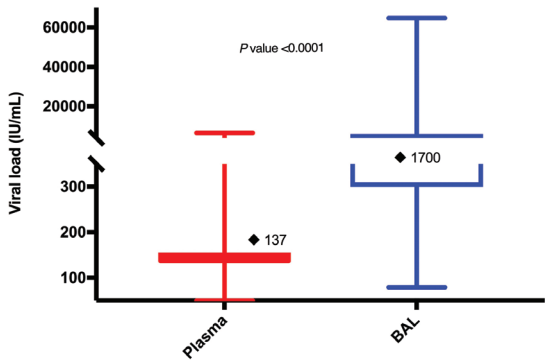


**Figure 1**: Comparison between median of CMV Viral load PCR in plasma and BAL by Mann-Whitney test. ◆ Median CMV PCR Viral Load, Abbreviation: BAL, Bronchoalveolar lavage; IU, International Unit.

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### 1539. Diagnosis of *Yersinia enterocolitica* in Cancer Patients With Diarrhea in the Era of Molecular Diagnostics for Gastrointestinal Infections

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***Background.*** *Yersinia enterocolitica* is usually transmitted through ingesting or handling undercooked pork products and is an uncommon cause of diarrhea, mesenteric adenitis and bacteremia in the United States. There is limited information regarding its clinical course in immunosuppressed and cancer patients. We describe the clinical presentation and outcomes of cancer patients diagnosed with *Y. enterocolitica* at a Comprehensive Cancer Center in the United States before and after the use of nucleic acid amplification testing (NAAT) using GI multiplex panel (GIMP).

***Methods.*** We studied all patients with *Y. enterocolitica* isolated from cultures or identified by NAATs. We then obtained demographic information, comorbidities, co-infections, clinical characteristics, treatment and overall mortality at 30 days post diagnosis.

***Results.*** Sixteen cases were identified (Table 1). The most common symptom of *Y. enterocolitica* infection was diarrhea [10/16 (62%)], followed by abdominal pain [8/16 (50%)] and fever [4/16 (25%)]. Ten of the cases were identified by NAAT over a 2-year period, compared with six cases identified prior to April 2016 over 70 years. Stool cultures confirmed *Y. enterocolitica* infection in two cases identified by NAAT (20%). Three patients had co-infection with *Clostridium difficile*, and four patients had a history of *C. difficile* infection. All but one patient was treated, mostly with a fluoroquinolone. Thirty-day mortality was 7.7%. Cause of death was most often a complication of advanced cancer. The one patient who did not receive antibiotics had maxillary sinus squamous cell cancer and had spontaneous resolution of symptoms.

***Conclusion.*** GIMP NAATs have increased the rates of *Y. enterocolitica* identification in patients with cancer, suggesting that this disease was underdiagnosed or is now more common as patients receive increasingly intensive immunosuppression. GIMP NAATs will likely re-define the epidemiology of *Y. enterocolitica* infection in cancer patients. In patients with *Y. enterocolitica* who are at high risk for *C. difficile* relapse and in whom no recent immunosuppression or evidence of systemic illness is present, it may be reasonable to consider observation or shorter course of antibiotics.

Table 1. Characteristics and Outcomes of *Y. enterocolitica* Infection.

| Patient Characteristics/Outcomes | *Y. enterocolitica* Infection N = 16 |
|---|---|
| Age (years, mean, standard deviation) | 58 ± 15 |
| Gender | |
| Male n(%) | 9 (56) |
| Female n(%) | 7 (44) |
| Race | |
| White n (%) | 12(75) |
| Black n(%) | 1(6.2) |
| Asian n(%) | 3(19) |
| Other n(%) | |
| Ethnicity | |
| Latino n(%) | 4(25) |
| Underlying Malignancy | |
| Solid n(%) | 9(56) |
| Hematologic n(%) | 7(44) |
| Stem cell n(%) | 5(31) |
| No malignancy n(%) | 0 |
| Clinical Presentation | |
| Fever n(%) | 4(25) |
| Nausea/vomiting n(%) | 3(19) |
| Abdominal pain n(%) | 8(50) |
| Diarrhea n(%) | 10(62) |
| Bacteremia n(%) | 2 (13) |
| Pseudoappendicitis n(%) | 1 (6.2) |
| *C. Difficile* | |
| Co-infection n(%) | 3(19) |
| Previous Infection n(%) | 4(25) |
| Imaging Studies | |
| Colitis n(%) | 2 (13) |
| Adenitis n(%) | 1 (6.2) |
| Date of diagnosis | |
| 1941-04/2016 | 6 |
| 04/2016-04/2018 | 10 |
| Treatment used | |
| None | 1(6.3) |
| Tetracycline | 1(6.3) |
| Sulfa | 1 (6.3) |
| Fluoroquinolone | 7 ((44) |
| Carbapenem | 1 (6.3) |
| Cephalosporin | 4 (25) |
| Penicillin | 2 (13) |
| 30 day mortality (%) | 7.7% |

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**1540. Left Ventricular Assist Device Driveline Infections: Relapsed Infections and Minimum Inhibitory Concentration Changes**

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***Background.*** Treatment of left ventricular assist device (LVAD) driveline infections (DLIs) pose difficulties given the permanent nature of the LVAD. Few studies have examined the minimum inhibitory concentration (MIC) changes over time or resistance patterns of implicated pathogens causing recurrent infections.

***Methods.*** This retrospective descriptive epidemiology study identified patients with DLIs in the Vanderbilt LVAD registry or INTERMACS data from January 2013 to August 2017. Driveline infections met International Society for Heart and Lung Transplantation definitions in addition to positive driveline drainage, blood, or sternal wound culture. Relapse included a DLI with an organism associated with previous DLI in the preceding year and similar MICs or new resistance to an antibiotic that was utilized. The LVAD registry and chart review were utilized to collect data. Patients were followed until transplant, death, or August 1, 2017.

***Results.*** A total of 330 patients underwent LVAD implantation. Thirty (9%) met criteria for DLI. Median duration of follow-up was 26 months (IQR 16, 39). There were 74 courses of infection, 40 new infections, and 34 relapsed infections. Median time to first DLI was 171 days (IQR 83, 403). Most common organisms in new DLIs were *S. aureus* (MRSA 11, MSSA 10), diptheroids (6), coagulase-negative staphylococci (6), and *P. aeruginosa* (5). *S. aureus* was the most common pathogen in patients with DLI associated bacteremia ($n$ = 16) as well as relapsed infection ($n$ = 11). There were 42 MIC changes in nine patients with relapsed infections from *S. aureus*, *P. aeruginosa*, and mycobacterium. Median time to first MIC change was 56 days (IQR 36, 88) and type of MIC change was an increase in five cases, decrease in two cases, and both increase and decrease in two cases. Time to first relapse from initial infection was longer in those who received suppression, 60 days vs. 83 days, $P$ = 0.047.

***Conclusion.*** Few patients had DLIs, but relapsed infections were more common with *S. aureus* and *P. aeruginosa.* MIC changes were quite variable and may not be the major contributor to relapsed infection.

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**1541. Infectious Complications in Adult Patients with Hemophagocytic Lymphohistiocytosis: A Single-Center Experience**

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***Background.*** Hemophagocytic lymphohistiocytosis (HLH) is a rare hematologic disorder which is characterized by excessive immune activation. In adults, it is typically secondary to an underlying process such as autoimmune disease, infection, or malignancy. Guidelines based on expert opinion suggest prophylaxis (PPX) with antiviral, antibacterial, and/or antifungal agents for patients undergoing treatment for HLH; however, the incidence of infectious complications is not known. We aimed to study the scope of infection in patients with HLH to help determine the best strategy for antimicrobial PPX.

***Methods.*** We performed a retrospective chart review of 56 adult patients who fulfilled clinical diagnostic criteria for HLH treated at Stanford University Hospital between 2012 and 2018. Infections diagnosed up to 1 month prior and up to 6 months after a diagnosis of HLH were reviewed.

***Results.*** A total of 57 episodes of HLH in 56 patients were reviewed. Infection was determined to be the trigger of HLH in five cases (EBV in three cases, Histoplasma in one case, MAC or HHV6 in one case). Antiviral PPX was used in 72%, PCP PPX in 75%, and antifungal PPX in 77% of HLH episodes. At least one infectious complication occurred in 33 of 57 episodes of HLH (58%) with 69 total infections diagnosed after HLH diagnosis: 46 bacterial, 12 viral, and 11 fungal. Bacterial infections included bacteremia (43%), pneumonia (15%), skin and soft tissue (13%), intra-abdominal infection (11%), urinary tract infection (13%), and others (5%). Of the viral infections, CMV viremia was the most prevalent and occurred in four patients (7% of HLH episodes). Fungal infections occurred in 19% of HLH episodes and included four yeast and seven mold infections (five proven and two possible). Three of these cases were not receiving antifungal PPX prior to infection; the remaining eight were breakthrough infections.

***Conclusion.*** Infectious complications of HLH are common, and likely result from a combination of host immune factors related to underlying disease and induced by immunosuppressive chemotherapy. Most noteworthy is the incidence of fungal infections which supports the use of antifungal PPX in this patient population. Even with this, breakthrough infection, including with opportunistic molds, is not uncommon.

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