Abstract

Background: Despite widespread use of prevention strategies, CMV remains a common opportunistic infection in SOTR. Contemporary data regarding CMV in pediatric SOTR is limited. We sought to determine the frequency and risk factors for CMV infection and disease in a large single-center cohort of pediatric SOTR.

Methods: A retrospective cohort study of patients < 22 yr of age who received lung, liver, kidney, or multiorgan transplants at TCH between 2011-2018 was completed. Universal CMV prophylaxis was used based on risk status. Primary outcome was quantifiable CMV DNAemia. Associations with CMV DNAemia were measured using Fisher exact, Kruskal-Wallis, and multivariable logistic regression. Survival analysis and time to CMV infection were assessed using Kaplan-Meier calculations. All statistical analyses was completed with SAS v 9.4.

Results: Among 719 SOTR, 172 (24%) developed CMV DNAemia, this included 32/90 (35%) lung, 40/231 (17%) liver, 30/161 (19%) kidney recipients, 3/59 (5%) multi-organ, and 22/92 (24%) kidney recipients (p = 0.27) SOTR had early-onset CMV reactivation while on antiviral prophylaxis. Post-transplant, 169 (23%) SOTR had CMV reactivation (43% had primary infection. Median time to any DNAemia was 322 days post-transplant for lung, 202 for liver, 186 for heart, and 338 for kidney (p<0.04). Inflicting differences in prophylaxis strategies. High-risk CMV status (D+/R- for heart, liver, kidney donors and D+/R+ for lung) and type of organ transplanted were associated with CMV DNAemia (p<0.01). DNAemia was not associated with age at transplantation or the use of induction immunosuppression. There was no difference in survival during the study follow-up period (1 – 8 years) for SOTR with vs. without DNAemia.

Conclusions: This large contemporary cohort of pediatric SOTR on universal prophylaxis demonstrates low overall rates of CMV DNAemia and CMV-disease. High-risk CMV status remains associated with CMV DNAemia, suggesting that further interventions targeting this group may be warranted.

Background

- Despite prophylaxis, CMV DNAemia occurs in up to 23% of SOTR during the first year post-transplant.
- Previously reported risk factors for developing CMV DNAemia and disease include high-risk CMV status (D+/R-, young age at transplantation, receiving induction therapy with anti-Thymocyte globulin, and receiving a small bowel or lung transplant.
- CMV DNAemia has negative direct effects on SOTR including CMV syndrome and CMV tissue invasive disease as well as indirect effects including chronic allograft rejection, decline in graft function/failure, and opportunistic infections.
- Limited contemporary pediatric data regarding CMV DNAemia exists.

Methods/Approach

- We hypothesized that 20-25% percent of children who undergo SOT at Texas Children's Hospital will develop CMV DNAemia.
- We hypothesized that SOTR who receive immunosuppressive induction therapy, who have high risk CMV status, or who receive a multi-organ transplant will have a higher incidence of CMV DNAemia.
- A retrospective review of first time SOTR ≥ 22 years of age at TCH from January 1, 2011 – December 31, 2018 was performed to determine the epidemiology and variables which impact rates of CMV infection and disease in SOTR recipients.
- Primary Outcome: CMV DNAemia
- Universal CMV prophylaxis was used based on organ and risk status.

Results

- CMV DNAemia occurs in 24% of SOTR with 11% being > 1,000, which is consistent with the literature.
- High and intermediate risk CMV status and receiving a lung transplant are associated with CMV DNAemia.
- Donor age, recipient age, and induction immunosuppression were not associated with CMV DNAemia.
- CMV DNAemia occurs post prophylaxis in the majority of patients.
- 18% of SOTR who developed CMV DNAemia had CMV syndrome and 2% had CMV invasive disease.
- CMV infection and disease continues to occur in pediatric SOTR despite routine prophylaxis.
- More effective prevention strategies aimed at higher risk SOTR are still needed.

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