Pediatric immunization practices post-hematopoietic stem cell transplantation

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Background

Hematopoietic cell transplant (HCT) recipients:

- HCT recipients, including autologous (auto) and allogeneic (allo), require re-immunization due to each patient losing immunities acquired prior to transplant. Re-immunization begins once adaptive (T and B cell) immunity is at least partially reconstituted. T cell recovery (CD4 + cell counts >200 µL) in children <18 years of age without chronic graft versus host disease occurs approximately 6-9 months after transplant. B cell recovery typically occurs between 3-12 months after transplant. Vaccinations are often delayed post-transplant due for various reasons including but not limited to rituximab administration, intravenous immune globulin administration, immunosuppression, chronic graft versus host disease, or patients who have transitioned to a primary care physician.

Immunization Guidelines:

- Immunization guidelines have been developed and published by various groups to guide health care practitioners when to start vaccinations, which vaccination, and the frequency of administration. While these are useful tools, it is often difficult to identify the correct time to start re-immunizing due to various patient factors or get the patient back to receive further vaccines in a series.
- This retrospective chart review at Children's Mercy will assess vaccination practices post-transplant and help to identify any inconsistencies or areas for improvement.

Objectives

- **Primary**: To evaluate the immunization practices in HCT recipients at Children's Mercy compared to immunization recommendations outlined in the Immunization after hematopoietic cell transplant policy (TCS. 44[1].
- **Secondary**: To evaluate the median time to starting immunizations post-transplant overall, the most frequently received and completed vaccination series, and the number of patients who received immunizations at Children's Mercy versus their primary care.

Methods

- Retrospective chart review of 100 patients who received an HCT at Children's Mercy Kansas City from January 1, 2015 to November 13, 2019.
- Approved by Investigational Review Board.

Participants

Figure 1. Patient Screening

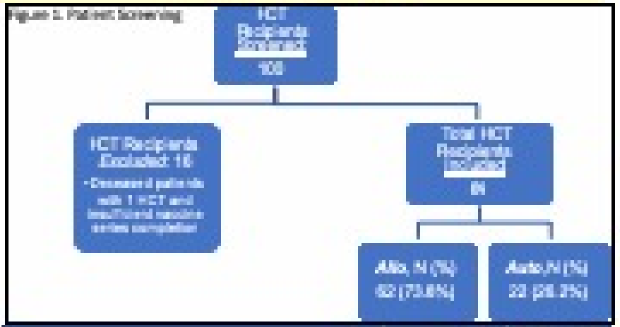


Table 1. Patient Characteristics	Allo, n=62	Auto, n=22
Gender, N (%) • Male • Female	37 (59.7%) 25 (40.3%)	13 (59%) 9 (41%)
Stem Cell Source, N (%) • Bone Marrow • Peripheral Blood • Cord Blood	46 (74.2%) 6 (9.7%) 10 (16.1%)	
Match, N (%) • Related • Unrelated	26 (41.9%) 36 (58.1%)	
Indications for Transplant, N (%) • Solid-tumor • Non-malignant • Leukemias	3 (4.8%) 23 (37.1%) 36 (58.1%)	22 (100%)
Received vaccinations at PCP, N (%) Received vaccinations at CMH, N (%) Received vaccinations at multiple locations, N (%)	5 (8.0%) 53 (85.5%) 4 (6.5%)	8 (36.4%) 8 (36.4%) 6 (27.2%)

Results

Figure 2. Percent of Individual Vaccine Recipients Post-HCT

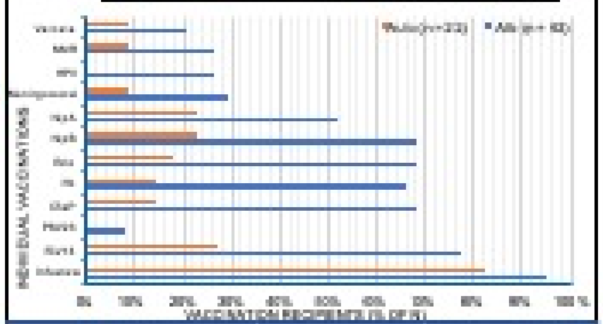
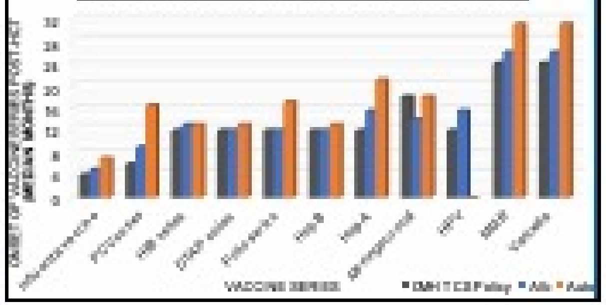


Table 2. Completed Vaccination Series	Allo n = 62	Auto, n= 22
Patients who completed the entire revaccination schedule, N	2	0
Patients who completed individual vaccine series, N		
Pneumococcal	8	0
DTaP	26	2
HIB	26	1
Polio	26	2
HepB	26	2
HepA	19	2
Meningococcal	18	2
HPV	7	0
MMR	8	1
Varicella	8	1

Figure 3. Median Onset Time of Vaccines Post-HCT[1]



Discussion

- A major limitation to the study is incomplete vaccination records. Allo recipients are more likely to receive vaccinations on time due to continued follow-up with the bone marrow transplant team. Auto recipients typically return to their oncology service for further follow-up.
- The most frequently received individual vaccine in both groups was influenza and the most frequently received vaccine series were pneumococcal and Hepatitis B. This is likely because these vaccines are the earliest in the vaccination schedule.
- The least frequently received vaccine series in both the auto and allo groups were varicella, HPV, and MMR. These vaccines occur later in the vaccination schedule and thus may be lost to follow-up.
- Two recipients in the allo group had documented completion of the entire revaccination schedule in the medical record. No patients in the auto group had documented completion within the medical record.
- The median onset time for all allo recipients receiving the Hepatitis B, polio, and DTaP vaccinations aligns with the recommended revaccination schedule.
- The auto group had more delayed onset of starting the revaccination schedule, especially with the MMR, varicella, and Hepatitis A vaccinations.

Conclusions

- Incomplete vaccine records due to gaps in transitions of care, loss to follow-up, and insufficient documentation leave HCT recipients vulnerable.
- At Children's Mercy, allo recipients have more complete documentation of their revaccination schedules. The documentation of revaccination is incomplete for the auto recipients.

Future Directions

- Evaluate efficient methods for documenting and obtaining vaccination histories from primary care providers to ensure vaccination completion.
- Develop oncology service vaccination practices for post-chemotherapy and auto recipients to ensure these patients are appropriately vaccinated.

References

1. Gonzales C, Shreve N, Rahmetulla R, Casey L, Rouch J. Recommended Vaccinations for Bone Marrow Transplant (BMT) Recipients. Blood and Marrow Transplant Program.

Disclosures

The authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

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