A Multidisciplinary Approach to the Pre-evaluation Process of Pediatric Solid Organ Transplant Patients

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Background

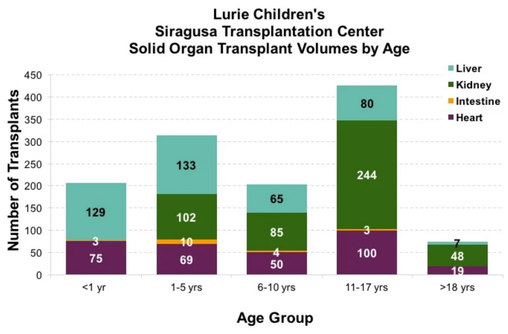
- Pediatric transplant recipients are at increased risk of infection-related morbidity and mortality from opportunistic infections and vaccine-preventable diseases.
- Vaccine immunogenicity may wane with organ failure and immunosuppressive therapies.
- Transplant candidates should be immunized early in disease course before transplant.
- Challenges to vaccination include complexity of care and multiple providers.
- A multidisciplinary approach involving Infectious Diseases (ID) is crucial to ensure optimal vaccination status prior to transplant.
- ID input is important to prevent and treat infectious complications of transplant.

Objective

To examine the impact of early Infectious Diseases involvement and multi-disciplinary pre-transplant evaluation process on vaccine optimization and infection management in our single tertiary care transplant center at Lurie Children's/Northwestern Medicine.

Siragusa Transplantation Center

- High volume transplant center ~50 solid organ annually
- Urban hospital in Chicago, IL
- Program includes Liver, Intestinal, Heart, Kidney and Stem Cell Transplants.
- In this study, we focused on solid organ transplants *excluding kidney* as we build our multi-disciplinary and ID focused pre-transplant evaluation program.



Methods

- During the solid organ transplant evaluation process, liver, intestinal, and heart transplant candidates and their families meet with clinicians from:
  - Infectious Diseases
  - Transplant Pharmacy
  - Organ Procurement
- The multidisciplinary team effort ensures that transplant candidates receive appropriate vaccines prior to transplant based on immunization history and serology results.
- The team helps to manage
  - Infections diagnosed during the evaluation process (active or latent)
  - Identify risk factors for infection
  - Optimize antimicrobial dosing based on comorbid conditions and concomitant medications
  - Follows patients post-transplantation
- Transplant candidates and their families are also educated regarding the process of organ donation and allocation in the United States.

We retrospectively reviewed ID consultations for transplant patients and our recommendations for vaccine optimization in the electronic medical record, reported herein.

Results

Table 1: Infectious Diseases Pre-Transplantation Evaluation

	Liver	Intestine	Heart	Total
ID Pre-Transplantation Evaluations (June 2019 - May 2020)	15	3	46	64
Vaccine Optimization Based on ID Evaluation	14 (93%)	3 (100%)	45 (98%)	62 (97%)
Transplanted Patients (June 2019 - May 2020)	14 (93%)	1 (33%)	30 (65%)	45 (70%)
Subsequent ID Consultation on Evaluation Patient	4 (27%)	2 (67%)	21 (46%)	27 (42%)

Table 2. Vaccine Optimization in Patients Pre-Transplantation

Vaccine	Patients (n) Requiring Dose Optimization	%
Meningococcal serogroups A, C, W, Y (MCV4)	45	70
Meningococcal serogroup B (MenB)[‡]	42	66
Pneumococcal 13-valent conjugate (PCV13)	38	59
Pneumococcal 23-valent polysaccharide (PPSV23)	36	56
Hepatitis B (HepB)	25	39
Hepatitis A (HepA)	24	38
Human papillomavirus (HPV)	20	31
Haemophilus influenzae type B (Hib)	18	28
Diptheria, tetanus, and acellular pertussis (DTaP)	11	17
Tetanus, diptheria, and acellular pertussis (Tdap)	10	16
Poliovirus, inactivated (IPV)	10	16

[‡] MenB no longer routinely recommended unless patient meets criteria (i.e. anatomic/functional asplenia, sickle cell disease, persistent complement component deficiency, and/or serogroup B meningococcal disease outbreak). Note: Live vaccines (i.e. MMR and VZV) may be recommended for certain patients pending urgency of transplantation.

Table 3. Issues Addressed in Subsequent ID Consultations (N=27 patients who had received pre-transplant eval)

Reasons for ID consult	n
Bacteremia	13
Focal bacterial infection UTI, pyelonephritis, meningitis, osteomyelitis, endocarditis	7
Viral infection	7
Wound/ulcer/fluid collection	4
Fever	3
Culture-negative sepsis	3
Catheter/post-surgical management	3
Fungal infection	2
Parasitic infection	1
Latent tuberculosis	1
Vaccine reaction	1

- Since the launch of the multidisciplinary transplant team, we have completed 64 pre-transplant ID evaluations.
- Eight patients required repeat evaluation for second organ transplant.
- Nearly all (97%) of evaluated patients received vaccine optimization (booster/new vaccine doses).
- 42% of patients evaluated pre-transplantation required subsequent ID consultations following transplant.
- Of the 27 patients who had subsequent ID consult involvement, most had >1 infectious complication summarized in Table 3.

Conclusions

- A multidisciplinary ID pre-transplantation evaluation provides individualized vaccine optimization and infection management.
- Transplant candidates and their families benefit from education and counseling from various clinicians.
- Transplant candidates and their families also gain familiarity with the Transplant ID consult service, which is involved in a large percentage of these patients' peri- and post-transplantation care.
- Subsequent ID consultation for a variety of infectious complications is common in solid organ transplant patients.

References

- Danziger-Isakov L, Kumar D; AST ID Community of Practice. Vaccination of solid organ transplant candidates and recipients: Guidelines from the American society of transplantation infectious diseases community of practice. *Clin Transplant*. 2019;33(9):e13563. doi:10.1111/ctr.13563
- Feldman AG, Sundaram SS, Beaty BL, Torres R, Curtis DJ, Kempe A. Immunization Status at the Time of Liver Transplant in Children and Adolescents. *JAMA*. 2019;322(18):1822-1824. doi:10.1001/jama.2019.14386