

A Single-Center 10-Year Analysis of Immunizations in Heart Transplant Recipients

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INTRODUCTION

- Vaccine-preventable diseases pose a risk towards heart transplant recipients on lifelong immunosuppression.
- The American Society of Transplantation (AST)¹ and the Infectious Disease Society of America (IDSA)² have released guidelines which provide recommendations for pre-transplant vaccinations.
- Vaccination rates in solid organ transplant (SOT) candidates range between 30-80% in multiple published studies^{3,4,5}.

STUDY DESIGN & METHODS

- Single-center retrospective chart review
- Patients 18 years or older who received a heart transplant between January 1, 2012 and March 31, 2022 at our multi-specialty teaching hospital located in Temple, TX.
- Reviewed 72 patients and documented vaccination status or seropositivity prior to or after transplant, as recommended by the AST.
- Evaluated the association with an Infectious Disease consult, which was optional at our institution before 2017 but mandatory since.

RESULTS

- Immunization statuses were as follows (Table 1):
 - Flu: 48.7%
 - Hepatitis B: 55.5%
 - Hepatitis A: 47.1%
 - MMR: 36.1%
 - PPSV23: 67.5%
 - PCV13: 67.5%
 - Tdap: 54.1%
 - Varicella: 83.3%
 - Zoster: 13.8%
 - COVID-19: 53.5%
- ID consult was associated with increased likelihood of receiving the MMR, PCV13, Tdap, and Zoster vaccines (Table 2).

Table 1

Immunization (Total)	Yes		No (%)
	Pre-Transplant (%)	Post-Transplant (%)	
Influenza ¹ (41)	20 Vaccinated (48.7)	0	21 (51.2)
Hepatitis B (72)	17 Seropositive ² (23.6)	23 Completed Series (31.9)	32 (44.4)
Hepatitis A (72)	32 Seropositive (44.4)	2 Completed Series (2.7)	38 (52.8)
MMR (72)	23 Seropositive (31.9)	3 Boosted (4.2)	46 (63.9)
PPSV23 (72)	41 Vaccinated (56.9)	4 Vaccinated (5.6)	27 (37.5)
PCV13 (72)	33 Vaccinated (45.8)	5 Vaccinated (6.9)	34 (47.2)
Tdap (72)	39 (5 Seropositive, 34 Vaccinated) (54.1)	0	33 (45.8)
Varicella (72)	60 Seropositive (83.3)	0	12 (16.7)
Zoster (72)	10 Vaccinated (13.8)	0	53 (73.6)
COVID-19 ³ (48)	0	28 (53.5)	20 (41.6)

1. 41 transplants completed within the flu season
 2. Defined as serum antibodies detected or titers measured within vaccine manufacturers' level of immunization (e.g. Hepatitis B titer > 10mIU/mL)
 3. COVID-19 initial series defined as three doses of Pfizer or Moderna vaccine, or a single dose of Johnson & Johnson vaccine followed by a single dose of Pfizer or Moderna vaccine.
 28 patients completed the COVID-19 initial series recommended for transplant patients.

Table 2

		Infectious Disease Consult		Odds Ratio (95% Confidence Interval)	p value
		Yes	No		
Influenza ¹	Yes	14	6	1.85 (0.53 - 6.48)	0.33
	No	10	11		
Hepatitis B	Yes	25	13	1.35 (0.52 - 3.50)	0.54
	No	20	14		
Hepatitis A	Yes	22	24	1.45 (0.44 - 2.98)	0.78
	No	12	15		
MMR	Yes	26	2	17.1 (3.61 - 81.2)	0.0004
	No	19	25		
PPSV23	Yes	28	17	0.97 (0.36 - 2.6)	0.95
	No	17	10		
PCV13	Yes	31	7	6.33 (2.18 - 18.4)	0.0007
	No	14	20		
Tdap	Yes	33	6	9.63 (3.13 - 29.6)	0.0001
	No	12	21		
Varicella	Yes	39	21	1.86 (0.53 - 6.48)	0.33
	No	6	6		
Zoster	Yes	10	0	21.79 (1.22 - 390.9)	0.04
	No	26	27		
COVID-19	Yes	21	7	2.54 (0.79 - 8.21)	0.12
	No	13	11		

1. With transplant during influenza season

Table 3

Patient Demographics	Heart Transplant Recipients n = 72
Sex	
Male, n (%)	53 (73.6)
Female, n (%)	19 (26.4)
Age, median (range)	
58.5 (26-73)	
Race	
White, n (%)	39 (54.2)
Black, n (%)	20 (27.8)
Hispanic/Latino, n (%)	7 (9.7)
Native American, n (%)	1 (1.4)
Asian, n (%)	1 (1.4)
Other, n (%)	4 (5.6)
Underlying Cause of Heart Failure	
Ischemic Cardiomyopathy, n (%)	31 (43.1)
Nonischemic Cardiomyopathy, n (%)	37 (51.4)
Combined Ischemic & Nonischemic, n (%)	4 (5.6)
Infectious Disease Consult Pre-Transplant	
Yes, n (%)	45 (62.5)
No, n (%)	27 (37.5)

OUTCOMES & DISCUSSION

- This study reveals the deficiency of vaccinations in our heart transplant patients.
- For improved compliance, we propose in addition to a pre-transplant ID consult, candidates eligible for transplant should have annual ID follow-up before and after transplant to ensure immunizations are up-to-date in this vulnerable population.
- Further investigation is required to evaluate risk factors associated with decreased vaccination rates.

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