Evaluation of Respiratory Syncytial Virus Vaccination Post-Transplant and Cellular Therapy

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Introduction

- Respiratory syncytial virus (RSV) is a significant cause of lower respiratory tract infection (LRTI) in patients undergoing hematopoietic stem cell transplantation (HSCT) and chimeric antigen receptor T-cell (CAR-T) therapy. These cellular therapies result in profound, time-dependent immunosuppression, increasing susceptibility to severe respiratory viral infections.[1]
- Among HSCT recipients, progression from upper respiratory tract infection (URTI) to LRTI occurs in up to 40–60% of cases, with mortality rates approaching 80% once LRTI develops.[2]
- The Advisory Committee on Immunization Practices (ACIP) and the Centers for Disease Control and Prevention (CDC) recommend a single RSV vaccine dose for adults ≥ 75 years or 50–74 years with risk factors for severe disease including moderate to severe immunocompromised adults, such as recent HSCT or CAR-T recipients.[3-5]
- At University Hospitals Cleveland Medical Center (UHCMC), adult post-cellular therapy guidelines recommend RSV vaccination approximately 120 days post-therapy for RSV season, though this strategy has not been formally evaluated.
- This study aims to assess RSV incidence and clinical severity among vaccinated and unvaccinated post-transplant and cellular therapy recipients across consecutive RSV seasons.

Methods

- Single-center, retrospective chart review spanning the 2023–2024 and 2024–2025 RSV seasons (defined as October 1st through March 31st).
- Adult patients who underwent autologous HSCT, allogeneic HSCT, or received CAR-T therapy at UHCMC between April 30th, 2023, through December 31st, 2025, were included.

Outcomes

Primary Outcome

- Compare the incidence of laboratory-confirmed RSV infection between vaccinated and unvaccinated adult HSCT and CAR-T recipients.

Secondary Outcomes

- Characterize RSV-related clinical outcomes including URTI-to-LRTI progression, hospitalization, and 30-day all-cause mortality.

Exploratory Outcomes

- Assess vaccination timing post-therapy and identifying patient-level risk factors.

References

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Results

Table 1. Patient Demographics and RSV Characteristics

Characteristics	All (N=279)	RSV – (N=267)	RSV + (N=12)
Age at transplant, years, median (IQR)	66 (57-71)	66 (58-71)	56 (38-63)
Male, n (%)	165 (59.1)	157 (58.8)	8 (66.7)
Race, n (%)			
White	230 (82.4)	219 (82.0)	11 (91.7)
Black or African American	42 (15.1)	41 (15.4)	1 (8.3)
Other	7 (2.5)	7 (2.6)	0
Cancer diagnosis, n (%)			
Multiple Myeloma	113 (40.5)	111 (41.6)	2 (16.7)
Acute Myeloid Leukemia	51 (18.3)	48 (17.9)	3 (25.0)
Diffuse Large B-Cell Lymphoma	27 (9.7)	27 (10.1)	0
Other	88 (31.5)	81 (30.3)	7 (58.3)
Smoking status at transplant, n (%)			
Never	159 (57.0)	151 (56.6)	8 (66.7)
Former	99 (35.5)	95 (35.6)	4 (33.3)
Current	21 (7.5)	21 (7.9)	0
Cellular therapy, n (%)			
Autologous HSCT	103 (36.9)	98 (36.7)	5 (41.7)
Allogeneic HSCT	96 (34.4)	89 (33.3)	7 (58.3)
CAR-T	80 (28.7)	80 (29.9)	0
Received RSV vaccine, n (%)			
Yes	75 (26.9)	73 (27.3)	2 (16.7)
No	204 (73.1)	194 (72.7)	10 (83.3)
Vaccine received, n (%); [n=75]			
Arexvy®	55 (73.3)	53 (72.6)	2 (100)
Abrysvo®	20 (26.7)	20 (27.4)	0
Time from cellular therapy to RSV infection, days, median (IQR)	176 (87 – 412)		

Table 2. RSV Severity (N=12)

Risk by Immunodeficiency Scoring Index (ISI), n (%)	
Low Risk (0-2)	5 (41.7)
Moderate Risk (3-6)	7 (58.3)
High Risk (7-12)	0
Clinical syndrome at RSV diagnosis, n (%)	
URTI	11 (91.7)
LRTI	1 (8.3)
URTI to LRTI transformation, n (%); [n=11]	
Yes	1 (9.1)
Treatment setting, n (%)	
Outpatient	10 (83.3)
Emergency Department	1 (8.3)
Hospitalization	1 (8.3)
Highest level of respiratory support required, n (%)	
None	12 (100)
RSV treatment, n (%)	
Ribavirin	3 (25)
IVIG	0
Coinfections during RSV episode, n (%)	
None	9 (75)
Viral	2 (16.7)
Bacterial	1 (8.3)
30-Day mortality from RSV infection onset, n (%)	
Alive	12 (100)
Deceased	0

Figure 1: RSV Infection by Vaccination Status (N=279)

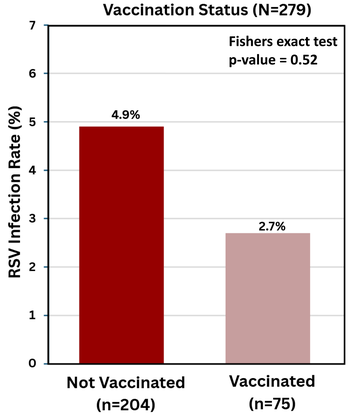
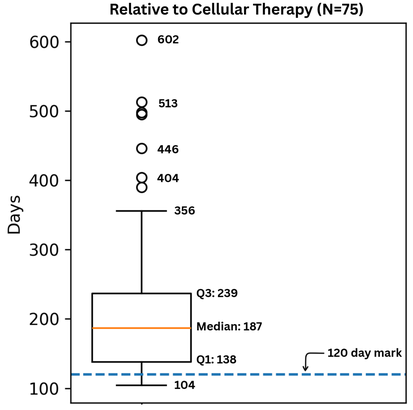


Figure 2: Vaccination Timing Relative to Cellular Therapy (N=75)



Conclusions

- Vaccinated patients had a lower incidence of laboratory-confirmed RSV infection compared to unvaccinated patients; however, this difference was not statistically significant.
- RSV disease severity was low. Most cases presented as URTI and required no ICU-level care or advanced respiratory support. No RSV-related deaths were observed.
- Vaccines were administered at a median of 187 days, while infections occurred a median of 176 days after therapy, suggesting earlier vaccination could be considered to mitigate infection risk if immune reconstitution allows.
- No RSV infections were observed among CAR-T recipients, whereas infections primarily occurred among allogeneic HSCT recipients < 60 years of age. These findings suggest HSCT recipients may represent a higher priority population for vaccination, while the optimal timing of vaccination in CAR-T recipients may be more flexible; however, warrants further evaluation.

Disclosures:
Christina Luszcak, PharmD, BCOP: Syndax Pharmaceuticals, advisory board.
Scott Heinemann, PharmD, BCOP: Sobi, advisory board; Syndax Pharmaceuticals, advisory board.