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CMV Immunity Testing in a Lung Transplant Recipient

CASE STUDY

PATIENT DIAGNOSIS

- 65 year-old male
- End-stage lung disease secondary to non-CF bronchiectasis
- Bi-lateral lung transplant
- CMV D+/R+

This bi-lateral lung transplant recipient is a 65 year-old male patient who received his lung transplant due to end-stage lung disease secondary to non-CF bronchiectasis. The donor and recipient CMV serostatus is D+/R+.

Initial Treatment Plan

The patient's initial peri-operative course was complicated by difficult explant, primary graft dysfunction, respiratory failure requiring prolonged mechanical ventilation, renal insufficiency and recurrent infectious concerns, including pseudomonas and stenotrophomonas pneumonias.

The patient was maintained on institutional post lung transplant regimen, including immunosuppression with tacrolimus, mycophenolate and prednisone. As CMV(D+/R+), he was also put on prophylaxis with TMP/SMX, voriconazole and valganciclovir.

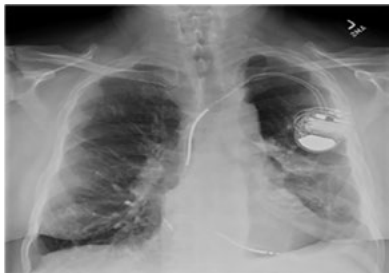


Image Xray: *PA Chest x-ray for a 65 year-old male, bi-lateral lung transplant.*

Goal

Manage post-transplant immunosuppression and antiviral therapy protocols to minimize risk of rejection while preventing CMV infection.

Approach

Evaluate neutropenic patient's CMV-specific immune response with CMV inSIGHT™ T cell Immunity testing.

Results

Due to the persistent leukopenia, CMV inSIGHT™ T Cell Immunity testing was ordered. The patient demonstrates CMV-specific immunity enabling the early discontinuation of antiviral therapy and self-management of CMV DNAemia.

Summary

This highly immunosuppressed lung transplant patient experienced untoward adverse effects of protocol prophylaxis, necessitating down-titration of immunosuppression. Unfortunately, they developed acute cellular rejection while immunosuppression was reduced. Demonstration of CMV immunity led to deviation from prophylaxis protocol, and early discontinuation of valganciclovir. There was a resolution of adverse effects and resumption of full immunosuppression. Although the patient developed persistent, short-term, mild CMV-DNAemia; it was resolved without additional antiviral treatment, with known CMV immunity utilizing the CMV inSIGHT™ T Cell Immunity test.

CMV Treatment Protocol for R+ Tx Guideline recommendations[1]:

- UR+ lung transplant recipients: Minimum 6 month of V/GCV prophylaxi

Institutional Protocol for R+ transplants:

- IV GCV pre-operative and POD#0
- Transition to VGCV once cleared for enteral nutrition
- Dosed per renal function

Institutional Duration:

- D+/R- : 12 months
- D+/R+: 12 months
- D-/R+ : 12 months
- D-/R- : Valacyclovir 12 months

Immunosuppression

- **Tacrolimus:** 8-10 first year, adjusted due to hx renal failure
- **Mycophenolate:** 1000mg q12hr
- **Prednisone:** Gradual taper to baseline 5mg/day by 6 months

Prophylaxis

- 1 DS **TMP/SMX** qMWF
- **Voriconazole** x4 months
- **Valganciclovir x12 months**

Patient Treatment Regimen

Dr. Justin Rosenheck, Ohio State University Wexner Medical Center

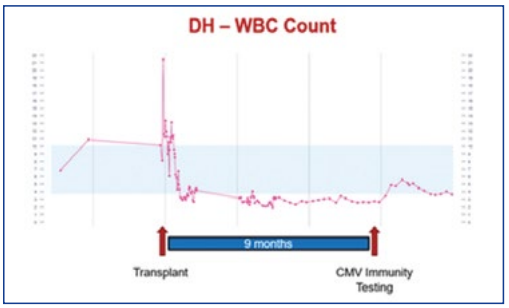
1. Kotton. Transplantation 2018;102: 900-931

CMV inSIGHT™ T Cell diagnostic delivers a deeper understanding of patients' response to viral antigens.

Treatment Protocol Assessment with CMV inSIGHT™ T Cell Immunity Testing

Pre-transplant, the patient's white blood cell count was normal. While on Valganciclovir post-transplant, the patient became leukopenic and Neupogen was administered for neutropenia (nadir 0.65 K/uL). At 6 months post-transplant, the patient underwent acute cellular rejection (A2) and was treated with pulse dose corticosteroids. The patient's respiratory function stabilized and was no longer rejecting. After coming off of dialysis, renal stabilization occurred with a new baseline CR of 1.8-2.0.

Due to the continued leukopenia, at 9 months post lung transplant, CMV inSIGHT™ T Cell Immunity testing was ordered. The patient demonstrates CMV-specific immunity with both CD4 and CD8 results above the reference range.



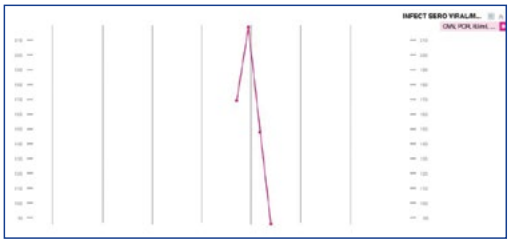
White blood cell count pre- and post-transplant.

Test	Result	Flag	Units	Ref Range
% CD4 CMV Interferon-gamma The patient displayed a high CD4 background response of 0.30%	1.17		%	>0.20%
CD8 CMV Interferon-gamma Cells	2.32		%	>0.20%
% CD4 SEB Interferon-gamma Cells The patient displayed a high CD4 background response of 0.30%	3.25		%	>1.22%
% CD8 SEB Interferon-gamma Cells	20.33		%	>1.25%
Viability	100.0		%	

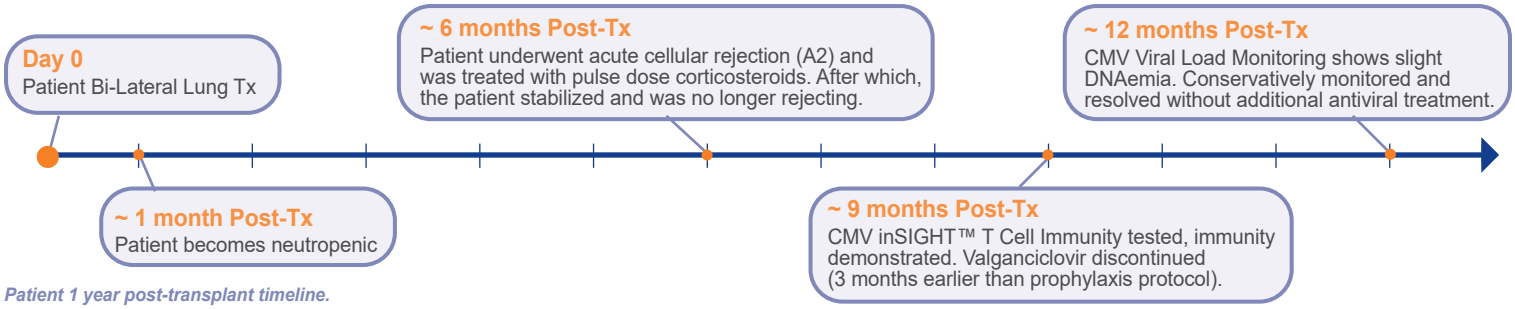
CMV inSIGHT™ T Cell Immunity (Test Code: 30360) Laboratory Results

Following demonstration of CMV immunity, the patient was taken off of valganciclovir three months earlier than the typical protocol. After it was discontinued, WBC count had a quick and persistent rebound. The transplant team continued to monitor the patient for CMV DNAemia.

At 1 year post transplant (3 months post valganciclovir discontinuation), CMV viral load rose mildly. Undetectable levels rose to a peak around 219 IU/mL. With known CMV immunity, CMV DNAemia was followed conservatively and resolved with no recurrent rises in last 1 year of post-transplant follow-up.



CMV PCR Viral Load Monitoring (IU/mL) 1 year post-transplant



Patient 1 year post-transplant timeline.

About Viracor

With over 40 years of diagnostic expertise in infectious disease, immunology and allergy testing for immunocompromised and critical patients, Eurofins Viracor is passionate about delivering accurate, timely and actionable results, never losing sight of the connection between the testing it performs and the patients it serves.

Eurofins Viracor is a subsidiary of Eurofins Scientific (EUFI.PA), a global leader in bio-analytical testing, and one of the world leaders in genomic services. For more information, please visit eurofins.com and eurofins-viracor.com

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