



A Diagnostic Odyssey: Successfully Treated Cytomegalovirus-Induced Immunodeficiency with Tuberculosis Coinfection Presenting as Fever of Unknown Origin in a Young Male

John Vincent A. Pagaddu, MD, MSc, FPCP; John S. Delgado, MD, MHPEd, FPCP, FPSMID

1

Background

- Fever of Unknown Origin (FUO) in TB-endemic areas is diagnostically challenging.
- Cytomegalovirus (CMV) is classically linked to immunocompromised hosts but can cause transient immunosuppression in immunocompetent individuals.
- CMV-induced CD4+ T cell lymphopenia can mimic HIV infection and predispose to opportunistic coinfections.

2

Case Presentation

- ❑ **Patient:** 20-year-old Filipino male, previously healthy
- ❑ **Presentation:** 3-week intermittent fever, headache, malaise, left cervical lymphadenopathy
- ❑ **Workup:**
 - CMV viremia: 463 copies/mL
 - CD4+ count: 332/ μ L
 - HIV tests: negative
 - Excisional lymph node biopsy
 - Histopathology: chronic inflammation
 - Xpert: rifampicin-sensitive *M. tuberculosis*
 - Bacterial culture: *Enterobacter cloacae*
 - Fungal culture: No growth
 - Blood and urine culture: No growth
 - Anti-dsDNA, ANA, IGRA RPR, CALAS, serum toxoplasma IgG, and EBV DNA: Negative
 - Chest radiograph and chest CT scan: No pulmonary infiltrates, masses, effusion, or suspicious mediastinal lymphadenopathy
 - Abdominal ultrasound: Unremarkable
 - Neck ultrasound: enlarged left cervical (IB) lymph node measuring 1.8 x 1.5 cm
 - Echocardiography: excluded valvular vegetations
- ❑ **Treatment:**
 - Antibiotics: ceftriaxone $\rightarrow$ piperacillin-tazobactam $\rightarrow$ levofloxacin
 - Valganciclovir $\times$ 2 weeks $\rightarrow$ CMV clearance & CD4 recovery (661/ μ L)
 - Anti-TB therapy (complicated by rash $\rightarrow$ successful rechallenge)
- ❑ **Outcome:** Sustained CMV clearance, CD4 recovery, and full clinical recovery

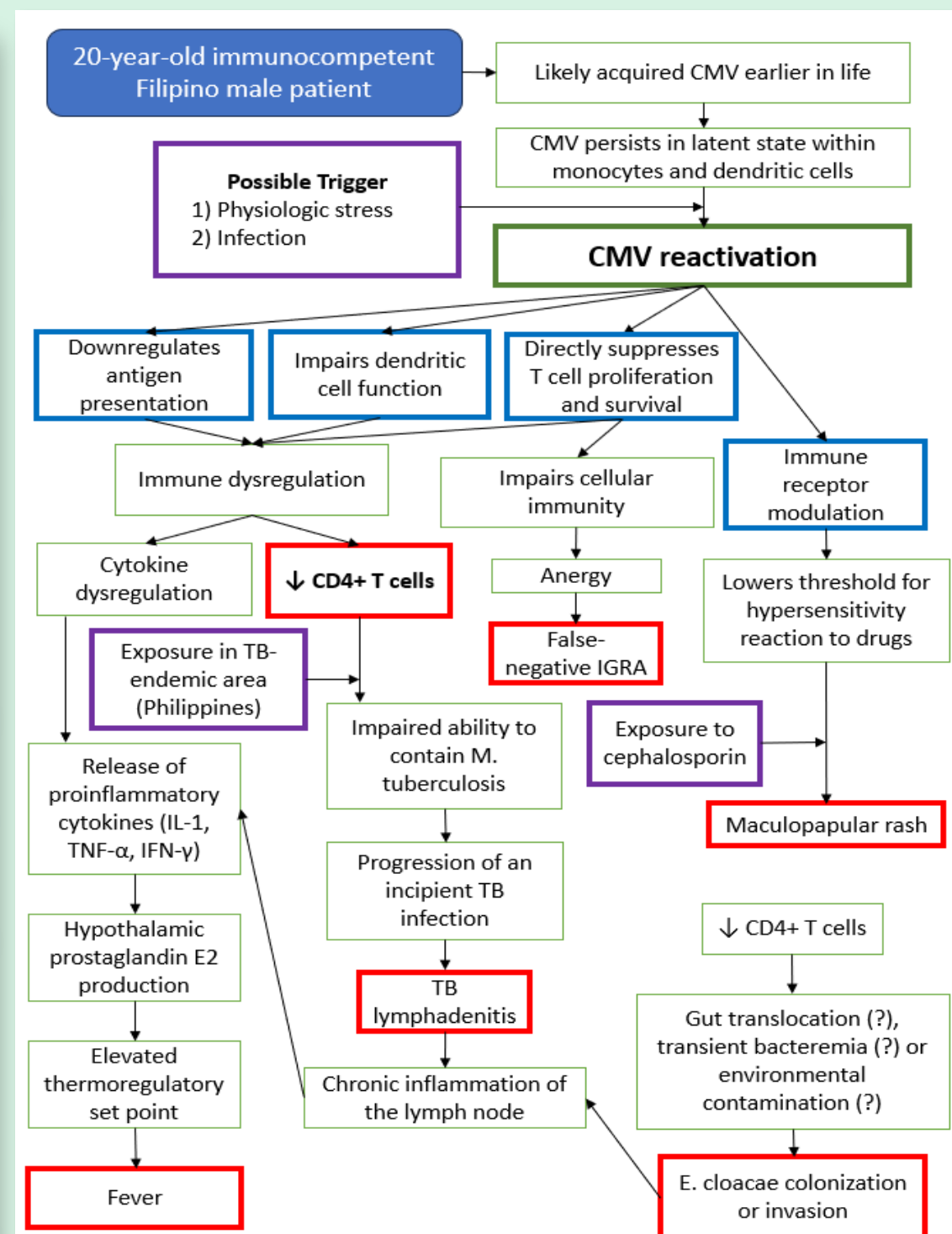


Figure 2. Concept Map

3

Conclusion

- CMV can cause transient immunodeficiency in immunocompetent patients.
- It is important to consider CMV reactivation in FUO with unexplained CD4+ lymphopenia and negative HIV tests.
- Thorough diagnostic workup is essential and ensures timely diagnosis and successful treatment.

4

References

1. Fornara, O., Odeberg, J., Khan, Z., Stragliotto, G., Peredo, I., Butler, L., & Söderberg-Nauclér, C. (2013). Human cytomegalovirus particles directly suppress CD4 T-lymphocyte activation and proliferation. *Immunobiology*, 218(8), 1034–1040.
2. Krenzlin, H., Corr, F., Ailani, D., Einheuser, P., Bukur, T., Röbler, T., Henrich, A., Hollnagel, R., Dauth, A., Hu, L., Schmidt, L., Griesel, M., Gutknecht, M., Mercado, N., Alessandri, B., Cook, C. H., Ringel, F., Lawler, S. E., Lemmermann, N. A., & Keric, N. (2025). Cytomegalovirus-induced oncomodulation drives immune escape in glioblastoma. *Scientific Reports*, 15(1), 25981.
3. Gredmark-Russ S, Söderberg-Nauclér C. (2012). Dendritic cell biology in human cytomegalovirus infection and the clinical consequences for host immunity and pathology. *Virulence*, 3(7):621-34
4. Foreman, T. W., Nelson, C. E., Kauffman, K. D., Lora, N. E., Vinhaes, C. L., Dorosky, D. E., Sakai, S., Gomez, F., Fleegle, J. D., Parham, M., Perera, S. R., Arlehamn, C. S. L., Sette, A., Brenchley, J. M., Queiroz, A. T., Andrade, B. B., Kabat, J., Via, L. E., & Barber, D. L. (2022). CD4 T cells are rapidly depleted from tuberculosis granulomas following acute SIV co-infection. *Cell Reports*, 39(9), 110896
5. Anci, E., Braun, C., Marinosci, A., Rodieux, F., Midun, E., Torres, M., & Caubet, J. (2021b). Viral infections and cutaneous Drug-Related eruptions. *Frontiers in Pharmacology*, 11