

S. De Sousa dos Santos¹, C. Martins Ruggiero², D.M. Falcão de Oliveira², S. Saad Guarda¹, M. Martins de Andrade¹, C. Toniolo Zenatti², C.A. Antonio Mestre³

1. Universidade Federal de São Carlos, Department of Medicine, São Carlos, Brazil
2. São Carlos Municipal Health Department, São Carlos Chronic Infections Care Center, São Carlos, Brazil
3. São Carlos Municipal Health Department, Department of Health Surveillance, São Carlos, Brazil



Background

In COVID-19, individuals with organ failure or immunosuppression have shown higher rates of morbidity and mortality.^{1,2,3} Despite that, current evidence points against an increased risk of severe COVID-19 in people living with HIV/AIDS (PLWHA).⁴ Untreated HIV infection causes progressive immune dysfunction primarily at the expense of qualitative and quantitative CD4⁺ T lymphocyte deficiency, in addition to systemic immune activation and dysregulation.⁵ Consequently, PLWHA have been preferentially vaccinated, as vaccination against SARS-CoV-2 appears to induce protection against COVID-19 in people with HIV infection.⁶ Little is known about the effects of the immune response, either to the virus or the vaccines, in immunological and virological parameters. This study aims to evaluate the safety of COVID-19 vaccines in PLWHA.

Methods

Retrospective cohort of 470 HIV-positive adults who received the first dose of COVID-19 vaccine at the São Carlos Chronic Infections Care Center, SP, Brazil, from 05/13/2021 to 07/16/2021. We assessed the Ministry of Health report system for therapeutic history, CD4⁺ T lymphocyte count and HIV viral load, and the "Vacivida"⁷ system for vaccine information. For analysis of mortality, data from the medical records of PLWHA who died and were reported to our institution or to the Brazilian Mortality Information System (SIM)⁸ between 2019 and 2022 were reviewed, and deaths were classified as associated with vaccination, covid-19, AIDS or other causes.

Results

- 470 HIV-positive adults vaccinated
- 68.1% male
- Mean age 41.8 years (Std dev 10.8 years)
- All patients on antiretroviral therapy
- Vaccine
 - 469 individuals received first dose of ChAdOx1-S
 - 448 two doses of ChAdOx1-S

Figure 1. Distribution of antiretroviral therapy of PLWHA vaccinated against SARS_CoV-2

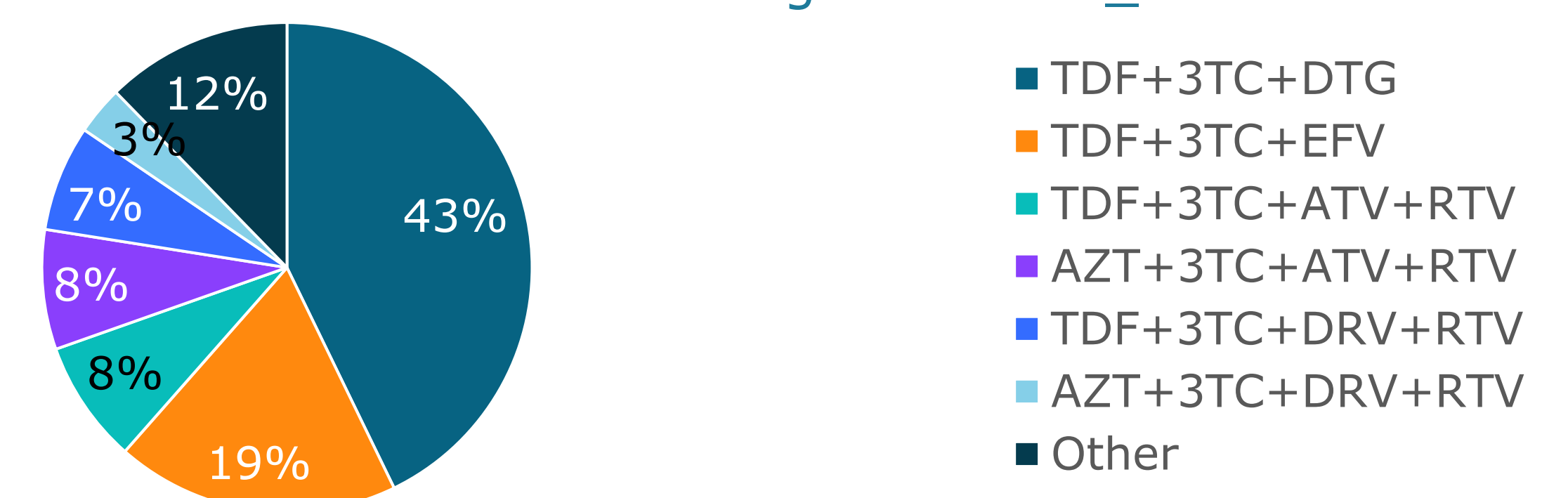
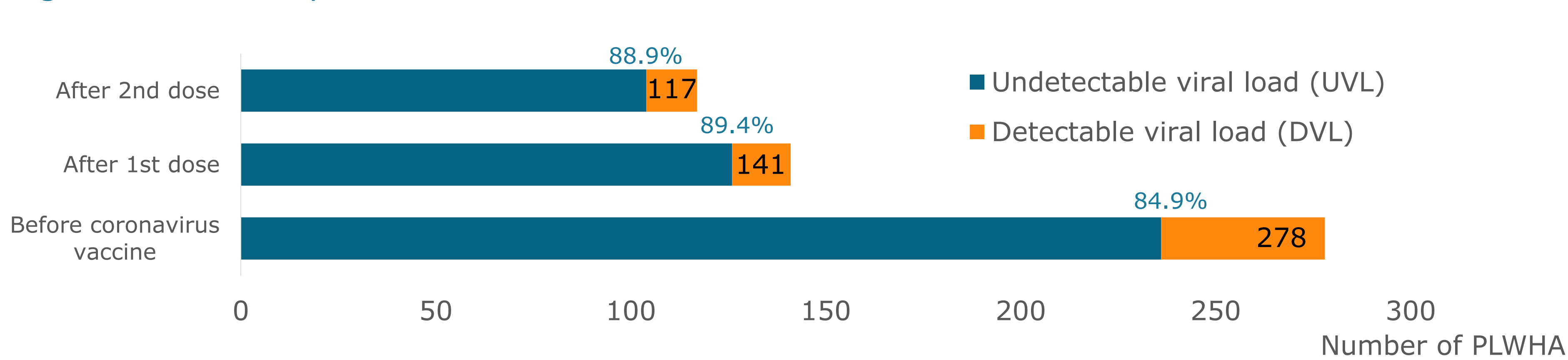


Figure 2. HIV RNA plasmatic load



CD4 count within six months before vaccination

- (n=156)
- Median 644.5 cells/mm³
 - IQR 394-932 cells/mm³

Table 1. Individual variation of virological and immunological parameters after vaccination

Individual viral load variation after 1 st dose (n 67)	Individual viral load variation after 2 nd dose (n 90):	CD4 count variation after 1 st dose (n 27):	CD4 count variation after 2 nd dose (n 25)
<ul style="list-style-type: none"> • 73.1% maintained an UVL • 13.4% undetected a previous DVL • 10.5% maintained a DVL • 3% had a detection after a previous UVL 	<ul style="list-style-type: none"> • 82.0% maintained an UVL • 10.1% undetected a previous DVL • 3.0% maintained a DVL • 4% had a detection after a previous UVL 	<ul style="list-style-type: none"> • 55.5% maintained slight fluctuations (<25%) • 37% increased count • 7.4% decreased count 	<ul style="list-style-type: none"> • 48% maintained slight fluctuations (<25%) • 48% increased count • One patient decreased count

Mortality

There were four reports of death during follow-up, none of which seems to be associated with the vaccine (kidney cancer, polytrauma, peritonitis in cirrhosis, sepsis in myelodysplasia). Our institution follows around 2000 patients. In 2019, before the start of the pandemic, there were 22 deaths (15 AIDS-related, 2 malignant neoplasms, 5 non-AIDS-related). In 2020 there were 18 deaths (17 AIDS-related, 2 neoplasms, 3 non-AIDS-related and one unreported). However, in 2021 there were 33 deaths: 11 AIDS-related, 8 non-AIDS related, 7 malignant neoplasms, 4 violence/trauma and 3 severe COVID-19. There was an increase of 83% of deaths in PLWHA, most not directly related to covid-19.

Conclusions

Apparently, COVID-19 vaccination has no impact on virological and immunological response of PLWH. However, the epidemic may have impacted healthcare of people living with HIV/AIDS.

References

- 1 ONDER, G.; REZZA, G.; BRUSAFERRO, S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. JAMA, Mar 2020. ISSN 1538-3598. Available at: < <https://www.ncbi.nlm.nih.gov/pubmed/32203977> >.
- 2 WANG, D. et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA, Feb 2020. ISSN 1538-3598. Available at: < <https://www.ncbi.nlm.nih.gov/pubmed/32031570> >.
- 3 LI, J. et al. Epidemiology of COVID-19: A systematic review and meta-analysis of clinical characteristics, risk factors, and outcomes. J Med Virol, v. 93, n. 3, p. 1449-1458, 03 2021. ISSN 1096-9071. Available at: < <https://www.ncbi.nlm.nih.gov/pubmed/32790106> >.
- 4 JOHNSTON, R. The first 6 months of HIV-SARS-CoV-2 coinfection: outcomes for 6947 individuals. Curr Opin HIV AIDS, v. 16, n. 1, p. 54-62, 01 2021. ISSN 1746-6318. Available at: < <https://www.ncbi.nlm.nih.gov/pubmed/33165007> >.
- 5 MOIR, S.; CHUN, T. W.; FAUCI, A. S. Pathogenic mechanisms of HIV disease. Annu Rev Pathol, v. 6, p. 223-48, 2011. ISSN 1553-4014. Available at: < <https://www.ncbi.nlm.nih.gov/pubmed/21034222> >.
- 6 WOLDEMESKEL, B. A. et al. The BNT162b2 mRNA Vaccine Elicits Robust Humoral and Cellular Immune Responses in People Living With Human Immunodeficiency Virus (HIV). Clinical Infectious Diseases, 2021. ISSN 1058-4838. Available at: < <https://doi.org/10.1093/cid/ciab648> >.
- 7 BRASIL. Centro de Vigilância Epidemiológica. Governo do Estado de São Paulo. Vacivida. 2021. Available at: < <https://vacivida.sp.gov.br/imunizacao/> >.
- 8 BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde. SIM - Sistema de Informação sobre Mortalidade. Available at: < <http://sim.saude.gov.br> >.