

Toxoplasma gondii IgG seropositivity is associated with increased risk of hospitalization and 1-year mortality— a Multicenter Research Network study



University of Colorado
Anschutz Medical Campus

Gabrielle E. Montalbano B.S., Elaine Reno M.D., Marika Rossetto B.S. Alexander Zhang B.S., Vanessa M. Kung M.D., Carlos Franco-Paredes M.D., Lilian Vargas Barahona M.D., Daniel B. Chastain M.D., Jose G Montoya M.D., Andrés F. Henao-Martínez M.D.



Introduction

- Toxoplasmosis is a neglected tropical disease, with a high disease burden among marginalized communities
- *Toxoplasma gondii* infects more than half of the world's population and 11% of the U.S. population^{1,4}.
- Epidemiological studies suggest the possibility of increased morbidity and mortality from latent infection^{2,3,5}.

This study aims to:

Evaluate 1-year mortality and risk of hospitalization in patients with toxoplasma IgG seropositivity compared to seronegative controls

Methods

Participants.

Participants were adults with toxoplasma IgG seropositivity (n=7850) and seronegative controls (n=31865) from 2010 to 2022. This excluded patients with active disease. Propensity scoring was performed to match IgG seropositive (n=7648) to controls (n=7654) by age, sex, race, ethnicity, and major medical conditions such as heart failure, HIV, and transplant status. Risk of hospitalization and mortality within 1 year of serology was compared.

Data. Data was queried from a federated national multicenter network, TriNetX.

Results

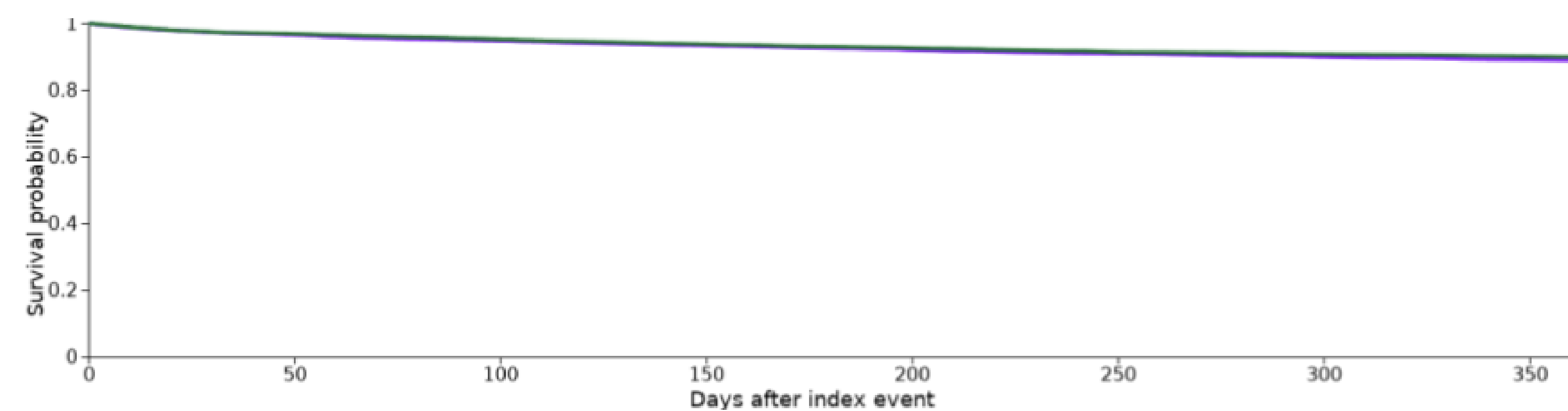
Table 1. Demographic and clinical characteristics of sample by IgG serology status before propensity score matching

	IgG Seropositive (n = 7850)	IgG Seronegative (n = 31865)	p
Age Mean (SD)	47.3 (16.3)	45.0 (16.4)	<.001
% Male	4052 (52.8%)	15537 (49.9%)	<.001
% Hispanic or Latinx	936 (12.2%)	2543 (8.2%)	<.001
% HIV positive	922 (12.0%)	1156 (15.1%)	<.001
% Systemic connective tissue disorders	111 (1.4%)	143 (1.9%)	0.043
% Type II Diabetes Mellitus	909 (11.8%)	994 (13.0%)	0.037
% Chronic Kidney Disease	1228 (16.0%)	1460 (19.0%)	<.001

Table 2. Results by IgG serology status after propensity score matching

	IgG Seropositive (n = 7648)	IgG Seronegative (n = 7654)	z	p
Mortality (risk)	732 (0.096)	662 (0.086)	1.982	0.047
Hospitalizations (risk)	4234 (0.552)	4098 (0.534)	2.203	0.028

Figure 1. Kaplan Meier survival analysis by IgG serology status



Patients with IgG toxoplasma seropositivity (purple line) had a survival probability of 88.92% (732 deceased) at the end of one year compared to 89.95% survival probability (green line) among toxoplasma IgG seronegative patients (662 deceased)

Conclusion

- Toxoplasma IgG seropositive patients are more likely to be older, male, and identify as Hispanic or Latinx.
- Toxoplasma IgG latent infection is associated with increased one-year hospitalization and mortality
- Schizophrenia is not associated with Toxoplasma IgG seropositivity unlike previous case reports suggest
- Underlying factors associated with poverty or links to DM2 or CKD may contribute to mortality differences
- Limitations include diagnoses collected by ICD codes, which may underestimate diagnoses that appeared elsewhere in the medical record. Also, seropositive patients are more likely to be low income or foreign-born and may be due to limited access to healthcare.

References

- “CDC - Toxoplasmosis - Epidemiology & Risk Factors.” Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 4 Sept. 2018.
- Flegr, Jaroslav, and Jiří Horáček. “Negative Effects of Latent Toxoplasmosis on Mental Health.” *Frontiers in Psychiatry*, Frontiers Media S.A., 18 Feb. 2020.
- Milne, Gregory, et al. “Toxoplasma Gondii: An Underestimated Threat?” *Trends in Parasitology*, Elsevier Current Trends, 1 Oct. 2020.
- Montoya JG; Liesenfeld O. “Toxoplasmosis.” *Lancet* (London, England), U.S. National Library of Medicine.
- Subauste, Carlos s. “Comprehensive, up-to-Date Information on HIV/AIDS Treatment and Prevention from the University of California San Francisco.” *Toxoplasmosis and HIV*, Mar. 200