Hyperglycemia and COVID-19: An independent risk factor for disease severity and death in the Dominican Republic

Y Roque, MD, MSc[1], L Castillo, MD[1,2], C Perdomo, MD[1,2], M Acosta, MD[2], D De Luna, MD, MSc[1], AJ Mena Lora, MD[3]

(1) Pontificia Universidad Católica Madre y Maestra, Santiago, D.R., (2) Hospital Regional Universitario José María Cabral y Báez, Santiago, D.R.

(3) University of Illinois at Chicago, College of Medicine, Chicago, IL

PUCMM Pontificia Universidad Católica Madre y Maestra

DEPARTMENT OF MEDICINE COLLEGE OF MEDICINE UIC

Background

- The COVID-19 pandemic has caused an unprecedented global public health emergency.
- Vaccine uptake in low and middle income countries (LMICs) lags developing nations and immunity from vector-based vaccines commonly used in LMICs may be inferior to mRNA vaccines. Thus, defining clinical characteristics that can help identify and triage cases and allocate resources in LMICs of priority.
- Hyperglycemia has been associated with higher morbidity and mortality in numerous diseases and in critical illness. We seek to understand the relationship between COVID-19 and hyperglycemia.

Table 1. Association between hyperglycemia and inflammatory markers

Hyperglycemia >140 mg/dl (N=120)	CRP>3 n=101 / 84.2%	Ferritin > 400 n=73 / 60.8%	D-Dimer > 100 n=77 / 64.1%	p value
Yes (69 / 57.5%)	57/ 56.4%	37/ 50.7%	38/ 49.3%	0.012
No (51 / 42.5%)	44/ 43.6%	36/ 49.3%	39/ 50.7%	

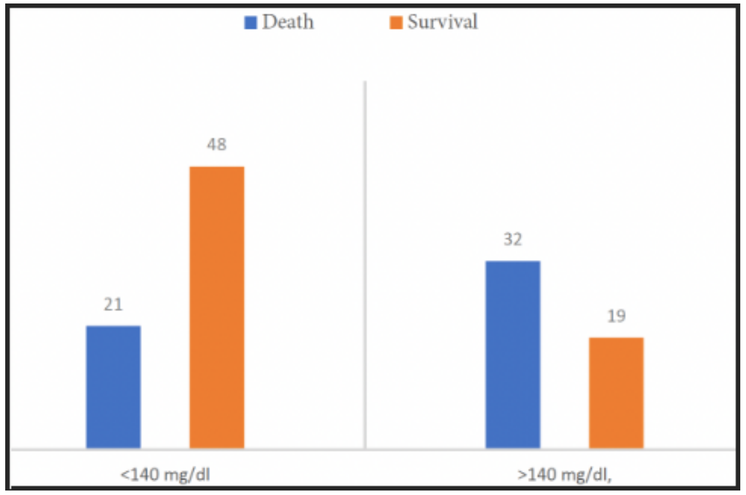
Table 2. Supplemental oxygen needs and hyperglycemia

Glucose	Supplemental oxygen requirements			p value
	No oxygen n=40 / 33.3%	<6 liters n=36 / 30%	>6 liters n=44 / 36.7%	
>140 mg/dl (69/57.5%)	21/ 17.5%	27/ 22.5%	21/ 17.5%	0.036
<140 mg/dl (51/ 42.5%)	19/ 15.8%	9/ 7.5%	23/ 19.1%	

Methods

- This is a single center retrospective review of cases with COVID-19 between January 2021 and June 2021.
- Adult patients >18 years of age were reviewed and those with a molecular-based laboratory confirmed SARS-CoV-2 infection were included in our study.
- Patients with known diabetes, elevated A1C or prior steroid use within 2 weeks of admission were excluded.
- Clinical characteristics, demographics, glucose levels, C-reactive protein (CRP) and ferritin were reviewed.

Figure 1. Survival and hyperglycemia



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Results

- A total of 120 patients were reviewed, of which 60.8% were male.
- Hyperglycemia (>140mg/dL) was present in 57.5%.
- Hyperglycemia was associated with elevation of inflammatory markers including CRP and Ferritin (p=0.12) (Table 1).
- Hyperglycemia was more common in patients requiring supplemental low flow oxygen (table 2) and was more common in patients who did not survive (Figure 1).
- The mortality rate was higher in the hyperglycemia group with 61.5%, a statistically significant finding.

Conclusions

- Hyperglycemia on admission was an independent risk factor for disease progression and death.
- Inflammatory markers were also higher in patients with hyperglycemia.
- Patients with hyperglycemia had no prior steroid use or diabetes. Thus, it is possible that it reflects inflammation, stress, or endocrine end-organ damage due to SARS-CoV-2.
- If validated in larger studies, this simple test can help clinicians identify patients at risk of decompensation and allocate resources and therapeutics accordingly.

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Yori A. Roque Jiménez, MD, MSc
yorirj@hotmail.com