

EVALUATION OF COVID-19 OUTCOMES AND MORTALITY IN PATIENTS WITH OR WITHOUT COMORBIDITIES DURING INITIAL PANDEMIC WAVE: WHAT HAVE WE LEARNT SO FAR?



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INTRODUCTION

- As SARS-CoV-2 virus continues to mutate and cases evolve, it has been seen that people with underlying chronic diseases are more likely to get infected and become severely ill, often leading to death. ACE-2 receptor is the target for SARS-CoV-2 binding, its expression is increased in patients with hypertension, diabetes, and chronic lung disease; henceforth increasing the risk and severity of COVID-19 infection.
- Outcomes rates are changing variably with the gain of more knowledge about this disease, increasing vaccinations rates, viral strain mutations and changing transmissibility, and henceforth, improved survival rates were seen in next pandemic waves of this disease during winter of 2020, in July 2021 and again during omicron wave.

- This study aims to evaluate outcomes of patients with co-morbidities (hypertension, diabetes, cardiovascular disease, chronic pulmonary disease, and cancer) and COVID-19 in a tertiary care hospital during early pandemic wave and compares it with current outcomes.

METHODS:

- We conducted a retrospective cohort study of all confirmed COVID-19 adult patients >18 years of age, admitted in Jacobi Medical Center, Bronx, NY during the first pandemic wave, for a period of 6 weeks during March-April 2020.
- We extracted demographic, clinical and outcomes data from electronic medical records of patients. Primary outcomes were death, discharge, or transfer to another center in patients with or without co-morbidities.
- Descriptive statistics considered proportions, means and medians. The Chi-square and Fisher's exact tests were used in determining associations between variables. We calculated the odds ratios of mortality according to co-morbidities in these patients with and without age and sex adjustment.
- The predictive value of the original Charlson comorbidity index (CCI) and the age adjusted CCI (ACCI) for mortality in these patients was analyzed using the receiver operating characteristic (ROC) curve. P-value ≤ 0.05 was considered statistically significant.

DISCUSSION

- A total of 124 adults with COVID-19 were included in this study, out of which 24 were classified as without comorbidities (19.35%).
- Hypertension was the most common comorbidity with prevalence of 57.2% followed by diabetes (40.3%).
- Mortality among patients without comorbidities was 12.5% and with comorbidities was 35%. Mortality was significantly higher among the patients with multiple co-morbidities, lowering down the survival rates ($P < 0.001$).
- The ROC curve analysis showed that ACCI yielded better cut-off for predicting death in COVID-19 with higher area under the ROC, which supports the importance of co-morbidities in the severity of COVID-19.

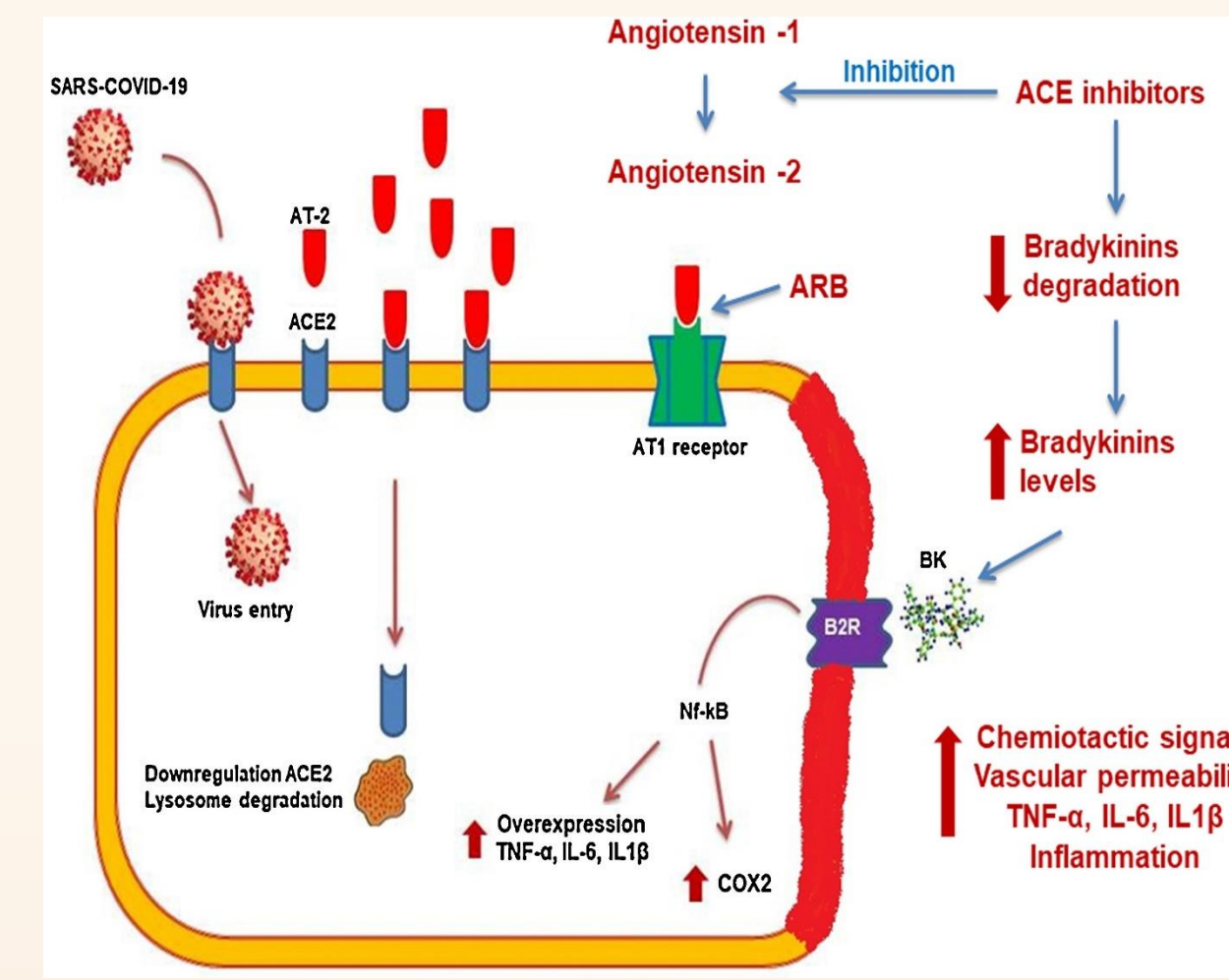
CONCLUSIONS

- Many studies have identified that co-morbidities can greatly affect the severity of COVID-19. Patients with COVID-19 and co-morbidities are more likely to develop a more severe disease and upwards progression curve.
- Thus, they need all necessary precautions to avoid infection with SARS CoV-2 and should be prioritized for vaccinations.
- We conclude from our study that co-morbidities like hypertension, diabetes, cardiovascular disease, chronic pulmonary disease, and cancer are significant risk factors for mortality in patients with COVID-19, after age and sex adjustment.
- And with progression of pandemic, more vaccination as well as understanding of the disease, mortality rates have been falling considerably.

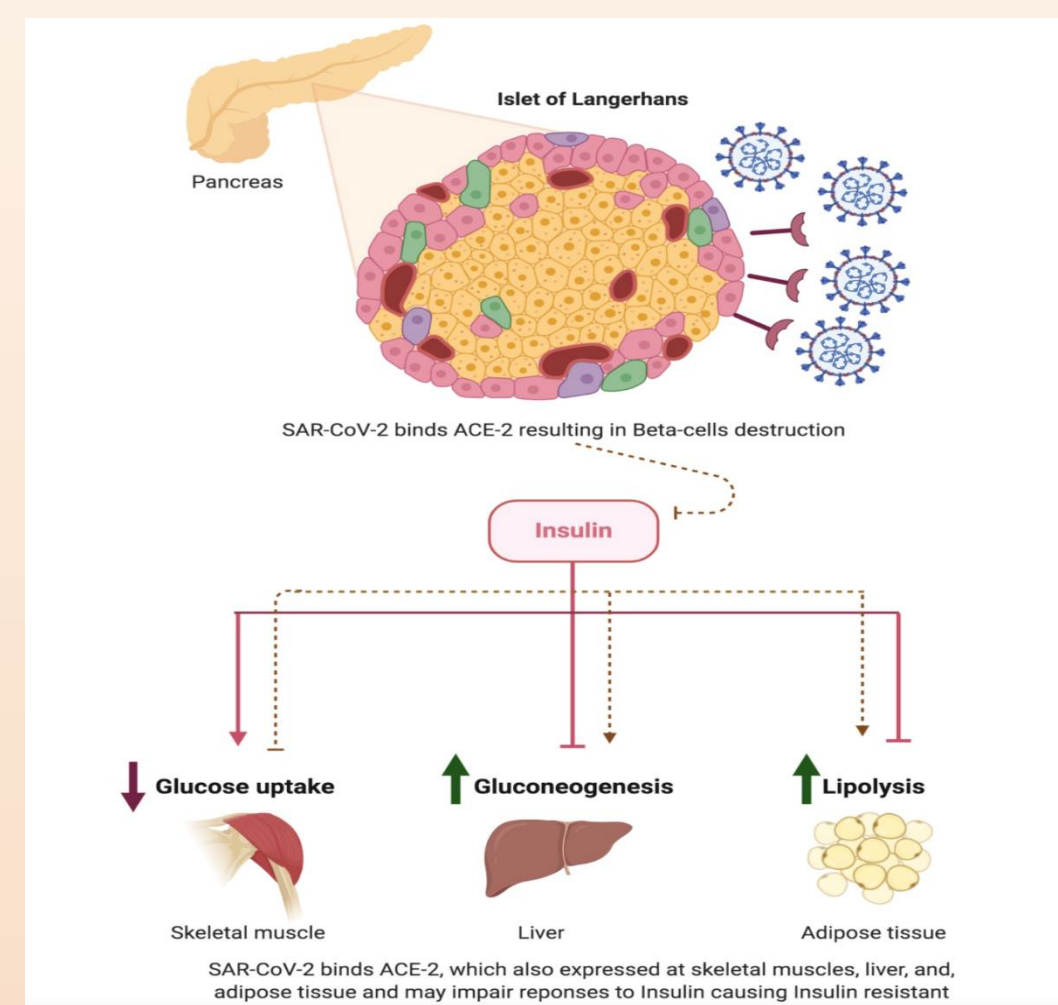
IMAGES & GRAPHS:

Population demographics present in the study

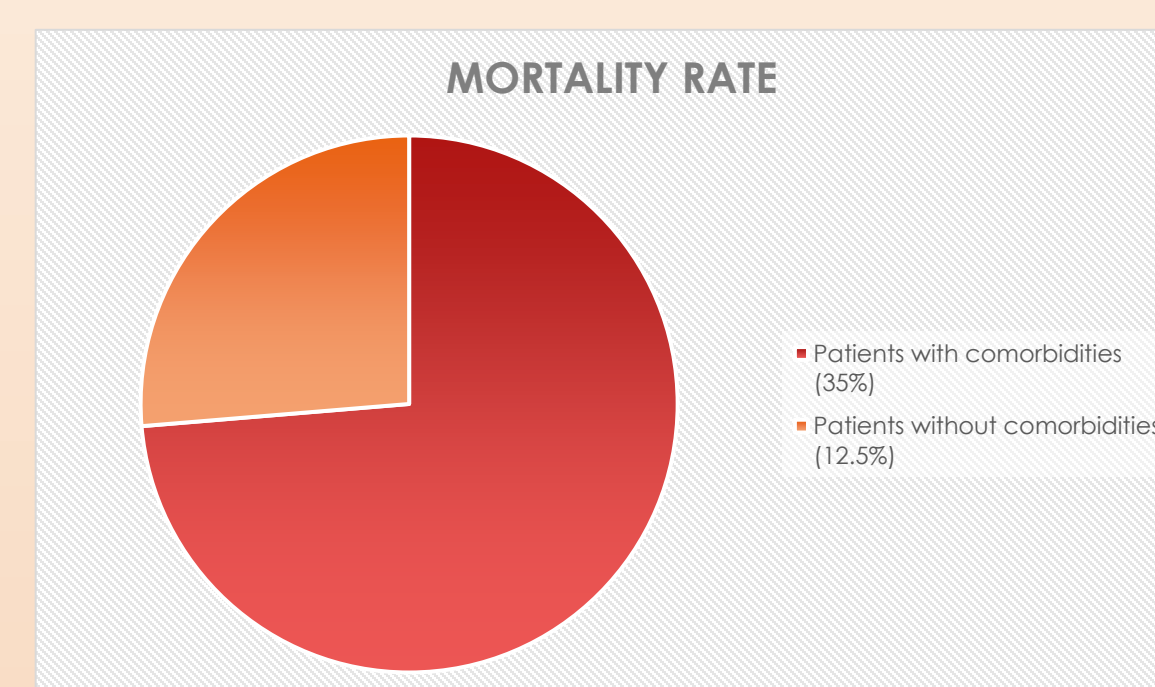
DEMOGRAPHICS	TYPES	TOTAL NUMBER	PERCENTAGE
Total population	Healthy with COVID-19	24	19.35%
	COVID-19 with comorbidities	100	80.65%
Age (years)	Range	28-100	-
	Median	61	-
Sex	Male	80	64.5%
	Female	44	35.5%
Race	Asian	8	6.45%
	African American	32	25.8%
	Caucasian	11	8.9%
	Hispanic	36	29%
	Unknown	14	11.3%
	Declined/Other	23	18.5%
Smoker	Yes	31	25%
	No	93	75%
Comorbidities	Hypertension	71	57.2%
	Diabetes	50	40.3%



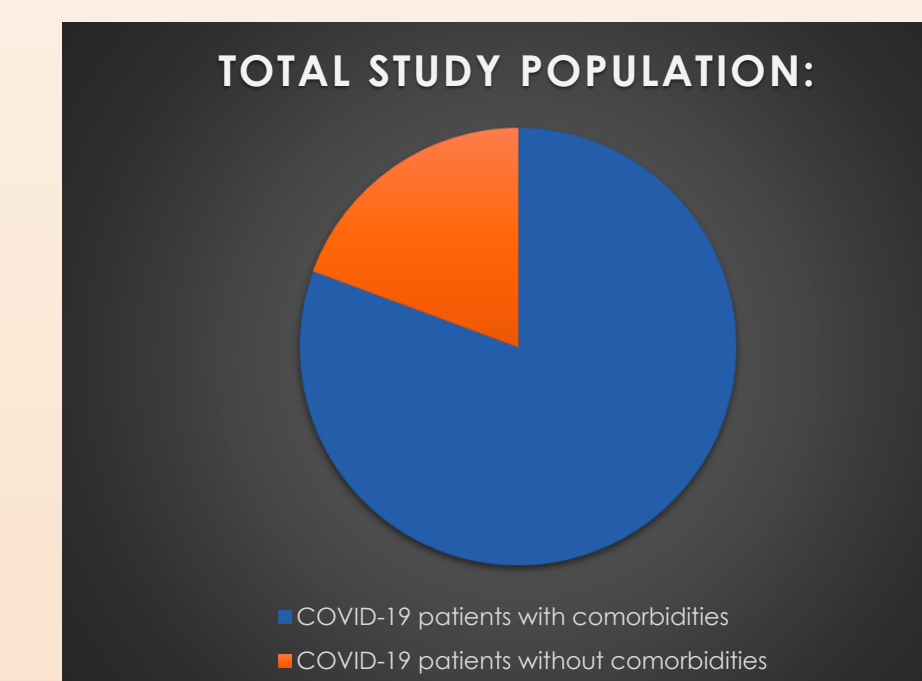
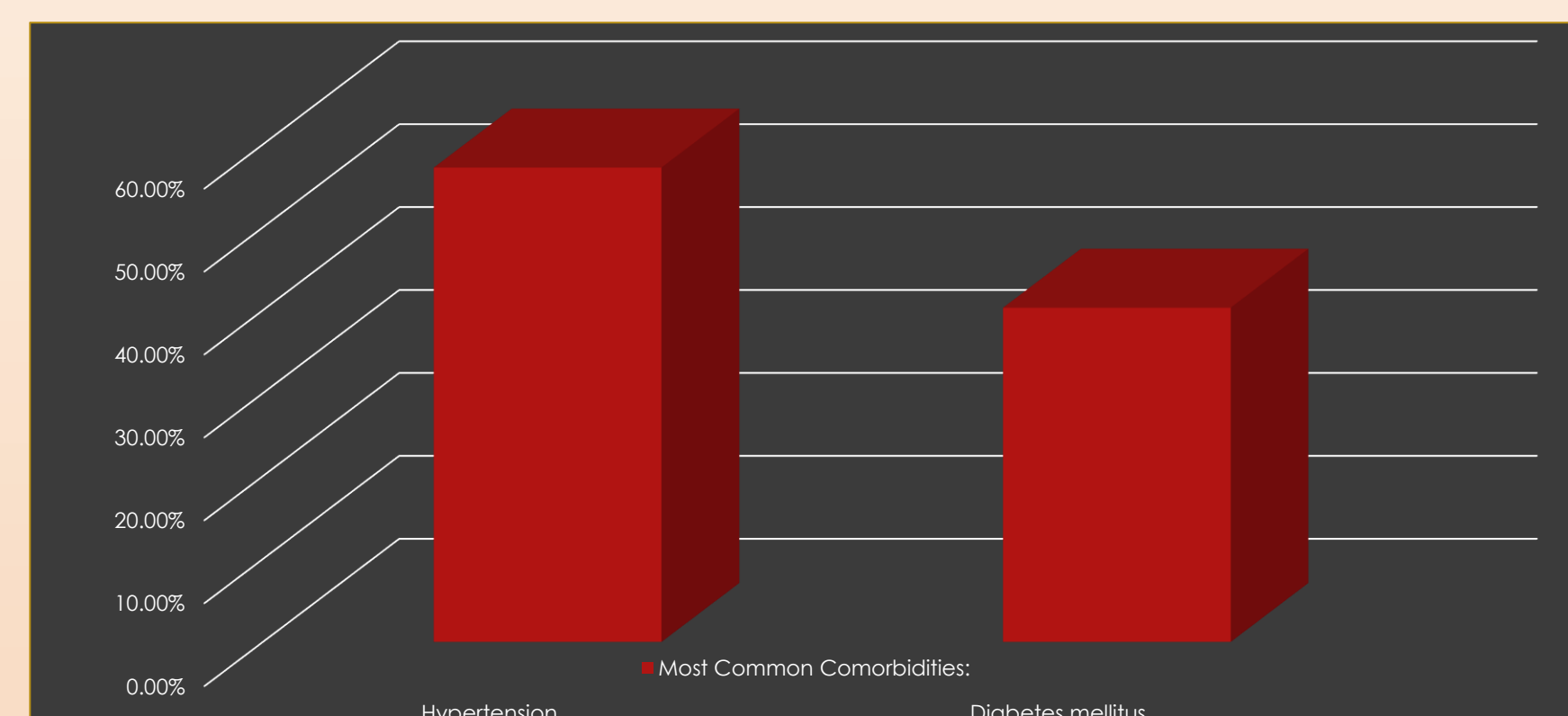
Schematic diagram of the potential mechanisms linking the ACE system and COVID-19 infection. The virus could enter directly inside the epithelial cell of the respiratory system via the ACE2 receptor or induce an inflammatory cascade by bradykinin escape related to ACEI therapy. The subsequent increase in prostaglandins and cyclooxygenases leads to interleukin production, which causes cell membrane inflammation potentially leading to apoptosis. Abbreviations: ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; AT, angiotensin; B2R, bradykinin 2 receptor; BK, bradykinin; COX, cyclooxygenase. Source: Gaetano et al. Hypertension prevalence in human coronavirus disease: the role of ACE system in infection spread and severity. International Journal of Infectious diseases. VOLUME 95, P373-375, JUNE 01, 2020



Pathophysiology of diabetes in COVID-19 infection: SARS-CoV-2 interaction with Angiotensin Converting Enzyme -2 leading to insulin resistance and henceforth, either new onset diabetes or expression of previously masked diabetes.



Patients with comorbidities and without comorbidities: Distribution.



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