

# Cirrhosis is Associated with Increased Incidence of Mortality, MACE, and Intubation in COVID-19 Patients: A Multi-Center Study of 3,283 Patients

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## Introduction

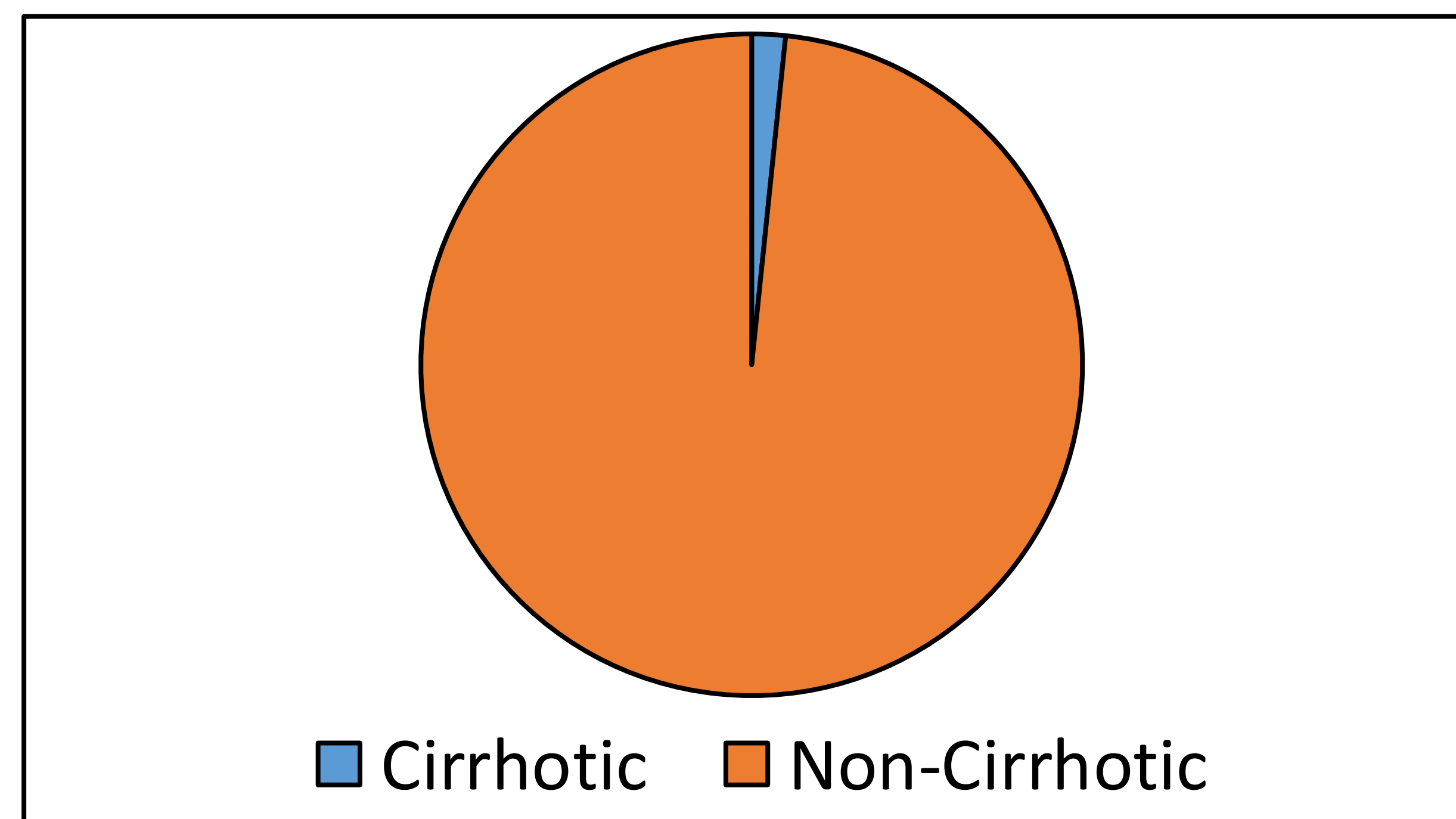
Coronavirus Disease 2019 (COVID-19) is typically associated with pulmonary and cardiac complications. Its relationship to the liver and cirrhosis is unclear. Here, we describe outcomes such as mortality, major acute cardiovascular events (MACE), and intubation for a cohort of cirrhotic patients hospitalized with COVID-19.

## Methods

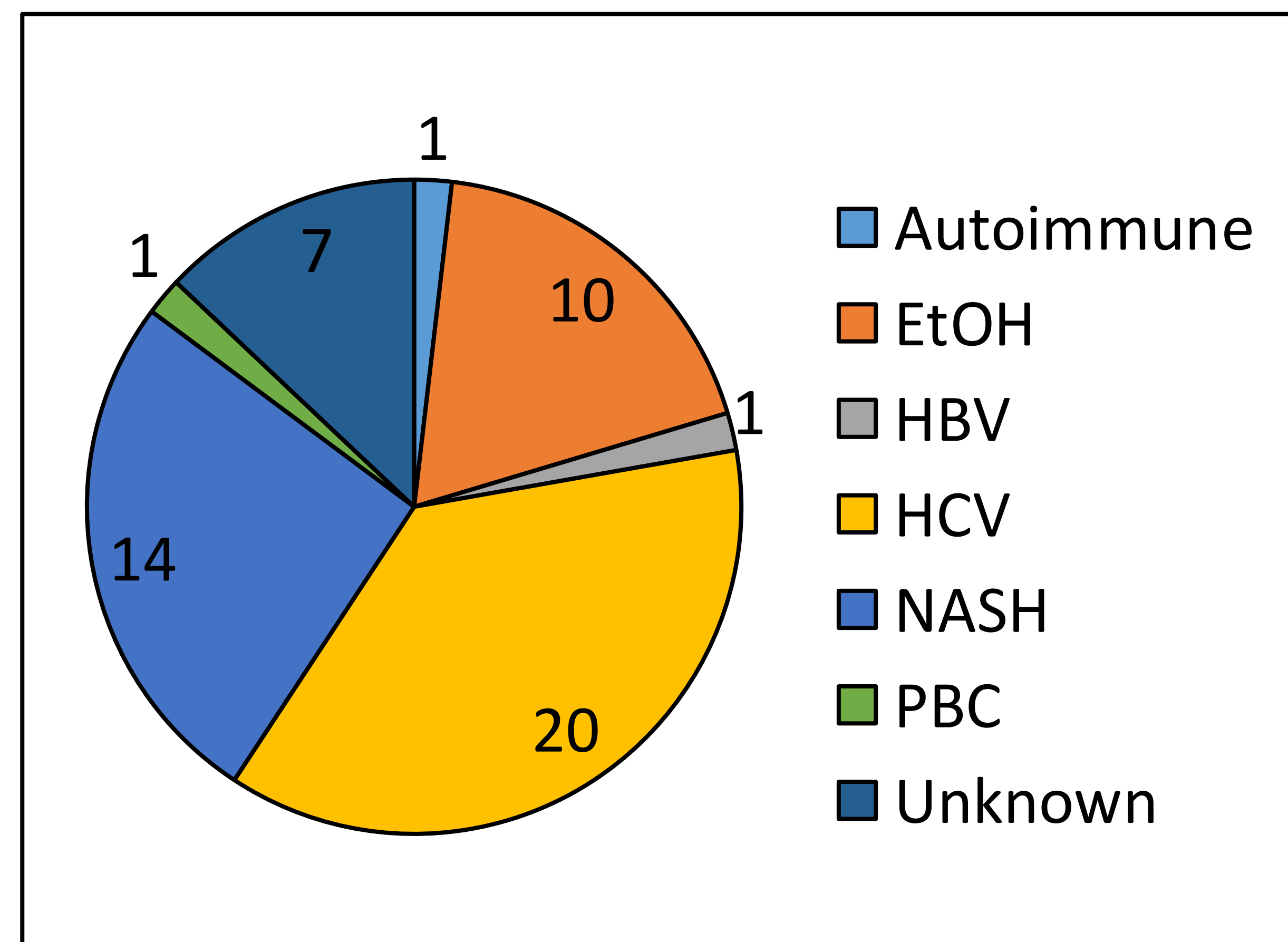
Using a multi-center facility database, we evaluated outcomes in 3,283 COVID-19 patients at Methodist Health System from March 2020 to December 2020. We determined diagnosis of cirrhosis by manual review of imaging reports and noted the etiology of cirrhosis. We evaluated the relationship between cirrhosis and the incidence of all-cause mortality, MACE (including heart failure exacerbation, cardiac tamponade, pericardial effusion, pericarditis, myocardial infarction, stroke, pulmonary embolism, deep venous thrombosis, and shock), and intubation during admission. Chi-Square test was used to analyze observed variables. Odds ratios were calculated for variables with a statistically significant difference ( $p < 0.05$ ).

## Results

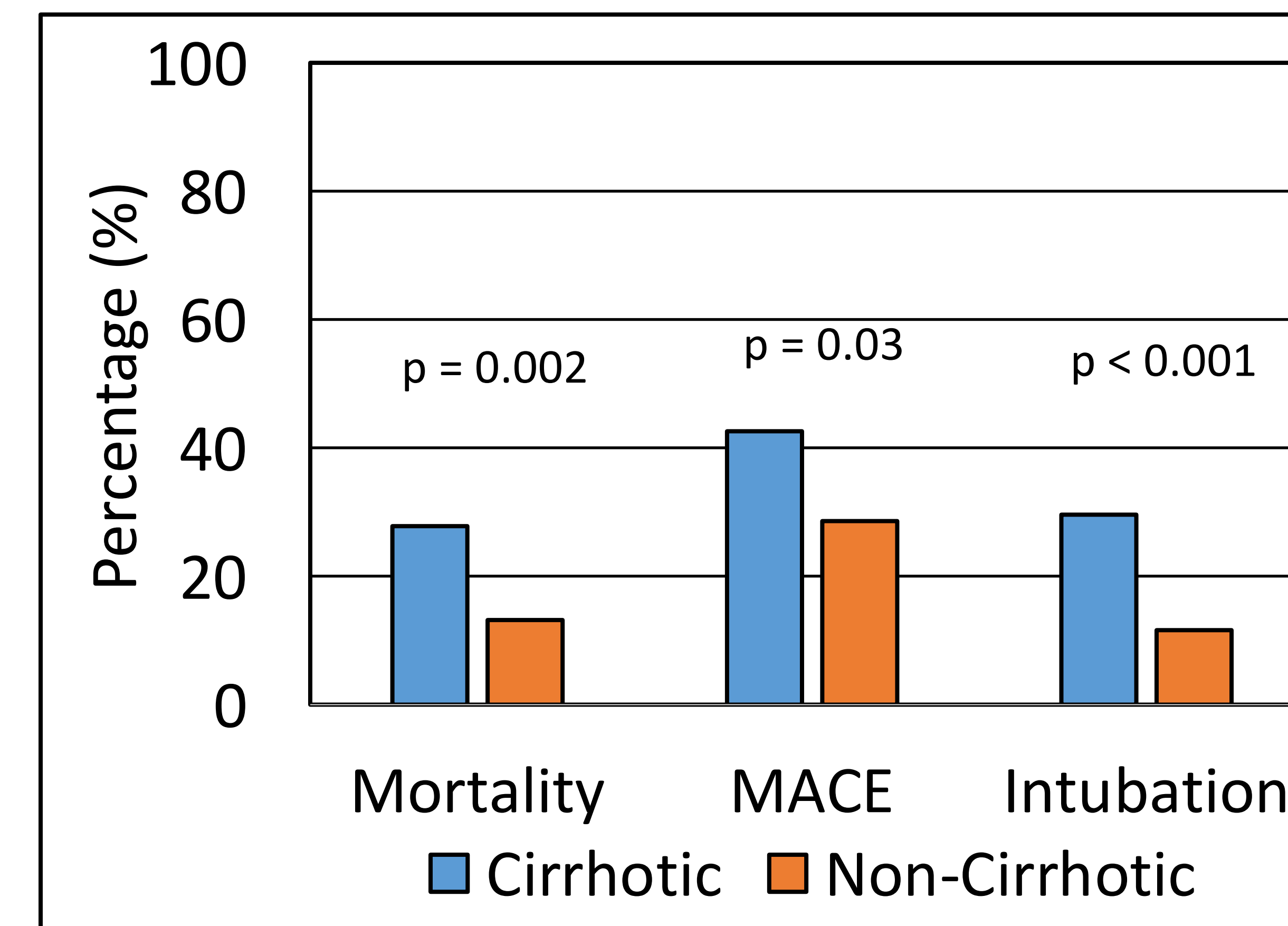
Out of 3,283 patients hospitalized with COVID-19, 54 (1.6%) were found to have cirrhosis on arrival.



**FIGURE 1. Distribution of hospitalized cirrhotic and non-cirrhotic COVID-19 patients.**



**FIGURE 2. Distribution of cirrhotic patients by etiology.**



**FIGURE 3. Comparison of incidence of mortality, MACE, and intubation in cirrhotic vs. non-cirrhotic patients.**

	OR	95% CI	P-value
Mortality	2.53	1.38-4.63	0.002
MACE	1.85	1.07-3.19	0.03
Intubation	3.2	1.77-5.80	<0.001

**Table 1. Odds ratios and 95% confidence intervals regarding mortality, MACE, and intubation in cirrhotic COVID-19 patients**

## Discussion

Our study suggests that cirrhotic patients who are admitted with COVID-19 infection are more likely to experience mortality, MACE, and intubation compared to their non-cirrhotic counterparts. By having a deeper level of understanding of the clinical course of cirrhotic patients, health care providers can better evaluate, prepare, and treat patients hospitalized with COVID-19 infection in the inpatient setting. Further studies with higher number of cirrhotic patients can help further differentiate variability between each etiology of cirrhosis.

## Conclusions

Cirrhosis is associated with higher rates of mortality, MACE, and intubation. Patients intubated with cirrhosis did not have lower rate of extubation compared to non-cirrhotic patients

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