PREDICTORS OF OUTCOMES OF COVID-19 INFECTION IN PATIENTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD)

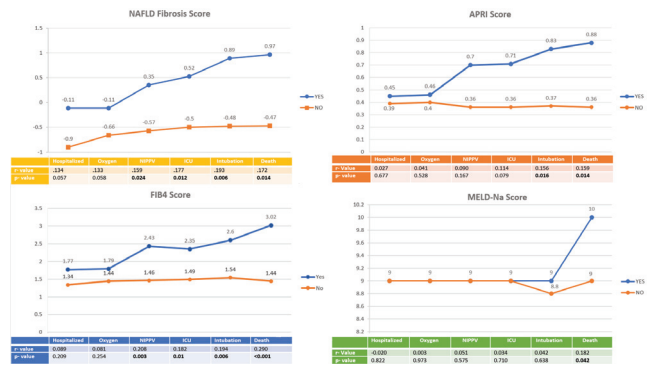Sunny Sandhu, Aalam Sohal, Sameeha Khalid, Dhuha Alhankawi, Ratnali Jain, Marina Roytman

Introduction COVID-19 has been shown to disproportionately affect patients with metabolic syndrome-associated conditions. Although a few small studies have reported an increased frequency of severe COVID-19 infection in patients with NAFLD, little is known regarding the factors portending adverse outcomes in this group. Given the high and rising prevalence of NAFLD, it is important to identify the predictors of adverse outcomes in this diverse group of patients which was the aim of our study.

Study Design We retrospectively studied patients with NAFLD diagnosed with COVID-19 at Community Medical Centers in Fresno, California between March 1 and September 30, 2020. Baseline demographics, medications, laboratory values during COVID-19, and baseline liver fibrosis scores prior to admission along with measured outcomes of severity were collected. Scores studied were NAFLD Fibrosis Score (NFS), AST to Platelet Ratio Index (APRI), fibrosis-4 (FIB-4), and MELD-Na. To assess correlations and associations, Chi-square tests, Independent sample t-tests and Pearson correlation testing were used.

Results Patients over 18 years of age with NAFLD and PCR-confirmed COVID-19 were included in the study (n=298). Demographics: 71% Hispanic, 52% male, 72% government insurance, mean age 55 years. Outcomes: 83% hospitalized, 74% required supplemental oxygen, 30% required non-invasive positive pressure ventilation (NIPPV), 25% admitted to the intensive care unit (ICU), 15% required intubation and 13% required vasopressors. COVID-19 related mortality rate was 14%.

Risk factors for adverse outcomes: Peak AST, ALT, and total bilirubin levels during COVID-19 had statistically significant positive correlations with ICU admission, intubation, and death. Albumin and platelet levels had statistically significant negative correlations with ICU admission, intubation, and death. Albumin had the strongest correlation of -0.431 to -0.497. Chronic proton pump inhibitor (PPI) use had a statistically significant positive correlation with intubation and ICU admission and chronic ACE-inhibitor use with the outcome of death. (Figure 1). Increasing baseline liver fibrosis scores (NFS, APRI, FIB-4) were associated with worse outcomes for hospitalization, oxygen requirement, NIPPV, ICU admission, intubation and death (Figure 2).

Discussion Based on our study, patients with NAFLD with elevated baseline liver fibrosis scores, elevated ALT, AST, total bilirubin, and decreased albumin and platelets during COVID-19 are at a significantly elevated risk for adverse outcomes. NFS, APRI, and FIB-4 scores appeared superior to MELD-Na in predicting outcomes. Chronic PPI and ACE-inhibitor use are associated with adverse outcomes, and thus should be used with caution in patients with NAFLD during COVID-19 pandemic. Clinicians should be aware of these risk factors while evaluating patients with COVID-19 and NAFLD.

Laboratory Values	*Intubation*		*ICU admission*		*Death*	
	Pearson Correlation Coefficient (r)	p-value	Pearson Correlation Coefficient (r)	p-value	Pearson Correlation Coefficient (r)	p-value
AST	0.312	**p<0.001**	0.248	**p<0.001**	0.279	**p<0.001**
ALT	0.220	**p<0.001**	0.189	**p=0.003**	0.147	**p=0.022**
T. Bilirubin	0.252	**p<0.001**	0.163	**p=0.011**	0.220	**p=0.001**
Albumin	-0.497	**p<0.001**	-0.463	**p<0.001**	-0.431	**p<0.001**
Creatinine	0.006	p=0.925	0.001	p=0.988	0.002	p=0.974
Platelets	-0.211	**p=0.001**	-0.181	**p=0.003**	-0.237	**p<0.001**

Medications	*Intubation*		*ICU admission*		*Death*	
	Pearson Correlation Coefficient (r)	p-value	Pearson Correlation Coefficient (r)	p-value	Pearson Correlation Coefficient (r)	p-value
Proton Pump Inhibitors	0.132	**p=0.023**	0.116	**p=0.045**	0.069	p=0.234
ACE Inhibitors	0.037	p=0.523	0.025	p=0.665	0.129	**p=0.025**

Figure 1: Demonstrates the respective correlations seen with laboratory values (AST, ALT, total bilirubin, albumin, and platelets) and medications (proton pump inhibitors and ACE-inhibitors) with regards to outcomes of intubation, ICU admission, and death.

Figure 2: Graphs illustrating the increasing baseline (prior to COVID-19) NAFLD Fibrosis Score, APRI, FIB-4, and MELD-Na scores, and associations of increasing scores with progressively worse outcomes. Pearson correlation values (r-value) and respective p-values are listed below each graph.

ELEVATED LIVER ENZYMES PORTENDS A HIGHER RATE OF COMPLICATIONS AND DEATH IN ACUTE RESPIRATORY SYNDROME CORONAVIRUS 2 (SARS-COV-2)

Emily E. Currier, Mohamad A. Dabaja, Syed-Mohammed Jafri

Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), or COVID-19, has infected millions worldwide since its discovery in Wuhan, China in December 2019, but little is still known about the disease process. Preliminary research in China notes liver function test (LFTs) abnormalities are common in COVID-19 patients, suggesting decreased hepatic function, and that abnormalities in LFTs are related to complicated disease course and negative outcomes. However, there has been limited large-scale data assessing COVID-19's association with liver dysfunction and negative outcomes. Aim: The significance of this research is to investigate how COVID-19 affects the liver function and disease course in patients infected with the virus treated at Henry Ford Hospital from March to September 2020. Results: 8,028 COVID-19 patients were identified and included in the study. Data from medical charts on LFTS (namely, AST, ALT, AP, and bilirubin levels), past history of liver disease, and disease course indicators (hospital/ICU admission, intubation, death) were recorded and analyzed. LFTs from 3,937 patients were available for interpretation. 45% were found to have elevated or super-elevated LFT. When compared to COVID-19 patients without elevated LFTs, this cohort was found to have significantly higher odds of hospital admittance, ICU admission, intubation, and death (all p<0.001). 248 (3.1%) had a history of liver disease. Those with elevated and super elevated LFTS had significantly higher odds of having a past history of liver disease (p<0.001). Conclusion: The findings from this study suggest that in patients who have tested positive for COVID-19, those with elevated and super elevated liver enzyme levels have significantly higher odds of hospital admittance, ICU admittance, intubation and death in comparison to those COVID-19 patients without elevated liver enzyme levels.

IMPACT OF CHRONIC LIVER DISEASE ON THE COVID-19 HOSPITAL ADMITTED PATIENTS

Waseem Amjad, Ritu R. Singh, Adnan Malik, Faisal Jaura, Saad Saleem, Waqas Qureshi, Peter Ells

Introduction: Patient with chronic liver disease (CLD) can have adverse outcomes in setting of COVID-19 infection. Our goal is to determine the prevalence of liver disease in COVID-19 infection and outcomes as compared to individuals without CLD. **Methods:** We conducted a retrospective review of the patients admitted for COVID-19 infection from March 1st, 2020 till May 31st, 2020. The patients who had chronic liver disease were identified based on imaging interpretation and chronically elevated liver enzymes. Chart review was done for 332 patients, the one with missing data were excluded (n=16). We included 316 patients in the analysis. Of them 12.0% patients had underlying chronic liver disease. **Results:** Of total 43.7% were female and 48.4% were Caucasians. The patients with liver disease were older (64.6 ± 15.3 vs 57.6 ± 17.4, p=0.02) as compared to non-CLD. The CLD patients had higher number of coronary artery disease (47.4% vs 18.9%, p<0.001). The other comorbid conditions including chronic obstructive pulmonary disease, asthma, cancer, chronic kidney disease, diabetes mellitus, hypertension, obesity, obstructive sleep apnea and smoking were similar in both groups. The CLD patients had higher mortality (aOR: 3.3, 95% CI: 1.37-8.05), thromboembolism (aOR: 3.77, 95% CI: 1.33-10.71), acute respiratory distress syndrome (aOR:2.25, 95% CI: 1.04-4.85) and trend of severe COVID-19 infection (aOR:1.90, 95% CI:0.91-3.98) whereas the 3 month readmission was similar in both groups. The Kaplan Meier survival curve suggest that COVID-19 patients with CLD died early during the study period. **Conclusion:** The presence of chronic liver disease in inpatient COVID-19 infections is associated with three fold higher mortality. The CLD patients had higher incidence of severe infection.