Fort Sam Houston, TX, San Antonio, TX; [8]Infectious Disease Clinical Research Program, Bethesda, MD, The Henry M. Jackson Foundation, Bethesda, MD, and Naval Medical Center Portsmouth, VA, Portsmouth, Virginia; [9]Uniformed Services University of the Health Sciences; Brooke Army Medical Center, San Antonio, TX; [10]Walter Reed National Military Medical Center, Bethesda, Maryland; [11]Infectious Disease Clinical Research Program, USU/HJF, Bethesda, Maryland; [12]Infectious Disease Clinical Research Program, Bethesda, Maryland

EPICC Study Group

Session: P-21. COVID-19 Research

Background. Approximately 10-20% of patients with critical COVID-19 harbor neutralizing autoantibodies (auto-Abs) that target type I interferons (IFN), a family of cytokines that induce critical innate immune defense mechanisms upon viral infection. Studies to date indicate that these auto-Abs are mostly detected in men over age 65.

Methods. We screened for type I IFN serum auto-Abs in sera collected < 21 days post-symptom onset in a subset of 103 COVID-19 inpatients and 24 outpatients drawn from a large prospective cohort study of SARS-CoV-2 infected patients enrolled across U.S. Military Treatment Facilities. The mean age of this n = 127 subset of study participants was 55.2 years (SD = 15.2 years, range 7.7 – 86.2 years), and 86/127 (67.7%) were male.

Results. Among those hospitalized 49/103 (47.6%) had severe COVID-19 (required at least high flow oxygen), and nine subjects died. We detected neutralizing auto-Abs against IFN-α, IFN-ω, or both, in four inpatients (3.9%, 8.2% of severe cases), with no auto-Abs detected in outpatients. Three of these patients were white males over the age of 62, all with multiple comorbidities; two of whom died and the third requiring high flow oxygen therapy. The fourth patient was a 36-year-old Hispanic female with a history of obesity who required mechanical ventilation during her admission for COVID-19.

Conclusion. These findings support the association between type I IFN auto-antibody production and life-threatening COVID-19. With further validation, reliable high-throughput screening for type I IFN auto-Abs may inform diagnosis, pathogenesis and treatment strategies for COVID-19, particularly in older males. Our finding of type I IFN auto-Ab production in a younger female prompts further study of this autoimmune phenotype in a broader population.

Disclosures. **David A. Lindholm, MD**, American Board of Internal Medicine (Individual(s) Involved: Self): Member of Auxiliary R&D Infectious Disease Item-Writer Task Force. No financial support received. No exam questions will be disclosed ., Other Financial or Material Support **David Tribble, M.D., DrPH**, **Astra Zeneca** (Other Financial or Material Support, HJF, in support of USU IDCRP, funded under a CRADA to augment the conduct of an unrelated Phase III COVID-19 vaccine trial sponsored by AstraZeneca as part of USG response (unrelated work)) **Simon Pollett, MBBS**, **Astra Zeneca** (Other Financial or Material Support, HJF, in support of USU IDCRP, funded under a CRADA to augment the conduct of an unrelated Phase III COVID-19 vaccine trial sponsored by AstraZeneca as part of USG response (unrelated work))

451. Is Antibody to Nucleocapsid More Prevalent in Individuals with Severe COVID-19?

Hemang Patel, PhD[1]; Ashish Bhargava, MD[2]; Daniel Lebovic, MD[1]; Tiziano Scarabelli, MD[1]; Meredith M. Coyle, MD[3]; Natali Salaytah, BS[1]; Louis Saravolatz, MD[4]; [1]Ascension St John Hospital, Detroit, Michigan; [2]Ascension St John, Grosse Pointe Woods, MI; [3]St. John's Ascension, Detroit, MI; [4]St John Hospital, Detroit, Michigan

Session: P-21. COVID-19 Research

Background. Virus-specific antibodies help to understand the prevalence of infections and the course of the immune response. Humans produce antibodies against the spike and nucleocapsid proteins of SARS-COV-2 virus. Patients with COVID-19 who recover from the infections have higher levels of antibodies to spike proteins. Our study aimed to find the levels of antibodies to spike and nucleocapsid proteins in severe COVID-19.

Methods. A single center prospective study was done at Ascension St John Hospital, Detroit, MI. We included COVID-19 cases diagnosed by reverse-transcriptase polymerase-chain-reaction (RT-PCR). Quantitative measurements of plasma or serum antibodies to nucleocapsid and spike proteins were done in hospitalized patients with acute COVID-19. Using the electronic medical record, we collected data on demographic and clinical information.

Results. A total 24 patients were studied. Of which, 15 patients were suffering from severe and critical COVID 19 and 9 patients were suffering from mild to moderate COVID 19. The mean age (standard deviation) of our cohort was 69 ± 10 years and 60% were males. Common comorbid conditions were hypertension, obesity, and type 2 diabetes. We also noted that severe to critical COVID 19 expressed higher level of antibody to nucleocapsid.

Conclusion. These results display the seroconversion in COVID 19 patients. Our study shows antibody level remain high in severe COVID 19 patients but those are against nucleocapsid protein instead of spike protein.

Disclosures. **All Authors**: No reported disclosures

452. Correlation of Charleston Comorbidity Index Score as the COVID-19 Pandemic Surged Throughout HCA Healthcare Facilities and Patient Outcomes

Irene Riestra Guiance, MD[1]; Ernesto Robalino Gonzaga, MD[2]; Isabel Riestra, n/a[3]; Steven Char, MD[2]; Minh Q. Ho, DO[4]; [1]UCF/HCA GME Consortium, Kssimmee, Florida; [2]UCF/HCA Healthcare GME, Kissimmee, Florida; [3]Suffolk University, Maitland, Florida; [4]Orlando VA Healthcare System, 14014 Deep Forest Court, Florida

Session: P-21. COVID-19 Research

Background. As the COVID-19 pandemic raged throughout the United States, the healthcare system was strained due to a sudden increase in demand. Testing was initially limited, and the perception was that patients with high comorbidity burden were at higher risk for poor outcomes. The Charleston Comorbidity Index (CCI) is widely used as a predictor of prognosis and one-year mortality for a wide range of pathologies. This study aims to assess whether a correlation exists between CCI score, COVID-19 incidence throughout the pandemic and patient outcomes.

Charleston Comorbidity Index Score

Charleston Comorbidity Index (CCI)	
Condition	**Score**
Myocardial infarction	1
Congestive Heart Failure	1
Peripheral Vascular Disease (including aortic aneurysm >6cm)	1
TIA or Cerebrovascular disease with mild of no residua	1
Dementia	1
Chronic pulmonary disease	1
Connective tissue disease	1
Peptic ulcer disease	1
Mild liver disease without portal HTN	1
Diabetes without end-organ damage	1
Hemiplegia	2
Moderate or severe renal disease	2
Diabetes with end-organ damage	2
Tumor without metastases (diagnosed <5years ago)	2
Leukemia	2
Lymphoma	2
Moderate or severe liver disease	3
Metastatic solid tumor	6
AIDS	6

Scoring system for Charleston Comorbidity Index (CCI). Plus 1 point for every decade age 50 years and over, maximum 4 points. Higher scores indicate a more severe condition and consequently, a worse prognosis.

Methods. Multicenter, retrospective review of patients diagnosed with COVID-19 from January 2020 to September 2020 throughout the HCA Healthcare system. The percent of total encounters that were COVID-19 positive by state was calculated along

with the average CCI score for COVID-19 patients in 2-month increments. Patient outcomes were obtained across the entire population.

Results. A clear surge of infected patients was seen in almost all states in the dataset from May 2020 onward except in Colorado and Louisiana where the percentage of COVID-19 positive encounters decreased until July 2020. As summer 2020 progressed, the highest percentage of COVID-19 positive encounters among HCA Healthcare facilities was in Florida and Texas. However, despite the fact that more patients were COVID-19 positive in these states, the CCI score was the lowest (Figure 1). The highest average CCI throughout the 9-month period was 7.66 in Colorado. In the first two months of the pandemic, patients who tested positive for COVID-19 had higher CCI scores on average than those who became COVID-19 positive later in the pandemic. Missouri had the lowest CCI average but the highest ICU admissions and in-hospital mortality. Indiana had the lowest average CCI score, and lowest admission rate (Figure 2).

COVID-19 Encounters and Average CCI score by State from January 2020 to September 2020

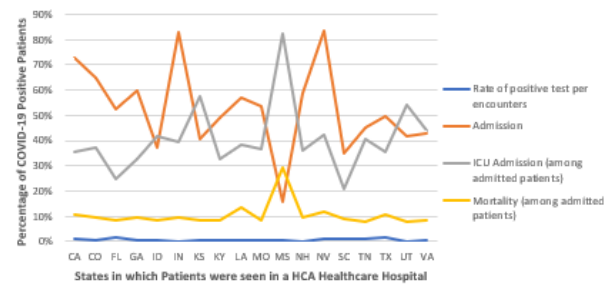Fig 1.1 Percentage of COVID-19 Encounters in 9 Months at an HCA Healthcare Facility by State
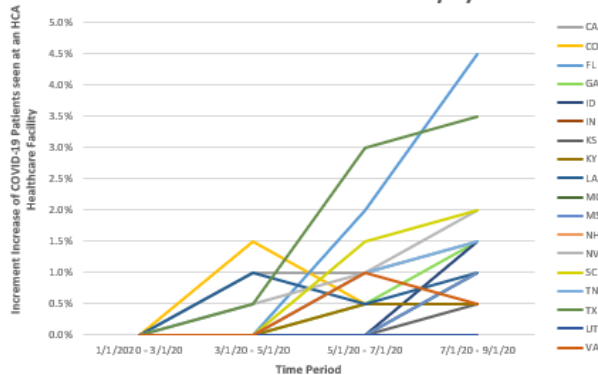
Fig 1.2: Average Charleston Comorbidity Index of COVID-19 Patients Seen at an HCA Healthcare Facility by State in 9 Months
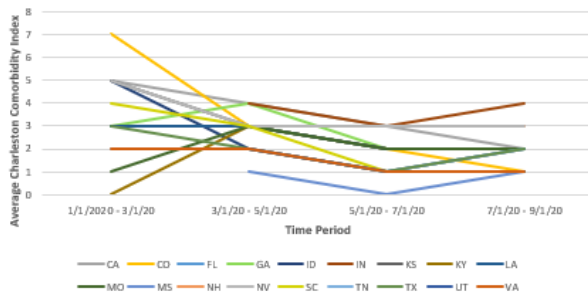
Graph 1: Percentage of COVID-19 Encounters in 9 Months at an HCA Healthcare Facility by State: Graph presents data obtained for the total of 92,800 patient encounters from January to September 2020 and recorded in 2-month increments. The rate of positive encounters throughout 18 states increased on average from May to September. From January to March 2020, the facilities with the highest rate of COVID-19 encounters were in Colorado, Louisiana and Texas. The states with the highest increment increase of COVID-19 positive patients were Texas, Florida and South Carolina and were trending up as the pandemic wore on through the summer of 2020. Graph 2: Average Charleston Comorbidity Index of COVID-19 Patient Seen at an HCA Healthcare Facility by State in 9 Months: In winter 2020 (January to March 2020) the average CCI score for patients seen with COVDI-19 was higher than in the Spring and Summer 2020 in all states except in Montana and Kentucky. Summer 2020 (May to July 2020) demonstrated some of the lowest average CCI scores for COVID-19 positive patients seen at an HCA Healthcare Facility.

Rate of Positive COVID-19, Patient Outcomes and Average Charleston Comorbidity Index Score by State

Fig 2.1: Outcomes of Covid-19 Positive Patients Seen at an HCA Healthcare Facility

Fig 2.2: Average Charleston Comorbodity Index Score of COVID-19 Positive Patients Seen at an HCA Healthcare Facility
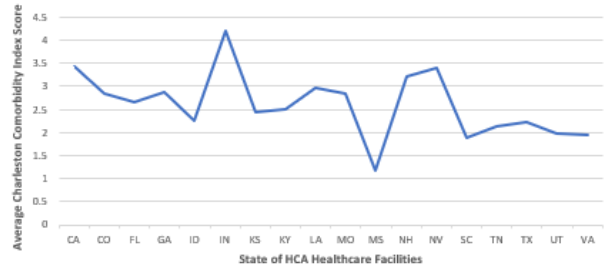
Graph 3: Outcomes of COVID-19 Positive Patients Seen at an HCA Healthcare Facility: Mortality and ICU admission was the highest in Missouri, however, the state had the least COVID-19 patients admitted. The rate of positive test per encounter was the highest in Florida and Texas. Texas had a higher mortality among admitted COVID-19 patients than Florida, however, Florida had a higher percentage of COVID-19 patients admitted. Graph 4: Average Charleston Comorbidity Index Score of COVID-19 Positive Patients Seen at an HCA Healthcare Facility: Average CCI was the lowest in Missouri. The states with the highest CCI score were Indiana, California, New Hampshire and Nevada.

Conclusion. We observed an inverse correlation between CCI score and COVID-19 incidence while seeing that, on average, COVID-19 positive patients had higher CCI score in the first few months of the pandemic when incidence rate was lower. CCI score did not correlate to ICU admission, but a higher CCI score correlated to higher admission rate.

Disclosures. **All Authors**: No reported disclosures

453. Neutralizing Antibody Responses to SARS-CoV-2 in Professional Soccer Players

Jorge Pagura, MD[1]; Clovis Arns de Cunha[2]; Roberto Nishimura, MD[1]; Sergio Wey, MD, PhD[1]; André Pedrinelli, MD[1]; Sergio Cimerman, MD, PhD[3]; Andreia Picanço, MD[1]; Sérgio Freire, MD[1]; André Guerreiro, MD[1]; Edilson Thiele, MD[1]; Carlos Starling, MD, MSc[4]; Bráulio R.G.M. Couto, pHD[5]; [1]Comissão Científica da Confederação Brasileira de Futebol - CBF, São Paulo, Minas Gerais, Brazil; [2]Universidade Federal do Paraná; [3]Brazilian Society of Infectious Diseases, Sao Paulo, Brazil; [4]Sociedade Mineira de Infectologia - SMI, Belo Horizonte, Minas Gerais, Brazil; [5]Centro Universitário de Belo Horizonte - UniBH, Belo Horizonte, Minas Gerais, Brazil

Session: P-21. COVID-19 Research

Background. The Brazilian Football Confederation (CBF) protocol to control the spread of COVID-19 among professional soccer players is based on four cornerstone measures: (1) Tracing all symptomatic and asymptomatic COVID-19 cases by clinical monitoring and nasal swab SARS-CoV-2 RT-PCR testing up to 3 days before the