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Thromboelastic Profiles of Patients With Coronavirus (COVID-19) Pneumonia

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Study Objectives: The primary objective of the study was to use thromboelastography (TEG) to evaluate coagulation dynamics in patients hospitalized with COVID-19 and to investigate TEG as a predictive tool for clinical course of infection.

Methods: Adult patients admitted to Naval Medical Center Portsmouth with the diagnosis of SARS-CoV-2 were eligible for enrollment. TEG was performed on admission and trended daily with other laboratory tests through the hospitalization. Charts were reviewed for demographic, medical history, daily progress notes, clinical status, lab values, and anticoagulation medication use for each patient. Treatment teams were blinded to TEG values.

Results: A total of 53 patients were enrolled, with three patients having two separate admissions. There were 31 males and 22 females with a mean age of 48. The preponderance of individual TEG components showed progression towards hypercoagulation as days of illness progressed, with 92% of subjects having at least one TEG value outside the reference range, even with the vast majority of patients receiving either therapeutic or prophylactic anticoagulants. The maximum amplitude (MA) and TEG coagulation indexes (CI) best correlated with day of illness (r = 0.45 and r = 0.32, respectively). Peak CI also correlated with length of hospital stay (r = 0.38). The majority (91%) remained hypercoagulable on discharge.

Conclusions: The use of TEG measurements in those hospitalized at NMCP with COVID-19 infection confirms the hypercoagulable state previously reported in COVID-19 patients. It may have a role as a tool to predict clinical courses or to direct anticoagulation or antithrombotic therapy to reduce morbidity and mortality.

Metabolic Syndrome Is Associated With Worse Outcomes in SARS-CoV-2 Positive Emergency Department Patients

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Study Objective: Increased body mass index (BMI) and metabolic syndrome (MetS) have been associated with adverse outcomes in numerous diseases. However, the role of BMI and MetS in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection remains unclear. We sought to examine the associations of increased BMI and MetS on several clinical outcomes in all ED patients tested for SARS-CoV-2 and then in the subset of COVID positive patients only.

Methods: The REgistry of potential COVID-19 in emERgency care (RECOVER) is an observational study of SARS-CoV-2 tested patients from 155 US EDs. Inclusion criteria were a nucleic acid test at index visit. Body mass was categorized per CDC designations ie, BMI 18.5 to <25 kg/m², 25 to <30 kg/m², ≥30 to <35 kg/m², 35 to <40 kg/m² and ≥40 kg/m². The presence of metabolic syndrome was defined as having 5 or more defining characteristics per the electronic medical record at the time of index visit; these included an elevated BMI (≥30 kg/m²), hyperlipidemia, hypertension, and diabetes. We used multivariable logistic regression to test for associations of several variables (including BMI, MetS, age, sex, race, ethnicity, and smoking) on the following clinical outcomes, first comparing SARS-CoV-2 positive and SARS-CoV-2 negative patients (N=27, 051) and then in the COVID+ subset (N=14, 056): hospital admission, intensive care unit (ICU) care, intubation, 30-day mortality and 30-day new or recurrent venous thromboembolism (VTE).

Results: We report that BMI ≥ 30 kg/m² was associated with SARS-CoV-2 test positivity (odds ratio [OR] 1.13, 95% confidence interval [CI] 1.08-1.20). Analysis of BMI ≥ 40 kg/m² revealed a stronger association with test positivity (OR 1.24, 95% CI 1.14-1.35). By contrast, MetS was not associated with testing positive (OR 0.95, 95% CI 0.89-1.01) in the overall cohort. In COVID+ patients, BMI ≥ 40 kg/m² was associated with ICU care (adjusted odds ratio [aOR] 1.97; 95% CI 1.65-2.35), intubation (aOR 2.69; 95% CI 2.22-3.26) and mortality (aOR 1.50; 95% CI 1.22-1.84). MetS was associated with worsened clinical outcomes: hospital admission (aOR 2.11; 95% CI 1.89-2.37), ICU care (aOR 1.58; 95% CI 1.40-1.78), intubation (aOR 1.46; 95% CI 1.28-1.66), and mortality (aOR 1.29; 95% CI 1.13-1.48) and VTE (aOR 1.51; 95% CI 1.07-2.13).

Conclusions: In this large nationwide sample of ED patients undergoing SARS-CoV-2 testing, we report that BMI ≥ 30 kg/m², BMI ≥ 40 kg/m² and not MetS was associated with SARS-CoV-2 test positivity. Multivariable analysis in COVID positive patients only revealed significant associations of BMI ≥ 40 kg/m² with three outcomes (ICU care, intubation and mortality) and of MetS with five outcomes (hospital admission, ICU care, intubation, mortality and VTE).

The Oropharyngeal Microbiome Predicts Need for Respiratory Support Among COVID-19 Patients

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Study Objective: The clinical course and severity of infection with respiratory viruses such as SARS-CoV-2, the causative agent of COVID-19, are hypothesized to be affected by the microbes colonizing the upper airway, also known as the oropharyngeal microbiome, where they first establish infection. To determine how the oropharyngeal microbiome interacts SARS-CoV-2 and if it affects the clinical course of COVID-19, we carried out a study of the oropharyngeal microbiome of patients presenting to the emergency department or on the admission wards with symptoms of COVID-19, to identify microbiota and clinical covariates that associated with the need for respiratory support and mortality. Nucleic acids were extracted from oral swabs and high-throughput metagenomic sequencing was performed on extracted DNA. Out of a total of 115 enrolled patients with complete data, 51 had a laboratory confirmed diagnosis of acute COVID-19 and 40 went on to require some respiratory support. We analyzed the relative abundance of detected organisms in individuals who were COVID-19+ versus COVID-19− and used mixed-effect random forest modeling to identify microbiota and clinical covariates that associated with the need for respiratory support among COVID-19+ subjects.

Results: We found 19 species that were significantly different among COVID-19+ versus COVID-19−, most notably, several Actinomyces species showed significant increases among COVID-19+ patients. We found that among COVID-19+ patients, microbiome features were highly correlated with need for respiratory support (F1 score 0.876).

Conclusions: The contributions of microbiome features such as relative abundances of Prevotella salivae, Campylobacter concisus, and Veillonella infantans as well as the Shannon Diversity Index this model approximated the importance of clinical factors known to contribute to risk for severe COVID-19 such as body mass index (BMI) and age. The composition of the oropharyngeal microbiome may represent a target for diagnostics in the ED to aid in the determination of who is likely to suffer respiratory failure and require oxygen support.