Relationship Between Patient Characteristics and Critical Illness in CoVID-19
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Background

While several studies have explored hospitalization risk factors with the novel coronavirus (CoVID-19) infection, the risk of poor outcomes during hospitalization has primarily relied upon laboratory or hospital-acquired data. Our goal was to identify clinical characteristics associated with intubation or death within 7 days of admission.

Methods

The first 436 patients admitted to the University of Colorado Hospital (Denver metropolitan area) with confirmed CoVID-19 were included. We hypothesized that a combination of clinically available risk factors would reasonably predict CoVID-19 severity. Demographics, comorbidities, and select medications were collected by chart abstraction. Missing height for calculating body mass index (BMI) was imputed using the median height for patients' sex and race/ethnicity. Adjusted odds ratios (aOR) were estimated using multivariable logistic regression and a minimax concave penalty (MCP) regularized logistic regression explored prediction.

Results

Participants had a mean (SD) age 55 (17), BMI 30.9 (8.2), 55% were male and 80% were ethnic/racial minorities. Unadjusted comparisons by outcome are shown (Table 1). Male sex (aOR: 1.60, 95% CI (1.02, 2.54)), increasing age (aOR: 1.25 (1.08, 1.47)); per 10 years), higher BMI (aOR 1.03 (1.00, 1.06)) and poorly controlled diabetes (hemoglobin A1C ≥8) (aOR 2.33 (1.27, 4.27)) were significantly ($p< 0.05$) associated with greater odds of intubation or death. Minority status tended to be associated with higher odds (aOR:1.8(1.01,3.36); p=0.052). Surprisingly, need for hospital interpreter was associated with decreased odds (OR: 0.58 (0.35, 0.95) of intubation/death. Our final MCP model included indicators of A1C≥8, age >65, sex and minority status, but predicted intubation/death only slightly better than random chance (AUC= 0.61(0.56, 0.67)).

Conclusion

In a hospitalized patient cohort with COVID-19, male sex, poorly controlled diabetes, increasing age and BMI were significantly associated with early intubation or death. These results complement larger cohort studies and highlight risk differences across metropolitan areas with varying COVID-19 prevalence, demographics, and comorbid disease burden. Notably, our predictive model had limited success, which may suggest unmeasured factors also contribute to disease severity differences.