

Risk Factors for Mortality in COVID-19 Patients in a Community Teaching Hospital

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BACKGROUND

- As of May 2020, there were over 190,000 confirmed COVID-19 cases in New York City (NYC) with approximately 13,000 deaths¹
- Goyal, et. al found higher mortality in patients on mechanical ventilation compared to non-mechanically ventilated patients²
- Richardson, et. al evaluated clinical outcomes in 2634 patients during hospitalization, such as intensive care unit care (373, 14.2%), invasive mechanical ventilation (320, 12.2%), renal replacement therapy (81, 3.2%), and death (553, 21%)³
- Zhou, et. al found older age, high Sequential Organ Failure Assessment (SOFA) score, and d-dimer greater than 1 mcg/mL to be associated with mortality⁴
- There are limited published studies assessing clinical characteristics, outcomes and risk factors for mortality in COVID-19 patients in NYC

OBJECTIVE

- To assess the risk factors for mortality in patients with confirmed COVID-19 infections in NYC

METHODS

- Retrospective case-control study from 1 March 2020 to 15 April 2020
 - Inclusion criteria:** Patients 21 years of age or older with moderate to severe COVID-19 infection confirmed by PCR, received at least 24 hours of COVID-19 therapy, and at least one of the following criteria: radiographic evidence of pneumonia, oxygen saturation < 94% on room air, or requiring supplemental oxygen
 - Exclusion criteria:** Death prior to COVID-19 result
- Primary Endpoint**
 - Risk factors for mortality in COVID-19 patients in a NYC community teaching hospital
- Treatment and Outcomes**
 - Treatment:** Primary antiviral agent; new start therapeutic anticoagulation; concomitant antibiotic therapy; vasopressor initiation; glucocorticoid initiation
 - Outcomes:** Increase in QTc by >60ms or >500ms (if baseline is < 500ms); renal failure or renal replacement therapy; ventricular fibrillation or ventricular tachycardia
- Statistical analyses**
 - Baseline characteristics between survivor and non-survivors were analyzed utilizing Mann-Whitney U test and two-tailed t-tests for continuous data and Chi-square and Fisher's exact test for categorical data
 - Univariable and multivariable logistic regression analyses were conducted to identify the risk factors for in-hospital mortality

Table 1: Patient Characteristics

| Patient Characteristics ¹ | Total (n = 286) | Non-Survivor (n = 97) | Survivor (n = 189) | P-value |
|--------------------------------------|-----------------|-----------------------|--------------------|---------|
| Age (years), mean ± SD | 67.0 ± 14.4 | 72.4 ± 11.6 | 64.3 ± 15.0 | 0.002 |
| Male sex | 155 (54.2) | 60 (61.9) | 95 (50.3) | 0.063 |
| Location prior to admission | | | | |
| Home | 219 (76.5) | 63 (65.0) | 156 (82.5) | 0.001 |
| Nursing home | 55 (19.2) | 32 (33.0) | 23 (12.2) | <0.001 |
| Assisted living facility | 8 (2.8) | 1 (1.0) | 7 (3.7) | 0.273 |
| Other | 4 (1.5) | 1 (1.0) | 3 (1.6) | 1.000 |
| Race or ethnic group | | | | |
| White | 14 (4.9) | 7 (7.2) | 7 (3.7) | 0.247 |
| Black | 180 (62.9) | 59 (60.8) | 121 (64) | 0.607 |
| Asian | 9 (3.2) | 5 (5.2) | 4 (2.1) | 0.173 |
| Hispanic | 23 (8.0) | 8 (8.2) | 15 (7.9) | 1.000 |
| Other/declined | 60 (21.0) | 18 (18.6) | 42 (22.3) | 0.541 |
| Current smoker | 14 (6.1) | 5 (7.9) | 9 (5.4) | 0.467 |
| Comorbidities | | | | |
| Obesity | 109 (38.3) | 33 (34.4) | 76 (59.8) | 0.498 |
| Hypertension | 207 (73.1) | 74 (78.7) | 133 (70.4) | 0.137 |
| Coronary artery disease | 47 (16.6) | 28 (29.8) | 19 (10.1) | <0.001 |
| Chronic respiratory disease | 44 (15.6) | 17 (18.1) | 27 (14.3) | 0.407 |
| Diabetes | 124 (43.8) | 53 (56.4) | 71 (37.6) | 0.003 |
| Hospitalization Information | | | | |
| ICU admission | 64 (22.4) | 50 (51.6) | 14 (7.4) | <0.001 |
| Laboratory Findings | | | | |
| White blood cell count > 10 k/cmm | 85 (29.7) | 43 (44.3) | 42 (22.2) | <0.001 |
| Lymphocyte count < 1.0 k/cmm | 177 (61.9) | 71 (73.2) | 106 (56.1) | 0.005 |
| Platelets < 150 k/cmm | 69 (24.1) | 27 (27.8) | 42 (22.2) | 0.294 |
| Serum ferritin > 300 mcg/L | 217 (80.7) | 80 (87.0) | 137 (77.4) | 0.063 |
| CRP > 100 mg/L | 165 (59.1) | 65 (68.4) | 100 (54.4) | 0.024 |

¹Data presented as n(%), unless specified otherwise

Table 2: Treatment and Outcomes

| Treatment and Outcomes ¹ | Total (n = 286) | Non-Survivor (n = 97) | Survivor (n = 189) | P-value |
|---|-----------------|-----------------------|--------------------|---------|
| Treatment | | | | |
| Primary antiviral therapy | | | | |
| Hydroxychloroquine (HCQ) | 44 (15.3) | 15 (15.5) | 29 (15.3) | 1.000 |
| HCQ and azithromycin | 236 (82.5) | 78 (80.4) | 158 (83.6) | 0.514 |
| Lopinavir-ritonavir (LPV/r) | 3 (1.1) | 3 (3.1) | 0 (0.0) | 0.038 |
| HCQ and LPV/r | 3 (1.1) | 1 (1.0) | 2 (1.1) | 1.000 |
| Concomitant Antibiotic Therapy | | | | |
| Multidrug-resistant organism coverage | 116 (40.6) | 57 (58.8) | 59 (31.2) | <0.001 |
| New Start Therapeutic Anticoagulation | 56 (19.6) | 31 (32.0) | 25 (13.2) | <0.001 |
| Glucocorticoid initiation | 97 (33.9) | 44 (45.4) | 53 (28.0) | 0.004 |
| Vasopressor initiation | 65 (22.7) | 54 (55.7) | 11 (5.8) | <0.001 |
| Outcomes | | | | |
| Renal Failure | 33 (13.0) | 30 (35.7) | 3 (1.8) | <0.001 |
| Renal Replacement Therapy | 14 (5.5) | 11 (12.9) | 3 (1.8) | 0.002 |
| Increase in QTc by >60ms | 14 (8.9) | 7 (9.9) | 7 (8.1) | 0.782 |
| Increase in QTc to > 500ms (if baseline is <500ms) | 12 (7.6) | 5 (7.0) | 7 (8.1) | 1.000 |
| Ventricular Fibrillation or Ventricular Tachycardia | 4 (1.4) | 4 (4.1) | 0 (0.0) | 0.013 |

¹Data presented as n(%), unless specified otherwise

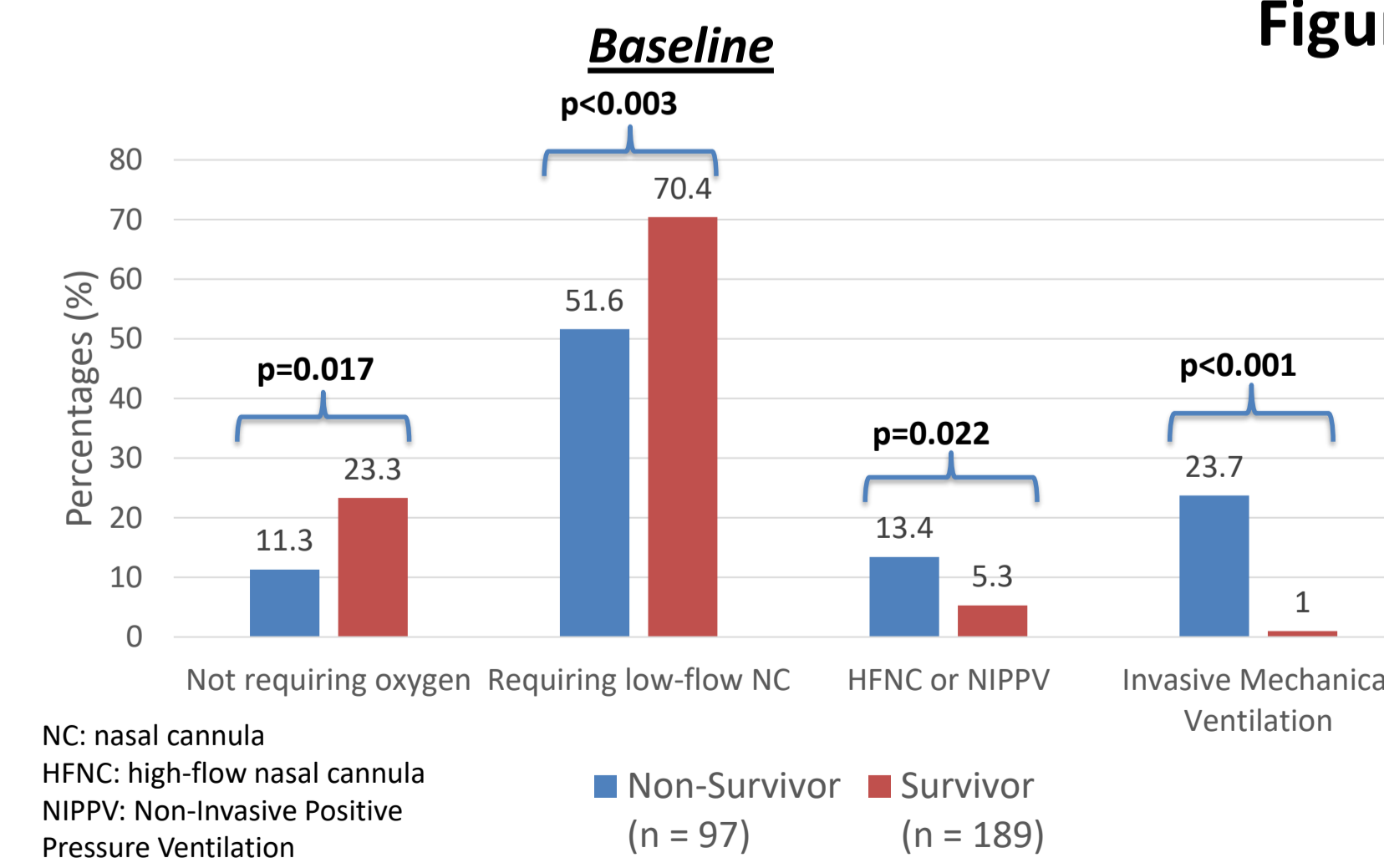


Figure 1: Disease Severity

RESULTS

Figure 2: Logistic Regression

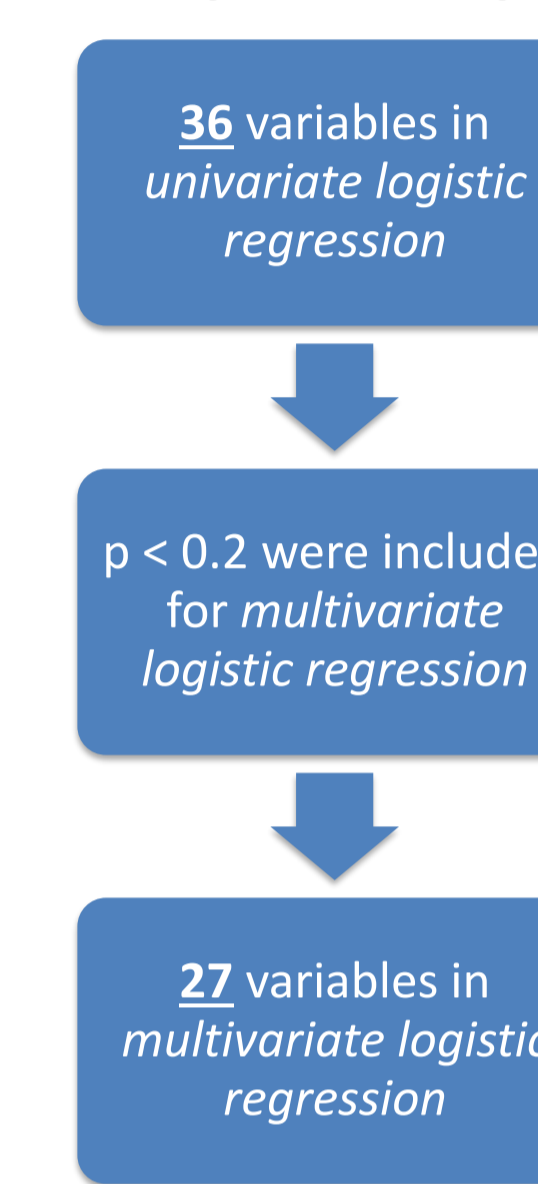


Table 3: Multivariate Logistic Regression

| Characteristics | Odd ratio (95% CI) | P-value |
|---|--------------------------|---------|
| Nursing home or assisted living facility prior to admission | 3.916 (0.986 – 15.560) | 0.052 |
| Age > 65 years | 5.779 (1.369 – 24.407) | 0.017 |
| Vasopressor Initiation | 28.301 (3.307 – 242.176) | 0.002 |
| Renal failure | 30.927 (1.871 – 511.201) | 0.016 |

DISCUSSION

- Higher mortality rate compared to prior studies secondary to ICU admission, comorbidities, and renal replacement therapy
- Choice of primary antiviral therapy was similar amongst non-survivors and survivors
- Risk factors for mortality were comparable to prior literature in the characteristic of age
- Limitations include early follow-up period and single center study

CONCLUSION

- Risk factors associated with mortality for COVID-19 patients at TBHC include advanced age, need for vasopressor therapy, and development of renal failure

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Disclosure

The authors of this presentation have nothing to disclose

