

# Studying the Clinical Data of COVID Positive Patients Admitted to a Tertiary Care Academic Hospital

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## Abstract

**Background:** At the time this data was studied in Florida, USA was expecting a surge in number of COVID patients. We are hereby presenting analysis of clinical data collected from the first 30 COVID positive patients admitted to our teaching hospital in Sarasota Florida. **Methods:** The present study was conducted at a not-for-profit 839-bed level-2 regional trauma center, level-3 neurointensive intensive care unit (ICU), and comprehensive stroke and cardiovascular center located on Florida's Central Gulf Coast. It was a single-center, retrospective review of the first 30 patients with reverse transcriptase–polymerase chain reaction confirmed 2019-nCoV infection between March and April 2020. Deidentified patient demographic data, abnormal admission laboratory and radiology findings, treatment medications received, need for mechanical ventilation, complications, and final outcome were recorded. **Results:** A total of 30 patients were included who were admitted during the study period. Majority of the patients (86%) were elderly, males were 57%, and the average age was 70 years (range, 38–90). About 43% had any travel history outside the region and most (83%) had a comorbidity. Fever, cough, and shortness of breath were common presenting symptoms. About 33% of the patients required ICU at presentation. Abnormal imaging on presentation was present in 80% of the patients and 42% of them had nonspecific bilateral opacities. Complications seen included acute hypoxic respiratory failure (43%), renal failure (13%), septic shock (10%), cytokine storm (3%), and cardiomyopathy (3%). All nonsurvivors developed acute respiratory distress syndrome prior to death. Of the survivors, 21 (70%) were relieved and were discharged. **Conclusion:** The most common presenting symptoms included fever, cough, and shortness of breath. Patients who required ICU admission at presentation had a worse prognosis. Those with greater severity of symptoms were mainly elderly patients among which the most common comorbidity was hypertension followed by cardiac disease.

**Keywords:** COVID, geriatric, geriatric population

## INTRODUCTION

The Epidemiologic data published on COVID19 reports a replication factor of R0 2.2–2.68 and doubling every 6.4–7.4 days.<sup>[1,2]</sup> As of April 30, 2020, the Centers for Disease Control and Prevention, USA (CDC) reports 1,005,147 total confirmed US cases with 57,505 deaths related to infection with cases in every state and the district of Columbia.<sup>[3]</sup> As of the date of this writing, 32,318 cases have been confirmed in the state of Florida.<sup>[4]</sup> With multiple epicenters expanding in large US cities, multiple international cruise ships porting in Florida, and spring break travel to internationally recognized beaches, a surge in cases is anticipated. Two confirmed cases were first reported in Florida on or around February 3, 2020. We examined the first 30 cases of laboratory confirmed 2019 novel coronavirus (2019-nCoV) at a large, community

hospital that serves a predominantly geriatric population in the community (situated on Central Florida's Gulf Coast) to identify presenting symptoms, clinical features, and outcomes of patients under investigation for COVID-19.

## METHODS

Sarasota Memorial Hospital (SMH) is a county, not-for-profit 839-bed level-2 regional trauma center, level-3 neurointensive

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intensive care unit (ICU), and comprehensive stroke and cardiovascular center located on Florida’s Central Gulf Coast. SMH is a regional campus for third- and-fourth year clinical education for Florida State University College of Medicine and sponsoring institution of Florida State University ACGME-accredited Graduate Medical Education with a total anticipated graduate medical education cohort of 60 combined residents and fellows in July 2020. Institutional review board approval from SMH was obtained and all laboratory-confirmed 2019-nCoV patients were deidentified and data were collected. We performed a single-center, retrospective review of the first 30 patients with reverse transcriptase–polymerase chain reaction confirmed 2019-nCoV infection between March and April 2020. Deidentified patient data included comorbid conditions, home medications, presenting symptoms, vitals, history of travel, emergency department (ED) length of stay, inpatient length of stay, abnormal admission laboratory and radiology findings, treatment medications received (specifically chloroquine/hydroxychloroquine, antibiotics, and tocilizumab), need for mechanical ventilation, disease complications (shock, acute respiratory distress syndrome [ARDS], and cytokine storm), and final outcome (discharged or deceased). Chest radiographs and computed tomography scans were officially interpreted by board-certified radiologists and their interpretations evaluated by the researching physicians. No follow-up of patients after discharge was performed.

## RESULTS

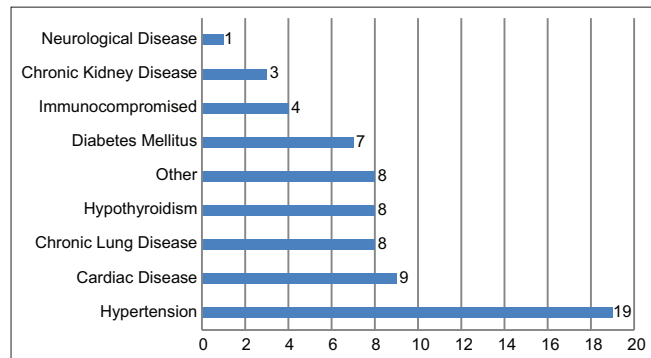
This study included all 30 patients who were admitted between March 1, 2020, and April 15, 2020. Most patients were elderly (26 [86%]; average age 70 years [range: 38–90] years), and 57% were men. Only 13 (43%) had any travel history outside the region, and most had a comorbidity (25 [83%]) [Figure 1]. Fever, cough, and shortness of breath were common presenting symptoms [Table 1]. The mean hospital stay was 12.4 days (range: 1–26 days, ±10 days). Twelve patients (40%) had a temperature >100.0°F on presentation. Seven patients (23%) had a heart rate of more than 100 bpm and 16 (53%) had a respiratory rate

equal to or more than 20 breaths per minute. Almost all the patients had PaO<sub>2</sub> more than 90% except two who has PaO<sub>2</sub> of 89%. On presentation, 10 (33%) patients required ICU admission, 17 (57%) patients were admitted to the medical floors, and 3 (10%) patients did not require admission and were sent home to self-isolate. Of the 10 patients who required ICU, 2 patients were eventually downgraded to the medical floors. Of the 17 patients admitted to the medical floors, 1 required ICU transfer. An angiotensin-converting enzyme/angiotensin receptor blocker was part of the home medication of 37% of the patients and 10% endorsed recent ibuprofen use.

**Table 1: On admission characteristics of the first 30 patients with COVID-19 in a Florida Community Hospital**

Baseline characteristics	Number of patients (%)	Reference range
<b>Symptoms</b>		
Fever	25 (83)	
Cough	21 (70)	
Other	19 (63)	
Shortness of breath	13 (43)	
Chills	8 (27)	
Diarrhea	5 (17)	
Myalgias	3 (10)	
Rhinorrhea	3 (10)	
Nausea/vomit	3 (10)	
Abdominal pain	1 (3)	
Sore throat	1 (3)	
Headache	0 (0)	
<b>Vitals, mean (range)</b>		
Temperature, degrees Fahrenheit	99.5 (97.1-102.3)	97-99
Heart rate, beats per min	86.4 (56-156)	60-99
Blood pressure, mmHg	130/71	<120/<80
Respiratory rate, breaths per min	20.5 (12-33)	12-20
<b>Laboratory measures</b>		
White blood cell count, uL	7020 (3200-17,200)	400-11000
Absolute lymphocyte count, uL	979.3 (256-2414)	1000-3400
Hemoglobin, g/dL	13.3 (8.8-16)	11.2-15.7
Platelets count, ×10 <sup>3</sup>	225.4 (100-483)	182-369
C-reactive protein, mg/dL	13.2 (1.1-28.7)	<0.3
Westergren sed rate, mm/h	57 (37-73)	0-20
Ferritin, ng/mL	913 (224-2635)	26-388
Dimer quantitative, mg/L FEU	2.70 (0.27-35.20)	0.00-0.49
Lactic acid, mmol/L	1.22 (0.6-2.4)	0.4-2.0
Lactate dehydrogenase, U/L	458.2 (171-1036)	87-241
Alanine aminotransferase, U/L	49.24 (13-138)	5-50
Aspartate aminotransferase	52.8 (12-154)	5-40
Alkaline phosphatase	70.9 (30-215)	31-120
Total bilirubin	0.53 (0.02-1.2)	0-1.5
Creatinine, mg/dL	1.17 (0.57-2.62)	0.6-1.2
ProCalcitonin, ng/mL	0.17 (0.04-1.05)	0.05-0.50
Brain-type natriuretic peptide	891 (16-4078)	<450
Troponin level >0.3 ng/mL, n (%)	1 (3)	

FEU=Fibrinogen equivalent units



**Figure 1: Comorbidities in a study patients (n = 30). Note: A total of 17 Patients had multiple comorbidities**

Abnormal imaging on presentation was present in 24 (80%) of the patients; nonspecific bilateral opacities (11 patients [46%]) being the most common followed by ground-glass opacities (10 [42%]). The average white blood cell count at presentation was 7020 Fibrinogen equivalent units of which 18 patients had normal values. Sixteen (53%) of the patients had an absolute lymphocyte count of <1000 cells/uL. The average platelets were  $225.5 \times 103/uL$ . Of the 30 patients, initial laboratories of 5 patients were significant for the presence of both leukopenia and thrombocytopenia. Elevation of all three such as C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and D-dimer was seen in 7 patients. A total of 12 patients (40%) had abnormal liver function tests in the form of raised liver enzymes.

Mechanical ventilation was initiated in 9 patients of which 7 (78%) developed ARDS. None of the patients included in this analysis were in shock at initial presentation, but 8 (27%) patients eventually required vasopressor support throughout their hospitalization. Complications seen included acute hypoxic respiratory failure (43%), renal failure (13%), septic shock (10%), cytokine storm (3%) and cardiomyopathy (3%) [Table 2].

A total of 13 patients were treated with hydroxychloroquine and 1 patient was treated with chloroquine. Thirteen patients were also treated with azithromycin and 3 with tocilizumab. Seven patients received a combination treatment with both chloroquine/hydroxychloroquine and azithromycin, of which 4 (57%) developed QTc prolongation. Of the 30 patients in this series, 5 (17%) died. All patients who died were elderly male (mean age 75 years), had a comorbidity, had an elevated lactate dehydrogenase, D-dimer, and CRP (mean values 346 IU/dL, 1.7 mg/dL, and 14.12 IU/dL, respectively). All

of them developed ARDS prior to death. Of the survivors, 21 (70%) were relieved and were discharged and 4 (13%) are currently hospitalized with 2 still in the ICU.

## DISCUSSION

The rapid global spread of 2019-nCoV has quickly brought to light the various presentations and primary clinical features of patients presenting to the EDs with concern for 2019-nCoV infection.<sup>[5,6]</sup> Varied clinical characteristics have been reported, most commonly fever with nonproductive cough, with a minority of presentations including headache, myalgias, and even less frequently gastrointestinal symptoms including nausea, vomiting, or diarrhea<sup>[7]</sup> Not surprisingly, average admission laboratory results show systemic inflammatory response with an elevation of nonspecific ESR and CRP; however, there was no significant leukocytosis. It is worth noting an average elevated D-Dimer among admitted patients. Even accounting for age adjustment, this marked elevation suggests related coagulopathy. In the setting of tachypnea and tachycardia as represented in our patient cohort, it would be reasonable to consider a related venous thromboembolism in patients under investigation for 2019-nCoV infection. While our analysis did not include arterial blood gas measurements, consider arterial or venous blood gas sampling liberally while caring for patients under investigation. With that in mind, treatment strategies to consider could include permissive hypoxia in admitted patients with appropriate mentation without significant respiratory distress. This may help to alleviate the ventilator availability burden; however, further discussion and research are warranted.

Our analysis discovered 2019-nCoV infection carried a mortality rate of 13%, with one-third of patients requiring ICU-level care at presentation. As described,<sup>[8]</sup> the most notable and concerning clinical finding on presentation was the presence of bilateral respiratory infiltrates. It is not surprising that the most common complication associated with 2019-nCoV infection was acute hypoxic respiratory failure. We also noticed that patients who were mechanically ventilated had a high incidence of ARDS. Management of airway in cases infected with new coronavirus disease, COVID-19 is a challenge and not only needs the optimization of patient care but also the protection of the health-care workers.<sup>[9]</sup> Although this is not a discussion of treatment strategy, our review suggests this novel infection requires a novel approach to airway management of critically ill patients. Discussion among emergency physicians and residents caring for patients under investigation for 2019-nCoV infection at SMH suggests a non-traditional approach to airway management. In view of the geriatric population involved, there was a low threshold for intubation and mechanical ventilation in the present series; however, it was not determined whether mechanically ventilated patients were intubated strictly for respiratory failure without hypoxia, airway protection, or strictly for oxygenation.<sup>[10]</sup>

**Table 2: Clinical outcomes of the first 30 patients with COVID-19 in a Florida Community Hospital**

Parameter	Value
Length of stay, mean (range)	
Emergency department, h	2:57 (0:27-6:33)
Hospital, days	10 (1-24)
Complications, number of patients (%)	
Acute hypoxic respiratory failure	13 (43)
ARDS	7 (23)
Renal failure	4 (13)
Septic shock	3 (10)
Cardiomyopathy	1 (3)
Cytokine storm	1 (3)
Clinical measures	
Mechanical ventilation	10 (33)
Vasopressors	8 (27)
Outcomes	
Deaths	5 (17)
Discharged	21 (70)
Remains hospitalized*	4 (13)

\*Of the 4 patients in hospital, two are in ICU. ARDS=Acute respiratory distress syndrome, ICU=Intensive care unit

At present, no proven effective therapeutic agent is available to manage SARS-CoV-2 infection; however, many potential drug and drug targets are under investigation.<sup>[10]</sup> Standard pharmacotherapy for patients under investigation consisted of the combination of azithromycin with hydroxychloroquine.<sup>[11]</sup> This combination commonly resulted in prolongation of the QTc<sup>[11]</sup> and this can be more problematic in the elderly population. As a result of this, recommended treatment of future patients under investigation includes doxycycline for antibiotic coverage instead of azithromycin. Additional pharmacotherapies are currently being pursued. As of this writing, SMH and Florida State University College of Medicine Graduate Medical Education are actively collaborating in clinical trials for the treatment of 2019-nCoV infection including remdesivir and convalescent plasma. It is shown that a combination of remdesivir (has antiviral drug) and chloroquine (has antiviral and immune-modulating activity) can be effective against 2019-nCoV virus infection; however, there is a need for more evidence.<sup>[12]</sup>

## CONCLUSION

This retrospective study represents the first 30 patient cases with SARS-COV-2 in a large, community hospital in Florida. Those with greater severity of symptoms were mainly elderly patients, among which the most common comorbidity was hypertension followed by cardiac disease. Similar to other reported data around the world, the most common presenting symptoms included fever, cough, and shortness of breath. This analysis further demonstrates how patients who required ICU admission at presentation had a worse prognosis and went onto develop acute hypoxic respiratory failure with ARDS. The limitations of this study included the small sample size of patients. The population of Sarasota is also mainly senior residents, and therefore, these analyses might not well represent the population of other areas of the world. The lack of uniformity of laboratory analysis on presentation added another restriction when mapping possible trends. At present, the efficacy of various treatments offered (Hydroxychloroquine (HCQS)/Chloroquine (CQ)) is uncertain. We did not stratify patients by HCQS usage, as a small dataset will be insufficient to draw any conclusions. Nevertheless, this retrospective

analysis provides good insight into the most common initial characteristics of COVID-19-affected patients which could hopefully help predict outcomes early on presentation.

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## Conflicts of interest

There are no conflicts of interest.

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