
Abstracts

□ CHARACTERISTICS AND OUTCOMES OF 21 CRITICALLY ILL PATIENTS WITH COVID-19 IN WASHINGTON STATE.

Arentz M, Yim E, Klaff L, et al. *JAMA*. Published online March 19, 2020. doi:10.1001/jama.2020.4326.

Severe acute respiratory distress syndrome coronavirus 2 (SARS-CoV-2) has spread from China across multiple continents and now is becoming more prevalent in the United States. The first area known to be affected has been in Kirkland, Washington. This case series reports characteristics and outcomes of these initial critical patients.

Patients included in this retrospective case series were admitted to the intensive care unit (ICU) at Evergreen Hospital between February 20 and March 5, 2020, and were positive for SARS-CoV-2 nasopharyngeal swab. Laboratory tests were included from the day of admission as well as day 5. Radiographic studies were interpreted by an intensivist and radiologist. Follow up was after 5 or more hospital days or death. Descriptive statistics were used.

A total of 21 patients were included. The mean age was 70 (range 43–92) and 52% were male. Nearly all (85%) had comorbidities, the most common being chronic kidney disease (47.6%), congestive heart failure (42.9%), chronic obstructive pulmonary disease (33.3%), and diabetes (33.3%). On presentation, 76.2% reported dyspnea, 52.4% had fever, and 47.6% had cough. Patients had symptoms for an average of 3.5 days before coming to the hospital. Notable mean laboratory values included white blood cell count of 9365/uL (range 2890–16900), creatinine of 1.45mg/dL (range 0.1–4.5), venous lactate of 1.8mmol/L (range 0.8–4.9), and procalcitonin of 1.8ng/mL (range 0.12–9.56). Three patients had an elevated troponin (>0.3ng/mL). Radiographic studies most commonly revealed bilateral reticular nodular opacities (52.4%), ground-glass opacities (47.6%), pleural effusion (28.6%), peribronchial thickening (23.8%), or focal consolidation (19%). Over two-thirds (71%) of patients required mechanical ventilation, on average within 1.5 days of admission. 57.1% of patients developed acute respiratory distress syndrome (ARDS), and half of intubated patients required prone positioning. Overall, most (67%) required vasopressors and one-third developed cardiomyopathy. At the time of the study conclusion, 11 (52.4%) had died, 2 (9.5%) had stabilized, and 8 (38.1%) were still critically ill on mechanical ventilation.

The authors discussed limitations including small sample size and skewed population as most were elderly residents of a skilled nursing facility.



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Comment: This is the first report of patients in the United States with confirmed SARS-CoV-2 (COVID-19). These critically ill patients had high rates of intubation, ARDS, and death. While most presented with dyspnea, many were afebrile and without cough. While such a small study has obvious limitations, this report underscores the importance of having high clinical suspicion for disease even if symptoms are atypical as many have rapid decline in respiratory status necessitating mechanical ventilation.

□ CLINICAL CHARACTERISTICS AND INTRAUTERINE VERTICAL TRANSMISSION POTENTIAL OF COVID-19 INFECTION IN NINE PREGNANT WOMEN: A RETROSPECTIVE REVIEW OF MEDICAL RECORDS.

Chen H, Gun J, Wang C, et al. *Lancet* 2020; 395: 809–15.

Multiple reports have been published recently on characteristics of patients with COVID-19 in the general population, but there is little information on pregnancy-related presenting symptoms and outcomes. The goal of this study was to report clinical data as well as incidence of vertical transmission in pregnant patients with COVID-19.

This retrospective chart review was performed on pregnant women admitted to Zhongnan Hospital of Wuhan University in China with confirmed COVID-19 between January 20 through January 31, 2020. Clinical, laboratory, and radiologic records were reviewed by two investigators. Additionally, analyses from amniotic fluid, cord blood samples, and neonatal throat samples from the time of delivery were included. Vertical transmission was defined as positive testing for COVID-19 in these samples. Descriptive statistics were used.

There were nine patients included in the analysis. All were in the third trimester on admission, the earliest presenting at 36 weeks, 2 days and all had a known source of exposure to COVID-19. None of the patients had baseline comorbidities, but one patient had gestational hypertension and another developed pre-eclampsia. The most common symptoms of COVID-19 were fever on admission (78%), postpartum fever (67%), cough (44%), myalgia (33%), and sore throat (22%). Most had low or normal leukocyte count (78%) and 5 (56%) had lymphopenia. C-reactive protein was greater than 10mg/L in 75% of patients. One was found to be co-infected with influenza, and all



were diagnosed with COVID-19 pneumonia and required oxygen therapy and antibiotics. Many (67%) also received antivirals. Regarding delivery, all nine were live births delivered via cesarean section with 1-min Apgar scores of 8-9 and 5-min Apgar scores of 9-10. Four of the 9 were delivered prematurely at 36 weeks (44%) for a variety of reasons including premature rupture of membranes, pre-eclampsia, or pneumonia. None of the fluid samples at birth were positive for COVID-19. Additionally, all of the mothers and babies were discharged from the hospital.

Limitations discussed include the retrospective nature of data abstraction and small sample size. Additionally all patients enrolled were in the third trimester. The authors concluded that pregnant patients with COVID-19 present with similar symptoms as nonpregnant patients. Also, based on this limited sample, the mothers had a low risk of complications and all of the infants tested negative for COVID-19 after birth, suggesting that vertical transmission is unlikely.

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Comment: There are still many uncertainties about the disease course of COVID-19 in pregnant patients. This review is reassuring, however this is a very small sample size so caution should be used in applying these results to our day to day patients, especially those at earlier gestational ages. More studies should be conducted on pregnant patients with COVID-19 in all trimesters to have a more accurate picture of how this virus affects pregnancy-related outcomes.

□ CLINICAL CHARACTERISTICS OF CORONAVIRUS DISEASE 2019 IN CHINA.

Guan W, Ni Z, Hu Y, et al. *N Engl J Med*. 2020 Feb 28 [Online ahead of print] DOI: 10.1056/NEJMoa2002032.



The novel coronavirus (SARS-CoV-2, causing COVID-19) was originally isolated in Wuhan, China. This virus spread quickly throughout many countries in Asia and now Europe, Australia, North America, leading the World Health Organization to declare COVID-19 a pandemic. Given the rapid spread of cases, the authors sought to provide analysis of patients with COVID-19, their clinical characteristics, and severity of disease.

This was a retrospective review of Chinese medical records for laboratory-confirmed COVID-19 reported to the National Health Commission between December 11, 2019 to January 29, 2020. Electronic medical records were used to record various clinical data including exposure risk, signs and symptoms, laboratory findings, and radiologic findings. Several researchers performed chart abstraction and disagreements were made by a third reviewer. If radiologic findings were included, these were reviewed by respiratory medicine attending physicians who interpreted the findings. Incubation periods of less than 1 day were excluded. Fever was defined as an axillary temperature of 37.5 degrees Celsius or higher. Patients were categorized into severe or nonsevere based on the American Thoracic

Society guidelines for community acquired pneumonia. The primary composite endpoint was admission to the intensive care unit (ICU), use of mechanical ventilation, or death. Secondary outcomes included death rates from symptom onset until each component of the composite end-point.

There were 7736 patients admitted at 552 sites during the study period and data were obtained on 1099 patients (14.2%). The majority were nonsevere disease (926, 84.3%). The median age was 47 years (IQR 35-58), 41.9% were female, and most were nonsmokers (85.4%). Any comorbidity was recorded in 23.7% of patients, with hypertension being the most common (15.0%). The majority of patients (72.3%) had recent contact with a Wuhan resident, although 25.9% had no reported exposure. The median incubation period was 4.0 days (IQR 2.0-7.0). Regarding symptoms, only 43.8% of patients had fever on presentation but 88.7% developed fever during hospitalization. Besides fever, the most common symptoms overall were cough (67.8%), fatigue (38.1%), sputum production (33.7%), and shortness of breath (18.7%). Chest radiograph findings were available for 274 patients, with the majority being abnormal (59.1%). Findings included bilateral patchy shadowing (36.5%), local patchy shadowing (28.1%), ground-glass opacity (20.1%), and interstitial abnormality (4.4%). Chest CT results were available on 975 patients. The majority (86.2%) were abnormal and consisted of ground-glass opacity (56.4%), bilateral patchy shadowing (51.8%), local patchy shadowing (41.9%), and interstitial abnormalities (14.7%). Laboratory testing was available on most, depending on the test, and showed a median white blood cell count of 4700/mm³ (IQR 3500-6000), elevated C-reactive protein (>10mg/L in 60.7%), and normal procalcitonin (<0.5ng/mL in 94.5%). Other notable laboratory abnormalities included elevated D-dimer (> 0.5mg/L in 46.4%) and elevated LDH (>250U/L in 41%). The most common complications were pneumonia (91.1%) followed by acute respiratory distress syndrome (3.4%) and most common treatments were intravenous antibiotics (58.0%), oxygen therapy (41.3%), and oseltamivir (35.8%). Systemic glucocorticoids and immune globulin were less common therapies, and mechanical ventilation was needed in only 6.1%. At the conclusion of the study, 15 (1.4%) of patients had died and 55 (5.0%) had been discharged from the hospital. The majority of the remaining patients were still hospitalized. Regarding the composite endpoint, there were 67 patients (6.1%) with ICU admission, mechanical ventilation, or death, leading to a cumulative risk of 3.6%. This percentage increased if you were designated as severe disease; in this case 24.9% had the composite outcome, leading to a cumulative risk of 20.6%.

The authors concluded that presenting symptoms and workup can be variable, with many patients being afebrile and having normal radiologic studies. Several limitations were noted including missing data for many on incubation periods. Additionally the majority of the patients were still hospitalized at the end of the study and therefore outcomes could not be provided for those patients.

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